Guidelines and Roadmap for full deployment of e-governance systems in Africa

Final Report

January 2019

International
Cooperation
and Development

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Service Contract NO: 387-517

The report was commissioned by unit C5 (Cities, Local Authorities, Digitalisation, Infrastructures) of the Directorate-General for International Cooperation and Development.

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Abbreviations

AU	African Union
CEN-SAD	Community of Sahel-Saharan States[1]
COMESA	Common Market for Eastern and Southern Africa[2]
EAC	East African Community[3]
ECCAS	Economic Community of Central African States[4]
ECOWAS	Economic Community of West African States[5]
eGA	e-Governance Academy of Estonia
EU	European Union
ICT	Information and Communication Technologies
ITU	International Telecommunications Union
NeGSt	National e-Government Strategy
NGO	Non-Governmental Organization(s)
OSI	Government Online Services index
SADC	The Southern African Development Community[6]
UN	The United Nations
UNCTAD	United Nations Conference on Trade and Development
WEF	The World Economic Forum

[1] Benin, Burkina Faso, Central African Republic, Chad, Comoros, Cote d'Ivoire, Djibouti, Egypt, Eritrea Gambia, Ghana, Guinea, Guinea Bissau, Libya, Liberia, Kenya, Mali, Mauritania, Morocco, Niger, Nigeria, Senegal, Sierra Leone, Somalia, Sao Tomé and Principe, Sudan, Togo, Tunisia
[2] Burundi, Comoros, Democratic Republic of Congo, Djibouti, Egypt, Ethiopia, Eritrea, Kenya, Libya, Madagascar, Malawi, Mauritius, Rwanda, Seychelles, Sudan, Swaziland, Uganda, Zambia, Zimbabwe
[3] Burundi, Kenya, Rwanda, Tanzania, Uganda, South Sudan
[4] Angola, Burundi, Cameroon, Central African Republic, Chad, Democratic Republic of Congo, Equatorial Guinea, Gabon, Congo, Rwanda, Sao Tomé and Principe
[5] Benin, Burkina Faso, Cape Verde, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Togo
[6] Angola, Botswana, Malawi, Mauritius, Mozambique, Namibia, South Africa, Zambia, Zimbabwe, Tanzania, Lesotho, Swaziland

Executive summary

We are experiencing a global Digital Revolution of the same magnitude of the Industrial Revolution of the 19th century. Digital technologies – relying on Information and Communication Technologies (ICT) - and the services they support are enablers of sustainable development and inclusive growth. Africa, with over 400 million mobile internet users and numerous sectorial leap-frogging innovations, demonstrates unprecedented growth of digital technologies. Africa is not homogenous but there some similarities between countries. Often, the full potential of digital technologies is not used, while development is rapid although with big differences between urban and rural areas. There are unique opportunities to use ICT for economic growth, productivity increase and better service delivery. It is timelier than ever for governments to create strong, enabling e-governance systems. Governments should ensure the best possible use of digital technologies for the benefit of the people, act as facilitators, enablers and regulators, involving all stakeholders through transparent cooperation.

The implementation of e-governance should be a comprehensive process, in which organisational and regulatory issues are addressed in addition to technology. The process should be adapted for each country, as e-governance should not be seen as separate from the general governance of the State. There is a need for support from top political leadership and for high-level coordination. The recognition of what e-governance means is still in its infancy with no clarity on key concepts. Generally, it should include some interactivity in addition to electronic access to information. For this study, the word "e-governance" is used as a wide concept that includes services for a public purpose carried out as a private service.

The relevant steps needed to achieve e-governance are listed and analysed, leading to suggestions on how they can be supported. Each country will need a different number of the steps, in different order, depending on their ICT availability and use, the current status of e-governance and their structure of, and choices for, governance in general. The report contains an analytical composite of what e-governance consists of and what the situation in different countries is like. Data gathering, mapping and inventory of existing approaches and activities has been performed, based on publicly available data from international organisations - including rankings performed by international organisations - as well as independent data gathering and expert analysis by eGA experts.

Key elements of e-governance can be divided into two complementary sections: digital elements directly connected to technology and analogue elements, supporting technology.

Key digital elements include:

- Government portals;
- Digital databases and digitisation of records;
- Secure exchange of data;
- Secure digital identity and digital signature;

- Infrastructure issues;
- Sectoral solutions (tax administrations are examined as an example).

Key analogue elements include:

- International frameworks;
- Legal framework (legislation and regulations enabling digital transactions and protecting privacy);
- Coordinating institutions;
- Political will and change management;
- Access to services;
- Awareness raising.

The situation in Africa regarding these elements is as follows: There are government portals in most African countries although in some cases these are limited to for example the President´s office or lack updated information. The status of portals has been determined based on indexes evaluating these or governments´ performance in delivering online services plus additional research by eGA experts. The extent of digital databases and digital exchange of data is difficult to identify, as it is spread between many different organs often without centralised handling, but most countries are in the process of digitising records even if a lot of data is still in analogue form. The indicator used to assess digital identity/signature is existence of national IDs with some electronic components that can be used for digital authentication purposes. At least twelve African countries had (in 2016) such IDs. The most ambitious ongoing project is the ECOWAS Biometric Identity Card. Regarding infrastructure matters and access to ICT, there is quite a lot of information available through various organisations such as the ITU and the World Bank, looking at broadband and telephone subscriptions and similar although some data is outdated or using less relevant indicators. The access to broadband internet is often not very well developed although the situation in North Africa and in the SADC countries is better than elsewhere. The penetration of mobile telephony and to some extent mobile internet is high in almost all parts of Africa. The analysis of tax administrations, performed by eGA experts, shows how an e-governance service is provided in practice, with a thorough analysis of the ease of access to information and availability of electronic services. Differences between countries are big, in some cases differing from the situation shown by existing indexes.

Moving to analogue elements, the efficiency of supporting international frameworks cannot be measured with quantitative indicators but is based on eGA expert´s analysis. The qualitative analysis is supplemented with data on the status of signing and ratifying international agreements like the Data Protection Convention and the Convention on Cybercrime. The legislative situation is indicated by listings of existing legal acts, analysis of these and the general legal situation, to the extent possible. e-governance does not require a lot of designated legislation, but rather an analysis of the total legal situation plus legislation to ensure recognition of electronic identities/signatures and electronic documents. Attention should be given to data protection. Various regional efforts exist, like a 2014 AU Convention on Cyber-security and Personal Data Protection, which however has very few parties. ECOWAS has adopted an act on data protection, EAC a Framework for Cyberlaws and COMESA a Model Law on Electronic Transactions.

Cybercrime legislation exists or is being developed in many countries. As to supporting organisations, the lack of a clear focal point for introduction of e-governance and coordination of digitisation is a problem all over the world, including Africa. The types of organisations responsible for e-governance vary significantly between countries. The analogue elements include "soft" matters like political will and awareness, which are assessed based on expert analysis, existing surveys and study of policy documents that signal political commitment. Overcoming resistance to change is one of the greatest challenges for implementing effective e-governance. The cross-governmental nature of the changes that need to be implemented adds complexity.

For ease of reference and overview, the report divides countries into three main groups. The first group consists of twelve countries (Botswana, Cape Verde, Egypt, Ghana, Kenya, Mauritius, Morocco, Namibia, Rwanda, Seychelles, South Africa, Tunisia) that have implemented various services, have an organisational structure and at least basic regulation, and in most cases some form of digital ID and interoperability. On-line services are generally accessible and well presented. These countries have preconditions for continued development and can act as regional examples and leaders. The second group is the biggest one (26 countries) and the most diverse, so it has been further sub-divided into three tiers (1: Algeria, Benin, Lesotho, Nigeria, Swaziland, Tanzania, Uganda, Zimbabwe; 2: Angola, Burkina Faso, Cote d´Ivoire, Gabon, Madagascar, Mozambique, Sao Tome and Principe, Senegal, Togo, Zambia; 3: Cameroon, Comoros, Ethiopia, Gambia, Liberia, Libya, Mali, Sudan). These countries have undertaken some work toward e-governance but not reached the same level as those in Group 1. Finally, the third group contains 16 countries (Burundi, Central African Republic, Chad, Congo, Democratic Republic of Congo, Djibouti, Eritrea, Equatorial Guinea, Guinea, Guinea Bissau, Malawi, Niger, Sierra Leone, Somalia, South Sudan) with a low level of development, unrest or extreme poverty that are lagging behind in many respects. Even if e-governance can be useful for such countries and may allow to leap-frog to faster development, there could be issues with finding adequate national capacity for knowledge transfer and sustainability of reforms.

The benefit of the grouping of countries is to highlight what type of activities and thus what type of support is suitable. For the countries in group 1 support can be given in the form of advanced sectoral solutions (to e.g. tax administrations, customs, education) or cross-sectoral enablers (interoperability, secure digital identity) to build upon existing solutions. Projects could include more than one country, so that several countries at a similar level but with existing solutions in different domains can share expertise and experience, or that states that have reached a higher level can support others by presenting examples. For Group 2 it is likely that more basic support may be needed, especially in the lower tier (like awareness-raising, basic regulatory adjustment or technical support). Projects should also here be regional or at least involve more than one country. Group 3 can benefit from basic assistance and the example of more advanced countries.

Steps to move to a higher level include adoption of specific and workable strategies and programmes as well as necessary legislation; creation and/or empowerment of a responsible organisational structure; improved availability and accessibility of on-line

information and services; attention to awareness-raising; introduction or improvement of e-identification; improved technical infrastructure; and increased involvement in international (regional, cross-border) initiatives. A country that wants to build e-governance should assess its level for the required prerequisites and, if necessary, bring them to the appropriate minimum level.

The report proposes a matrix as a tool for indicating the level of e-government and determining the key elements that should be addressed, with work on different issues proceeding in parallel. A roadmap shows in a brief but comprehensive manner the different steps. Both the matrix and roadmap can serve as a checklist for national responsible persons as well as the EU for evaluation and policy development. In addition, specific activities are suggested per group, to support national capacity building and the creation of clear organisational structures (including ensuring high-level leadership, financing, proper analysis of the legal framework, citizen engagement, digital identity, digital data handling, interoperability); and to support regional cooperation both outside and within existing regional and sub-regional organisations to achieve mutual support and synergies between countries at different levels and in different situations.

Chapter 1. Introduction

Digital technologies – relying on Information and Communication Technologies (ICT) - and the services they support - are enablers of sustainable development and inclusive growth. The role of governments in the creation of a modern information society that ensures the best possible use of digital technologies for the benefit of the people, is to act as facilitators and leaders, but also as enablers and regulators. Given the limited resources of governments, the involvement of all stakeholders through transparent cooperation is essential. In this way, the benefits of digital technologies can be used for the improvement of the lives of all categories of people, including in poorer states and regions. One important potential benefit of digital technologies is the improved accessibility and transparency of governance.[7]

Even if the focus is not primarily on technology, it does not mean that connectivity and affordability of ICT are not relevant concerns. A lack of access to ICT prevents the development of e-services using digital technologies.[8] The implementation of e-governance[9] should however be a comprehensive process, not focused primarily on technology, but a process in which organisational and regulatory issues are addressed. If this is not done, there is a danger of a situation where instead of fully benefiting from modern technologies there will be problems such as digital data and transactions having no legal meaning; data not being re-used; service delivery processes just being copied from the paper era with no changes; computers used as typewriters; and even online application forms printed out in the government offices and data manually submitted. With an exclusively technology-focused approach, there may be functional technology in place, but it may not be integrated into the government processes in a sustainable way with proper institutional and legislative support, and there may be a lack of trained personnel. Such a situation often means that few services are in place, which leads to a vicious circle as e-governance will be seen as ineffective and it may take years to convince government departments and their legal offices or citizens to use the technology.

In addition to the necessity of a comprehensive process, the process must also be adapted for the country it is taking place in. The system of governance is a core part of the identity of the State and something which it would be unsuitable as well as unethical for external forces to impose on sovereign countries. E-governance is an integral and indivisible part of the governance of a country. In this respect, it is important to keep in mind that e-governance is a way to conduct *governance*: not something separated from the governance of the State. Digital technologies are used to improve governance and not for their own sake. There are many different ways in which e-governance can support society, including open public data, involvement of citizens in the decision-making process or providing services like paying taxes on-line. The many aspects of e-

[7] Commission Staff Working Document "Digital4Development: Mainstreaming digital technologies and services into EU Development Policy", Brussels 2.05.2017 SWD (2017) 157 Final, p. 5.
[8] R. Heeks (2010) "Do information and communication technologies (ICTs) contribute to development?" *Journal of International Development,* 22(5), pp.625-640.
[9] Please see the definition in Annex 11 – Glossary.

governance explain why to properly implement the changes necessary for successful e-governance, there is a need for support from top political leadership and for high-level coordination among government departments as well as among other actors. Such interventions support the creation of a sustainable social and economic environment that, in turn, supports the creation of new forms of entrepreneurship and civil society, diminishes bureaucratic barriers and separation lines and avoids the creation of "information have" and "information have-nots" social groups and regions. Without such support from the country in question, it will not be possible to implement sustainable e-governance.

The mentioned nature of the process of e-governance dictates the parameters to identify the various steps needed and analyse what it is in each step that is necessary and how this can be supported. Each country will need a different number of these steps and in different order, depending on the current status of their e-governance but also on their structure of, and choices for, governance in general. The basis for the grouping of countries is an analytical composite of what e-governance consists of and what the situation in different countries is like.

1.1. Objective and scope of work

The objective of the study is to provide an analysis of the potential for e-governance in Africa and to suggest the best way to move forward towards increased e-governance. The work consists of information gathering, consisting of compilation and assessment of existing public data as well as our own research. On the basis of this information, the report presents an evaluation and a ranking of countries. Furthermore, it suggests steps to be taken to progress toward improved e-governance.

Africa is a diverse continent, but even if the regional variations are big, it is true in most countries that the full potential of digital technologies is not yet being used. The countries show very varied development; some countries may be advanced in some things but behind in others, without it being evident which of these aspects should weigh heavier in the general evaluation. Within countries there are big differences between urban and rural areas, with many major urban centres in different countries showing evidence of what may soon come. In such areas, many persons have internet-capable devices, there are 3G networks up and running and 4G planned, as well as a growing wave of innovation both in public and private services. This shows the need for a narrative and not just lists of numbers to be able to explain the current status of e-governance. For example, Namibia is very advanced with interoperability of databases[10] – a key element of e-governance – whereas Nigeria is ahead when it comes to implementation of an e-ID by the National Identity Management Commission.[11] Rwanda[12] has been ambitious regarding internet access for the population, while Morocco[13] has quite a large number of public e-services. Even a country like Somalia

[10] http://ega.ee/project/governmental-interoperability-in-namibia (2016)
[11] National Policy and National Identity Management Commission Act (Act No. 23, of 2007). https://www.nimc.gov.ng/
[12] http://statistics.gov.rw/node/756
[13] http://www.egov.ma/fr

where government services are almost non-existent does not present a clear picture, as the country has a lively private ICT sector (albeit until recently with an absence of a regulatory framework).[14]

Where African countries have gone further in their development of e-governance, various implementation issues can be identified that may be useful as lessons for other states. For example, in Ghana the central database infrastructure for electronic IDs was completed, but data capturing did not take place until five years later, which led to inconsistency between the number of citizens registered for the programme and those with recorded data.[15]

There are many and increasingly important regional integration organisations in Africa. As opposed to Europe, in addition to the African Union (AU) there are important sub-regional organisations, but the AU shows signs of increasing activity in different spheres.[16] This includes e-governance, with for example an agreement on African partnership for the provision of digital identification from April 2016, when African leaders and development partners agreed on "a common approach for accelerating the provision of unique identification to millions of people in Africa as a means to foster more inclusive economies and greater regional integration."[17] The AU has expressed the potential for Africa to "leap frog into digital era and harmonise e-governance rules at the very early stage to ensure true interoperability".[18] The role of regional organisations both as a source of information and as a means to accelerate development is an important element of our study.

The short overview in this section illustrates the variety of issues that African countries are faced with and that we identify, list and systematise, as well as analyse in our report. We are aware that for some countries (like South Sudan or the Central African Republic) there is little to report and analyse, but for most countries there is a variety and a multitude of relevant issues. Some countries provide examples in some spheres – others in different ones, but the objective of this report is to provide a roadmap on how to progress with e-governance in Africa and what avenues there are to assist with this essential development. The report provides a comprehensive knowledge-basis for necessary policy choices in assisting the process of e-governance development.

[14] http://www.worldbank.org/en/news/feature/2017/10/02/legal-ict-framework-is-pivotal-moment-for-somalia (2017)
[15] R. Akrofi-Larbi "Challenges of National Identification in Ghana", *Information and Knowledge Management* Vol. 5 No. 4 2015. http://www.iiste.org/Journals/index.php/IKM/article/view/21651
[16] K. Nyman-Metcalf & I Papageorgiou Democracy through Regional Integration (Intersentia 2015), http://intersentia.com/en/shop/academisch/democracy-through-regional-integration.html
[17] Press release, April 15, 2016, https://au.int/web/en/pressreleases/20160415-0
[18] https://eeas.europa.eu/delegations/brazil/8093/eu-african-union-collaboration-on-egovernance-a-potential-to-accelerate-development-and-good-governance_en

1.2. Methodology

An essential component of the report is data gathering, mapping and inventory of the existing diverse approaches of African countries regarding e-governance, showing the heterogeneity of the current situation and preparedness of countries. Given the vastness of both the geographical area of study and the substantive area for analysis, it has been necessary to scale back the level of detail possible to research and to summarise the various indicators set out in the report. It is however possible to identify key digital and analogue elements for e-governance, illustrate the existing situation regarding e-governance development in African countries and determine the challenges and opportunities. To some extent, the method includes action research as we combine knowledge production and policy development (in the form of actionable recommendations).

Mapping and inventory of data
The analysis is based on publicly available data gathered by different international organisations, including rankings of e-governance or matters relevant to e-governance performed by international organisations. This includes the World Bank, the International Telecommunications Union (ITU, with for example the ICT Development Index), the World Economic Forum (WEF) and United Nations Conference on Trade and Development (UNCTAD). The United Nations (UN) has an e-government development index that covers only some aspects of the elements we have identified as essential for the purpose of this report. On legislation and organisational matters, some information is gathered for a number of countries through international organisations (like UNCTAD), national agencies (like data protection agencies) or privately by law firms and consultancies. Such listings are not complete, and it varies how updated the information is. Consequently, the work consisted of moving on from this initial and basic data gathering, to both analyse what can be found from the publicly available lists and compilations and to fill gaps plus verify the information through original research by the e-governance Academy experts (hereafter eGA experts).

Initially it was intended to also use expert opinions via questionnaire, but due to time constraints, the feedback to the questionnaire remained too modest. Therefore, the gathered answers were not used in this report as the sample threshold was not met.

Key elements of e-governance
The eGA experts have divided the key elements of e-governance into two sections. One section is "digital elements" and is directly connected to technology. The other section is "analogue elements" and supports the technology with regulations, organisation, financing, change management, raising awareness and political will. These sections are not opposed to, but rather complement, each other.
A selection of key digital elements includes:

- Government portal;
- Digital databases and digitisation of records;
- Secure exchange of data;
- Secure digital identity and digital signature;
- Infrastructure issues;

- Sectoral solutions (in the report only one sector - taxation - is examined).

A selection of key analogue elements includes:

- International frameworks;
- Legal framework (legislation and regulations enabling digital transactions and protecting privacy);
- Coordinating institutions;
- Political will and change management;
- Access to services;
- Awareness raising.

For a number of key elements there are no indexes or other quantitative indicators, as the issues do not permit quantification but require an analytical and qualitative approach. In most cases, this means that the report relies on eGA expert analysis.

Sectoral solution example: taxation

The above-mentioned digital elements serve as the foundation of e-government. On top of these basic elements there is the possibility to create an endless number of sectoral solutions, which can enable services in various areas: education, healthcare, taxation, law, economic development, agriculture, transportation, etc. Sectoral solutions can be supported with broader sectoral programs, such as for example, "ICT for Schools," "Mobile Solutions for Farmers," "Modernisation of Public Transportation and Ticketing," etc. As the development of sectorial solutions is the responsibility of many ministries and agencies or municipalities, it is not possible to focus on all of them in all African countries within the scope of this study. Therefore, the report focuses on one sector example – tax administration – as an example to a country's ability to introduce e-governance. The reasons for choosing tax administration are:

- It is a public office that exists in all countries and is unique in every country (cannot be "imported" as some other examples of sectoral solutions);
- It can be studied in all countries and regions;
- It is an administration that deals with a large amount of personal data and data about companies;
- It needs access to data from other databases (like the land registry, business registry);
- Many subjects (persons and companies) need to interact regularly with the tax administration, often by filling in forms;
- It illustrates all the above-mentioned elements of e-governance;

The situation analysis of tax administrations provides a litmus test and an illustration of how the various digital and analogue elements are represented and helps to make the grouping of countries.

Grouping of countries

The information used for the grouping and ranking of countries has not been previously gathered by international organisations into any comprehensive list, as it goes beyond the pure existence of websites or infrastructure. In addition, the eGA experts have analysed, country-by-country, the existence and usability of government portals, together with the existence of digital services, identifying bodies that are responsible for e-governance in African countries.

The categorisation of the countries is based on the most recent data about the present level of the e-governance critical components (key elements and indicators, in Annex 12). The analysis of the sources cited has been made by experts as the data is for the most part qualitative rather than quantitative. Given this nature of elements to be evaluated, the rankings made by various international organisations are also based on expert evaluation of various components. We use this "as-is", without questioning the analysis behind these rankings, but using them as one of several inputs to our eGA experts' independent ranking. The analysis and ranking of countries in categories as presented in the report should be viewed with caution as it was based on dates from when relevant data were available, which may not necessarily be fully valid at the date the report was elaborated.

The pre-requisite key elements, that comprise e-governance, were measured. Each key element had reference value what was summed up per each country. In case of global rankings, data was converted into African context, meaning that the higher-ranking countries attributed higher points, starting from 54 points as best ranking. In case of no data or non-existence of key elements, 0 points were attributed. All African countries are included in the ranking, as there is at least some information about all countries, even if some of them have very few digital activities. The calculation and division into groups can be found in Annex 12 in a separate spreadsheet "Grouping". The key indicators used for the ranking have equal weight.
This situation of a number of elements of equal weight or weight depending on very specific circumstances in any time and place can also be seen from the different position that states are given in indexes made by different organisations (see Annex 8).

While countries in Group 1 are leading on e-governance practices in most of the critical key elements, the countries in Group 3 lack the majority of these key elements or in many cases there is no comparative data available. It is not possible to use statistical analysis or other quantitative methods for grouping the countries as the issues that are determining for e-governance come from many domains in which quantitative analysis is not possible.[19] For that reason, in grouping of countries expert's qualitative analysis in the form of expert's personal experience with a country and key elements in question was used in upgrading and downgrading of countries. Short narratives on expert's

[19] Quantitative research is used to test or verify the appropriateness of existing theories to explain certain behaviour or phenomena, as opposed to developing new insights or constructing new theories to be able to understand social phenomena. Wing Hong Chui "Quantitative Legal Research" pp. 48- in M McConville and Wing Hong Chui (eds.) *Research Methods for Law* (Edinburgh University Press 2017) at p. 51. The description is applicable to other social science research than law and it adequately explains why quantitative research was not relevant for our report

opinion, meaning justification for moving the countries from one group to another (whether upgrading or downgrading), is provided in the main report as well as in its Annex 6.

The selection of the number of groups and of the division of Group 2 into three tiers has been made as a decision by the experts, based on the possibility to distinguish recognisable factors of similarity and difference on which to build the various levels. At the same time, we stress that the division is made for the purposes of this study and based on the criteria transparently shown, concerning the matters under investigation. It does not purport to be a general categorisation of African countries for any other purposes.

Threshold of the groups

Group 1	292- 840 points
Group 2 -Tier 1	207 -292points
Group 2 -Tier 2	142- 207 points
Group 2 -Tier 3	97-142 points
Group 3	97-

Deployment matrix and roadmap

Based on the analysis of the current situation in African countries, a deployment matrix is presented, differentiating the steps leading to the full deployment of e-governance systems including key elements. The matrix can be considered as a tool for indicating the level of e-government in a country and to determine the key elements that should be addressed for development of e-governance as well as how to advance from one level to another.

The matrix and roadmap provided are not tools for use in a pre-defined manner by external actors, but tools supporting the relevant governments in their determination of how to proceed with e-governance. Any country, regardless of its current level, can use the matrix to identify what key elements e-governance consists of in order to determine how to develop work on the matter. The exact order will have to be decided by each state as there are many ways in which to achieve an equally good result.

Recommendations for deployment of e-governance

The study presents guidelines and recommendations: a description of activities for deployment of e-governance, identifying possible areas for pilot projects and digital transformation for groups of countries, focusing on selected categories.

1.3. Terminology

The recognition of what e-governance means is in many ways still in its infancy in many countries. Clarity of concepts is not helped by the fact that there is no coherent terminology, although with the spread of certain technical and legal solutions, such terminology is gradually being created. Even the term "e-governance" itself is not universally used in the same way. The Council of Europe in one of the relatively few international legal instruments on e-governance, Recommendation Rec (2004)15, refers to Electronic Governance or e-governance without a definition, but with an understanding that the term is self-explanatory.[20] The Council of Europe employs the term "eGovernment" and generally focuses on eGovernment in the context of open government services,[21] thus looking at what the new forms of governance can be used for rather than the technology as such. This approach fits well with the EU promotion of technology neutrality in its policies and legal acts. The World Bank also links the benefits of e-government to the definition: *"E-Government" refers to the use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government. These technologies can serve a variety of different ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management. The resulting benefits can be less corruption, increased transparency, greater convenience, revenue growth, and/or cost reductions."*[22]

As seen, the term e-government is used almost interchangeably with e-governance. For this study, the word "e-governance"[23] will be used as this concept is wider and can better include, for example, services that may be for a public purpose but carried out as a private service. It is however clear that countries talk about introducing e-governance or e-government when they facilitate access to information by electronic means, even without any interactivity. Legislation related to e-governance quite often only deals with rather basic use of ICT in public administration, to facilitate administrative work.[24] This study concentrates on services that include more than just accessing information,

[20] Recommendation Rec (2004)15 adopted by the Committee of Ministers of the Council of Europe on 15 December 2004 and explanatory memorandum, www.coe.int.
[21] For example, https://joinup.ec.europa.eu/community/opengov/og_page/ogs-study
[22] http://web.worldbank.org/ (e-Government – Definition of E-Government)
23 E-governance is the application of information and communication technology (ICT) for delivering government services, exchange of information, communication transactions, integration of various stand-alone systems and services between government-to-customer (G2C), government-to-business (G2B), government-to-government (G2G) as well as back office processes and interactions within the entire government framework (Saugata, B., and Masud, R.R. (2007). Implementing E-Governance Using OECD Model (Modified) and Gartner Model (Modified) Upon Agriculture of Bangladesh. IEEE. 1-4244-1551-9/07)
[24] As in some European examples, like the French Ordinance on electronic interactions between public services users and public authorities and among public authorities (Ordonnance n° 2005-1516, 8 décembre 2005 relative aux échanges électroniques entre les usagers et les autorités administratives et entre les autorités administratives http://www.legifrance.gouv.fr/ ; the Polish 2005 Act on the Computerisation of the Operations of the Entities Performing Public Tasks http://www.mswia.gov.pl/portal/pl/; the Swedish Open Government Action Plan, Bill 2009/10:175 Public administration for democracy, participation and growth (www.opengovpartnership.org/file/938/download).

although there is also mention, where and when relevant, to existing access to information tools. Such tools may for example be the first step towards creating interactive e-governance.

Chapter 2. Pre-requisites for successful e-governance

This Chapter gives an overview of the basic key elements for successful e-governance, starting with the elements that have a specifically digital nature.

2.1. Basic Digital Elements

2.1.1 Government portal, digital databases and secure exchange of data

The central point of access to governmental online services are government service portals. Service portals play a crucial role when efficiency of public administration, public services and user centric benefits are analysed.

Such portals are the central information gateways to all government services, both offline and online. The value of the offline information (i.e. information for reading without interactive services) is often underestimated. The information about the services should be clear, well organised and well presented. It should help individuals to understand how the government can assist them in various situations: registration of birth, getting married, finding a job, visiting a doctor, etc. Important improvements in accessibility and user-friendliness of government portals can be achieved through the harmonisation of explanatory texts in the web pages of different institutions, good design and lay-out, mobile-friendly sites and so on. A specific issue is the mobile messaging gateway, which provides the opportunity to send short messages (SMS) to mobile networks from the government portal. This can be a convenient and fast method to inform individuals, as a large number of people carry mobile phones. Mobile messaging can be used for individual or bulk messages (e.g. respectively as a reminder to pick up a new driving licence or to warn the population in a certain area of flooding).

From a technical point of view, government portals are usually divided into two layers: the presentation layer and the services layer. The presentation layer provides visual information while the services layer allows the creation of services: application templates, data queries and submission. If separated properly, changes in the visual layer (new visual outlook, changes in the texts, etc.) do not affect the technical capabilities of the portal. For services, it is important to also develop a payment gateway which allows governments to receive online application forms together with the payments for the government service fee.

Depending on the structure of the State, there may be centralised government portals only or also federal State, regional, municipal or other level portals. Services may be provided by one or different levels and what these levels are depends on the general structure of the administration and is normally not affected by e-governance as such, although in some States, a certain region may start with pilot projects for example.

In the creation of e-governance, databases provide a backbone. During the last decades, most governments have turned their data from paper to digital format or are in the process of doing so. Electronic databases are a prerequisite for many e-governance services. Key databases (often referred to as registries) normally include the civil registry (population register), the real estate registry (buildings, land cadastre and property ownership) as well as the business registry. These are main databases, as many others use data from them, while other registries tend to be more specific and in many instances link data with the main ones. Many e-services will use data from different databases, so interoperability of databases can provide important efficiency gains.

The main registries normally provide single identifiers for each person, part of land, and business unit that is usually a numeric code. These are personal ID (identity) numbers, business ID numbers and property ID numbers or codes. This helps to differentiate persons with the same name, to keep track of a company even if it changes the name and so on. Such identifiers can be used to keep track of data, allow for combinations of different data and in other ways promote e-services. Consequently, a clear and functioning system of identifiers is essential. It is common nowadays that new entries into main registries are made digitally while old records are in the process of being digitised. This can mean that there is a discrepancy between how data is kept depending on when someone was born or when a company was formed, but such discrepancies are diminishing each year as the process of digitisation proceeds. But in the absence of comprehensive records, digitisation will not solve problems. If the system of recording births does not function because people do not inform authorities or if people unofficially change names or other details, such issues will only be transferred to a digital format unless there is a change in the underlying reasons. [25]

Modern data handling provides opportunities to use a "once only" principle, meaning that governments can only ask for information once, following which the government agencies must share the data if needed.[26] What this means in practice is e.g. that the government cannot record the same data (like an address) in several databases, but only in e.g. the civil registry. To provide services, other government units will get the address from this registry and not ask it from the individual. This reduces the administrative burden for individuals and companies, as well as avoiding risks related to data duplication and quality. In order, not to add new risks when old ones are eliminated, there is a need to exchange digital data securely. There should not be any centralised databases, as this would provide risky single points of failure. Neither should sending copies of data via regular mail or on disks or flash drives be the methods used. A Secure Data Exchange Solution should meet the following criteria:

- Both sender and receiver of the data should be registered and verified, meaning identified through agreed procedures and mechanisms;
- The confidentiality of the exchanged data should be ensured with encryption;

[25] Commission Staff Working Document SDW (2017) 157 p 21.
[26] For this principle in Europe see https://ec.europa.eu/digital-single-market/en/news/eu-wide-digital-once-only-principle-citizens-and-businesses-policy-options-and-their-impacts (2017) or https://www.scoop4c.eu (2017)

- The data transactions should be timestamped, so that it is possible later to verify that at a certain moment the data in the database was as presented;
- Electronic records should be logged and archived to ensure a legal audit trail;
- There should be a proper legal status of data requests and answers.

Together with secure data exchange, digital information assets management should be organised, including proper information about the databases (registries), services and user rights. Digitisation should not be introduced in a vacuum, but as part of a set of structural measures to support improvement of key databases like civil registers - improving the integrity, effectiveness, and completeness of such registries, which is not just a technology issue. The reasons for incomplete or faulty registers are manifold with cultural issues, lack of accessible contact points with authorities and fear of insufficient data protection as some factors.

2.1.2 Secure digital identity and digital signature

In Africa, as in most parts of the world, governments are increasingly using e-governance solutions.[27] Starting with simple governmental information websites, the trend is towards integrated services that allow interaction with citizens, like filing documents online or paying taxes. As soon as e-government services begin to include interaction, the importance of a secure identification system comes into play. Many States have made progress on introduction of electronic identity (e-ID) but the penetration of such identification systems among the population as well as the number of services they can use varies and, in general, needs improvement. Sometimes a digital ID is in fact only a personal code in the form of numbers, but it is not linked to any electronic functions. One problem is that a number of countries have several different identification numbers (IDs) and systems, which when translated to the electronic world means a multitude of e-IDs, making their use complex and unattractive. This is the case e.g. in Tunisia with separate e-ID numbers for social security, pensions, hospitals and so on, as well as for Nigeria with a permanent voter's card, bank verification cards, driver´s licences and the National Identity Card that all are to some extent transitioning to electronic format and approaching recognised e-IDs. Despite advances in the use of electronic means, many hours that could be spent in productive activity are still lost for many African citizens because of the need to go to authorities, perhaps in far-away places, and line up for services.

For use of digital services, it is essential to have a digital identity and a digital signature that are secure enough to allow transactions to have legal value. Such identities must be securely connected to the physical identity and trusted by the government. The identities may be developed for specific services (like taxation or social security) but having too many different identities risks making these less attractive to use, as people do not easily remember the various codes and log-in details. It is possible to use the same identification systems for many services, including for public and private services. Financial institutions often provide digital identification systems, which presents a good

[27] Based on an analysis of the trends in various performance indexes, for example in ICT Development Index (by ITU) at https://www.itu.int/net4/ITU-D/idi/2016/index.html#idi2016rank-tab(Accessed August 2017)

opportunity for public-private-partnerships, as the requirements for a secure identification are similar as for public services.

The method of identification may include an identity card, like a smart card that contains machine-readable chips, containing not only the data fields visible on the card (including the person's photograph), but also data fields that may be readable only to particular state officials. However, a real digital identity should be possible to securely use online, for different transactions. Cards carry a digital identity on a chip - a set of data and software, protected with cryptographic means. To use those cards, individuals must have card readers in the computer (or plugged into the computer via the USB port) as well as special shareware (software usually free of charge and publicly available). The card carries a specific piece of individualised software - called the key – and users enter a PIN number to use the card plus usually a second number to provide a digital signature.

However, in a global perspective many people do not have access to computers, while access to mobile phones and mobile networks is very high. There are possibilities to use a mobile ID linked to Subscriber Identification Module (SIM) cards. A similar set of data and software, used in smart cards and protected with cryptographic means, is transferred to the mobile phone user´s SIM card. Technologies for secure digital identities and signatures may vary and there is no need to use identical means in different countries, but a certain interoperability and harmonisation as well as tools for mutual recognition are important.

Interoperability frameworks are an essential part of the Whole-of-Government Approach and enable the integration of different technological platforms and solutions into common solutions and services. From an e-governance perspective, interoperability refers to the collaboration ability of cross-ministerial and cross-border services for citizens, businesses and public administrations. Exchanging data can be a challenge due to language barriers, different specifications of formats and varieties of standards and categorizations.

If data is interpreted differently, collaboration is limited, takes longer and is not efficient. Hence e-government applications need to exchange data in a semantically interoperable manner. This saves time and money and reduces sources of errors. Fields of practical use are found in every policy area, be it justice, trade or participation etc. Good examples of the benefits of interoperability frameworks in practice can be found at the European Interoperability Framework process.[28]

[28] ISA², Interoperability solutions for public administrations, businesses and citizens, https://ec.europa.eu/isa2/eif_en

2.1.3 Infrastructure issues

Providing access to the internet is a key factor for developing an information society, because it serves as the foundation for delivering and using e-government services. Access to the internet is usually provided by private telecommunication companies, who also run telecommunication networks. Access can be by wired or mobile networks, with mobile becoming increasingly common. For wired networks, the last metres at home or in the office can be either by cable or wireless access point connection (WiFi). In some parts of the world, including Africa, the extent of wired networks both for internet and telephony is limited, with mobile being more common.

Modern internet connection is normally by broadband. Mobile network technologies are in constant development and keep coming up with better connections. Today, new mobile communications generations (e.g. NMT, 2G, 3G, 4G, 5G) are upgraded frequently. Mobile communications require radio frequencies, which is a natural limited resource, regulated by international agreements and national law. Regulatory agencies handle the practical application of such rules. There are quite extensive common principles and international best practices on how the licensing and monitoring of users of the radio frequency spectrum should take place.

2.2 Basic analogue elements

2.2.1 International frameworks

A number of international initiatives exist to benefit from the absence of physical borders in cyberspace and promote international cooperation. The 2030 Agenda for Sustainable Development adopted by the United Nations (UN) General Assembly in 2015 highlights the importance of ICT.[29] The UN promotes initiatives linked to connectivity and infrastructure such as the United Nations Broadband Commission for Sustainable Development.[30] These activities provide support to countries to make it possible for them to enjoy the benefits of the technologies, but there are also a number of international initiatives that benefit from what the technologies permits. In Europe, the EU Digital Single Market is a very important such idea. In Africa, there is no well-developed single market analogue to the European one, but regional organisations provide fora for cooperation on different issues, often modelled on, or inspired by, the EU.

2.2.2 Legal framework

According to the principles of the rule of law, the governance of a country is conducted through legislation, and all activities, including those of government institutions, should be carried out in accordance with the law. Therefore, it is vital to have appropriate regulation in place for e-governance. It is a common misconception that e-governance demands a lot of designated legislation. This is not the case and such legislation may even be harmful, as it risks creating a parallel system of governance rather than improving governance. Only a few areas necessitate special legislation. This includes

[29] https://sustainabledevelopment.un.org/post2015/transformingourworld (2015)
[30] http://www.broadbandcommission.org/Documents/reports/bb-annualreport2016.pdf (2016)

recognition of electronic identities and signatures as well as electronic documents. This can be done through special laws or amendments to existing laws, such as administrative and criminal procedure legislation and contract law. In addition, protection of privacy is essential. Such protection is a constitutional right in most countries in the world as well as being protected by international human rights instruments. The general rules are in many instances supplemented with specific data protection regulation – a concept that dates from the beginning of automated data processing. Electronic data does not necessarily mean increased risks for privacy, but the perception is still predominantly that this is the case. There are also situations in which technology does entail more or different risks.
Cyber security is a broad term used for various aspects of securing digital systems. It does not exist in isolation, but is a fundamental part of e-government development. It is integrated into legal work but also awareness raising and training, as many cyber incidents are simple human accidents or technical failures. Other incidents might be organised by criminals or terrorists or be part of military operations. What is essential to keep in mind about cyber security is that threats directly affect the normal functioning of national information and communication systems. Various electronic services may be subject to attacks, including critical e-services like passport and migration control; customs or general critical infrastructure of the country such as electricity production and distribution, drinking water and sewage systems; or bank card payments.

In order to manage cyber threats, each country must have appropriate legislation and specifically designated government entities that are responsible for baseline cyber security and incident management. Legislation must designate the organs with primary responsibility for cyber security and outline their competence. The type of legal act or the exact nature of the organ designated is not relevant. Countries furthermore need legal acts and agencies for combating cybercrime and terrorism.

2.2.3 Coordinating institutions

There is a need for high level coordination of e-government activities between various units of the government as well as other agencies, to identify the capacity to introduce e-government elements into the functioning mechanisms of government institutions.[31] The idea of coordination is not to centralise decision making and technical capacities, but to support the innovation and service delivery modernisation in every government institution in a harmonised manner, avoiding duplication and overinvestment. The tools for coordination are policies, legislation and regulations; budgeting; monitoring; common standards; allowing nation-wide re-use of data; data exchange; re-use of the software solutions; and rapid development of the online services.

According to good governance principles[32] it is appropriate to separate the levels of decision making: strategic decisions, supervision, coordination and implementation are

[31] On the relevance of institutions, K. Echebarria (2001) *Goverment Modernization and Civil Service Reform: Democratic Strengthening, Consolidation of the Rule of Law, and Public Policy Effectiveness* (No. 80485). Inter-American Development Bank, p. 1.
[32] As outlined e.g. by the Council of Europe: https://www.coe.int/en/web/good-governance/12-principles-and-eloge (2017)

better kept in separate institutions. There should be clear roles, mandates and responsibilities between the institutions. In addition to existing organisations, it may be necessary to create a new central coordination unit or otherwise to explicitly give this task to an existing organ. This might be an independent agency or be housed, for example, in the office of the Prime Minister. The central coordination unit must have clear mandate either from the Parliament, President or Cabinet of Ministers. It is important that the central coordination unit reports directly to the Prime Minister (or possibly President), to make sure that decisions and progress will have high level political support and appropriate resources. If a ministry is in charge of e-governance development, there is a danger that other ministries – normally horizontally placed hierarchically – may question the basis for this one ministry to determine issues for all ministries. It is recommended to centralise development of the policies and standards and decentralise the implementation.

Supervisory institutions that provide monitoring of the proper implementation of legislative and regulative norms are an important supplement to the implementing institutions. These can include data protection agencies, ICT regulatory agencies, consumer protection agencies and national audit offices. Important support for the development of e-governance can also be provided by organisations uniting ICT professionals and companies, universities and other research and development institutions, open data communities, digital human rights groups and other community organisations.

2.2.4 Political will and change management

To secure long-term changes, political will and leadership is required.[33] At least a critical mass of Members of the Parliament must be aware of the benefits of e-governance, trends and progress in the country. With this knowledge, they can support the important legislative process. Personal leadership matters, both at the political and administrative level.

The whole e-governance implementation process is not only about technology. It is also not about transferring the services from paper to computer: it is re-inventing public services. Or even broader, it is re-inventing governance. The key question for change management is how to release energy and ideas for the re-engineering of the existing public services and related business processes in the government. New skills such as computer skills, including typical office solutions as well as sophisticated software (design, planning, technical design, etc.), are needed, as well as new competences, such as analysing big data, understanding links between public services and their impact and designing new services based on such knowledge.[34]

[33] F. Bouaziz (2011) "E-Government Project Risk Management: Taking Stakeholders in Perspective in" in A. T. Al Ajeeli, Y.A.L Al-Bastaki (eds.) *Handbook of Research on E-Services in the Public Sector: E-Government Strategies and Advancements* (Information Science Reference, IGI Global) pp 147-163 at p. 156.

[34] V.J.J.M. Bekkers, J. Edelenbos, & A. J. Steijn (2011). *Innovation in the public sector: linking capacity and leadership*. (New York, Palgrave Macmillan); S-A. Hazlett & F. Hill (2003) "E-government: the realities of using IT to transform the public sector", *Managing Service Quality: An International Journal*, Vol. 13 Issue: 6, pp.445-452

2.2.5 Access to services and awareness raising

A very important element of the implementation of e-governance is to increase awareness of individuals and organisations about the opportunities. Without that, there will be no usage of e-services and therefore no need to invest in them.
Many aspects need to be considered including:

- Cultural - individuals might be used to the existing governance culture, preferring physical visits to the offices and face-to-face contact with officials;
- Economic - costs for access to online services may still be high for individuals;
- Religious - in some religions, numbers instead of names (like a personal ID number) might be unacceptable;
- Security and privacy - individuals may be concerned about how their data is collected, handled and stored.

There is no single recipe on how to deal with cultural, economic, religious or security aspects for every country, as cultural, religious, historical and economic factors vary society by society. But all questions could and should be clearly answered, both to the general public, stakeholders' groups and experts. As e-governance can provide transparency, the implementation of e-governance tools and programmes must also be transparent.

Chapter 3. Current status of e-governance in Africa

This chapter places the above-mentioned elements in the African context. The details on each element are found in the Annexes, with the text below summarising the key findings and referring to the relevant Annex in which data for the countries can be found.

3.1 Basic digital elements

3.1.1 Government portal, digital databases and secure exchange of data

Government portals – whether interactive or just as sources of information – are essential digital tools of governance and in many ways a first step toward creating e-governance.

The elements to assess the efficiency of public administration are:

- The existence of government portals;
- The quality of governments´ delivery of online services, measured by the United Nations Online Service Index – OSI;
- ICT Development Index, measured by the International Telecommunications Union.

There are government portals in a large number of African countries (see Annex 1). Some African countries lack functioning government portals or have such portals, but they are limited to just, for example, the President´s office or lack updated information. The Republic of Congo, the Central African Republic, Djibouti, Eritrea, Guinea, Mauritania and Sudan are among such countries.

The OSI assesses governments´ performance in delivering online services to the citizens (see Annex 7). Governments of Morocco, Egypt, Tunisia, Ethiopia, Mauritius and Rwanda are the top leaders of delivering online services in their country. These countries express a high level of e-governance deployment. For comparison, Morocco ranks 85 in the UN e-Government Development index, in the ITU ICT Development index 96 and in the WEF Network readiness index 78. Burundi, Chad and Guinea belong to the other end of the OSI index, with less activity in the provision of online services to citizens. A comparison of the UN, ITU and WEF indexes show that the last countries in the ranking are: Burundi, Chad and Guinea.

The extent of digital databases and digital exchange of data is to a large extent difficult to identify. Most countries are in the process of digitising records but in almost all cases, this process is ongoing with a lot of data still only in analogue form. For example, as of 2016, South Africa's Department of Home Affairs had 286 million records, 90% of which were in paper format. The country launched a comprehensive digitisation project in 2016 so that new entries are made digitally while old records are digitised. Since the project's goal is to digitise 5.8 million old birth records per year, this process can be expected to take several decades. South Africa has a wealth of information-rich websites but has been slow in moving to transactional websites.[35]

In 2017 the AU launched ".africa", a new geographic Top Level Domain (TLD). A campaign to establish this new domain was launched at the 29th AU summit in Addis Ababa, Ethiopia in July 2017. Hopes are that the ".africa" campaign will establish a new, united, cross-cultural digital identity for the continent, and that this will allow Africa to contribute more to the global digital economy.[36]

The EU through the EU Trust Fund for Africa is helping to consolidate the civil registers of Mali and Senegal and to establish the appropriate environment and legal framework (including data protection legislation as well as equipping local authorities with computers and software suitable for digitalisation and biometric registration campaigns).[37]

3.1.2 Secure digital identity and digital signature

The indicator that was used to assess secure digital identity and digital signature is the existence of national IDs with some electronic component that can be used for digital authentication purposes.

A detailed narrative of the situation of African countries regarding digital identity can be found in Annex 2. The main findings are:

A 2016 review of National Identity Programs around the world conducted by the ITU[38] identified at least twelve African countries that had National IDs with some electronic

35 G. Naidoo, S. Singh, N. Levine (2011) "An Overview of Internet Developments and their Impact on E-Government in South Africa" in A. T. Al Ajeeli, Y.A.L Al-Bastaki (eds.) Handbook of Research on E-Services in the Public Sector: E-Government Strategies and Advancements (Information Science Reference, IGI Global) pp. 63-77 at p. 76.

36 https://au.int/en/pressreleases/20170703/dotafrica-africa-roadshow-launches-african-union-headquarters (2017)

37 Commission Staff Working Document SDW (2017) 157 p 22.

38 International Telecommunication Union ICT Development Index 2016, https://www.itu.int/net4/ITU-D/idi/2016/index.html#idi2016rank-tab (Accessed August 2017)

components (usually either a microchip or a machine-readable barcode): Angola, Algeria, Egypt, Ghana, Kenya, Morocco, Nigeria, Sudan, Tanzania, Uganda, and Zambia (see Annex 2). The list is not exhaustive and given the rapid developments many African countries are experiencing in this area, it is bound to become out of date soon, especially if countries that are either in the planning or pilot stages are added to it.

The most ambitious ongoing project is the Economic Community of West African States (ECOWAS) Biometric Identity Card, which will contain chips that can carry digital identities and potentially allow the application of digital signatures. In the 46th ordinary session of the ECOWAS in December 2015, Heads of State and Government of the 15 member countries of the organisation approved the introduction of an interoperable biometric ID card with a vision to eliminate in the future the need for ECOWAS citizens resident in another ECOWAS state to hold residence permits.[39] Based on an agreed framework of mandatory, optional and supplementary features, all cards are mandated to include a contactless chip and biometric information comprising at least two fingerprints.[40]

The duty to issue the ECOWAS Biometric Identity cards falls on each member state, and Senegal and Benin were the countries that volunteered to begin issuance first, with the other countries expected to follow suit.[41] In Senegal, these biometric cards began to be issued in October 2016, with the authorities claiming to have enlisted nearly 2 million people and issued 350,000 ID cards by January 2017. As of January 2017,[42] Benin, Burkina Faso, Cote d'Ivoire, Mali, Niger, and Togo were allegedly in the pilot stages towards the development of their own cards.

Electronic National IDs are also increasingly common in the rest of the continent. South Africa launched its own smart card National ID in 2013, expecting a phased rollout over seven years – by May 2017 6.8 million cards had been issued.[43] Cameroon also adhered to the technology in 2016.[44] In North Africa, Morocco was a pioneer in smart cards when it launched its Carte Nationale d'Identité Electronique (CNIE) back in 2008.[45] The country was followed by Algeria in 2016,[46] and currently Tunisia and Egypt have projects for smart IDs at an advanced stage.[47] The recent expansion of National IDs with electronic components is a promising development.

[39]http://www.ecowas.int/wp-content/uploads/2015/02/46th-ECOWAS-Summit-Abuja-15-Dec-20141.pdf (2014)
40 http://www.id4africa.com/prev/img/ECOWAS_COMMISION_PRESENTATION.pdf
41 http://www.pulse.ng/news/local/ecowas-biometric-ids-senegal-benin-begin-issuance-of-cards-id4651170.html (2016)
42 http://apanews.net/en/pays/senegal/news/senegal-two-millions-enrolled-for-ecowas-biometric-id-cards (2017)
43 http://www.htxt.co.za/2017/05/18/3-mil-smart-id-cards-to-be-issued-in-2017/ (2017)
44http://www.gemalto.com/govt/customer-cases/new-national-identity-card-for-cameroon (2016)
45 http://www.cnie.ma/
46 http://www.gemalto.com/govt/customer-cases/new-national-identity-card-algeria (2016)
47http://geopolis.francetvinfo.fr/tunisie-le-projet-de-carte-d-identite-biometrique-fait-debat-151631 (2017)

3.1.3 Infrastructure issues

There is quite a lot of information available through various organisations such as the ITU and the World Bank about the situation in different countries with regard to access to communications technologies.

The indicators to assess the state of infrastructures are:

- Fixed broadband subscriptions;
- Fixed telephone subscriptions;
- Mobile cellular subscriptions;
- Investments in telecom with private participation;
- Secure internet servers.

These indicators are important, in particular to assess the current state of the digital transformation process in specific countries as the access provides a core fundament for successful e-governance.
The data for African countries on these indicators can be found in Annex 3. Here is the summary of key findings:
In Africa, the access to broadband internet is generally not very well developed although the situation in North Africa and in the SADC countries is generally better than in other regions. Government offices and public authorities tend to have access to internet, although speeds may not be very high, but among the population the access – albeit with important variations between countries as well as between regions in countries – is generally not good. This is especially true for fixed broadband, where several countries have below 0.1 connections per 100 people. Only twelve countries of which only eight Sub-Saharan ones, have more than one fixed broadband connection per 100 people (in 2015): Algeria, Botswana, Cabo Verde, Djibouti, Egypt, Mauritius, Morocco, Namibia, Seychelles, South Africa, Tunisia and Zimbabwe.[48]
However, the penetration of mobile telephony and to some extent of mobile internet is high in almost all parts of Africa. The penetration rate of mobile telephony in particular is very high, with 19 countries with a higher than 100% mobile penetration (Algeria, Botswana, Cabo Verde, Republic of Congo, Cote d´Ivoire, Egypt, Gabon, Gambia, Ghana, Lesotho, Libya, Mali, Mauritius, Morocco, Namibia, Senegal, Seychelles, South Africa and Tunisia). Only Eritrea and South Sudan have less than 25% penetration.[49]

3.1.4 Example of sectoral solution – taxation

The opportunities offered by e-government and information technologies are much wider than their present use. This applies not only to the ICT sector itself, but to every sector of the economy. [50] Good harmonisation between these sectors permits efficiency gains and can make services more attractive to users, as they have to learn fewer ways to access them. We have analysed the situation in the taxation sector with the following indicators:

- Whether the tax administration has a designated web-site;

48 http://data.worldbank.org/indicator (2017)
49 Ibid.
50 Commission Staff Working Document SDW (2017) 157 p 5.

- If this site looks easy to navigate, has a lot of content and how this is displayed;
- If it is possible to provide information on-line, to download forms, to ask for and/or send information electronically, thus the level of interactivity.

The data for African countries on these indicators can be found in Annex 4. Here is the summary of key findings:
Most, but not all African countries have designated tax office websites. In some countries government portals provide tax information, but there are also examples of countries with no on-line tax information. Downloadable forms exist in many instances, but mostly these cannot be filled in and submitted online.

In many cases, additional information on tax questions can only be obtained by phone or in person. The FAQ sections on websites are often limited, with no shat possibility. The most interactive websites were in Kenya, Madagascar, Mauritius, Swaziland and Tanzania, where they also have online components.

3.2 Basic analogue elements

3.2.1 International Frameworks

The efficiency of supporting international frameworks for digital technologies cannot be measured with quantitative indicators but is based on the eGA expert´s analysis. One quantitative indicator that was used is the status of signing and ratifying the Council of Europe's Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data[51] and Convention on Cybercrime[52] (see the Annex 12).

Developments in countries as well as in regional organisations show an increasing awareness of the important role of digital technologies for the development of any country and of the risks and challenges as well as opportunities that this brings. The AU has for example created a Specialised Technical Committee on Communication and Information and Communication Technology, which held its first meeting in September 2016.[53]

International frameworks in Africa also exist on the donor side. The Seychelles East African Submarine Cable System to which the EU has contributed considerably is a project of wide impact. Other EU supported initiatives include Satellite-enhanced Telemedicine and eHealth for sub-Saharan Africa and the African Internet Exchange System, funded through the EU-Africa Infrastructure Trust Fund. The EU has supported the harmonisation of ICT Policies in Sub-Saharan Africa and in the Southern Mediterranean as well as infrastructure projects for research and education institutions,

51https://www.coe.int/en/web/conventions/full-list/-/conventions/treaty/108/signatures?p_auth=eEtCYk9I (2017)
52https://www.coe.int/en/web/conventions/full-list/-/conventions/treaty/185/signatures?p_auth=eEtCYk9I (2017)
53https://au.int/web/en/newsevents/31357/extraordinary-session-au-specialized-technical-committee-stc-communication-and-ict (2016)

linking such institutions in different countries, including African countries in the Mediterranean region (*AfricaConnect*).[54]

3.2.2 Legal Framework

The legislative situation in Africa varies considerably between countries with regards to the extent to which relevant legal acts permitting e-governance exist and what types of acts these are. As explained in Chapter 2.2.2, e-governance does not require a lot of designated legislation. What is needed is legislation to ensure the recognition of electronic identities/signatures and electronic documents. This can be done through special laws or amendment to existing laws, like administrative and criminal procedure legislation and contract law. In addition, attention should be given to the protection of privacy, including specifically data protection. The multitude of laws implicated in a transition to e-governance means that there is no single type of law to search for or any existing comprehensive international listings of the legal situation in different countries. There are however compilations of laws on certain issues, covering many countries, for example on data protection or cyber security.

The indicators to assess the performance of the regulatory environment are:

- Existence of data protection legislation;
- Laws relating to ICTs.

There are not many comparative analyses made about the level of the ICT or e-governance specific regulatory environments in Africa. The World Economic Forum has dedicated separate efforts to highlighting the importance of regulatory environments in their Global Information Technology Report 2016[55]. This analysis of the performance of the regulatory environment of African countries is in Annex 9. This particular index measures the quality of regulations pertaining to ICTs, the capacity and the role of ICTs in driving innovation and represents the level of sophistication for ICT related laws in a country. The top ranked countries are South-Africa, Rwanda, Mauritius and Kenya.

The overview of data protection laws in Africa can be found in Annex 5. Here is a summary of key findings: Several African countries have designated data protection legislation, often designed similarly to European laws (which are similar between European countries, based on EU rules as well as common principles provided by other organisations). Others may have data protection as part of general privacy rules, for instance as constitutional provisions, in various laws or in sub-legal acts. After Europe, Africa is the continent with the most data protection legislation.[56] Still, a majority of African countries have no designated legislation or authorities for data protection and in many countries, the amount of provisions in other (non-specific) legislation is also limited. Some African countries, namely Mauritius, Senegal and Tunisia have joined the

54 Commission Staff Working Document SDW (2017) 157 p 8-9.
55 http://reports.weforum.org/global-information-technology-report-2016/
56 UNCTAD (2016) Data protection regulations and international data flows: Implications for trade and development p 42.

Council of Europe Data Protection Convention.[57] It is noteworthy that many data protection laws are very recent, and it is thus too early to comment on how they are implemented and enforced.

In June 2014, the AU adopted a Convention on Cyber-security and Personal Data Protection.[58] The Convention aims to establish regional and national legal frameworks for cyber-security, electronic transactions and personal data protection.[59] However, the Convention has, as of June 2017, only received one ratification (Senegal in August 2016) and despite nine[60] more signatures, it is difficult to predict if it will ever enter into force.

ECOWAS has adopted an act on data protection[61]which is a binding regional agreement. It specifies the required content of data protection laws and requires member states to establish a data protection authority. Seven countries have enacted legislation in compliance with the agreement. The East African Community (EAC) has developed the EAC Framework for Cyberlaws, adopted in 2010, which recommends that each member state develops a regulatory regime for data protection, but makes no specific recommendations as to the content of legislation.[62] The EAC is also working on establishing a legal framework regarding cyber laws that "provides guidelines on the enactment and enforcement of laws that promote the deployment of e-government and e-commerce services".[63]

COMESA has developed a "Model Law on Electronic Transactions and Guide to Enactment 2010", which is a report regarding a programme for member countries concerning e-legislation, so as to assist member states in establishing "appropriate legislation to support e-commerce". A study was done, followed by two workshops on "e-Legislation" in general and e-commerce laws specifically. The report discusses issues concerning e-signatures, consumer protection, and a wide variety of other matters.[64]

Based on the National Cyber Security Index[65] produced by the eGA, South Africa appears on place 17 out of 26 countries and Kenya on place 21. The ranking also compares how cyber security is handled in view of the general development of the ICT sector in the country. On this score, both countries pay much more attention to general ICT development than to cyber security, which is common almost everywhere. Only a few countries address cyber security matters with the same high priority as other ICT issues (including the Czech Republic, Lithuania, Ukraine and to some extent also Pakistan).

57 The Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data, 1981 ETS 108, http://www.coe.int/en/web/conventions/full-list/-/conventions/treaty/108/signatures
58 https://au.int/en/treaties/african-union-convention-cyber-security-and-personal-data-protection (2017)
59 UNCTAD p. 35 (2016)
60 Benin, Chad, Congo, Ghana, Guinea-Bissau, Mauritania, Sierra-Leone, Sao Tome & Principe, Zambia https://au.int/sites/default/files/treaties/29560-sl-african_union_convention_on_cyber_security_and_personal_data_protection.pdf (2017)
61 Supplementary Act A/SA.1/01/10 (2010)
62 UNCTAD (2016) p 35
63 https://www.eac.int/infrastructure/communications-sector/ongoing-projects
64 COMESA Model law on Electronic Transaction and Guide to Enactment (2010)
65 http://ncsi.ega.ee/ncsi-index/ (2017)

South Africa has a good capacity to provide cyber security policies and provide baseline security as well as to react to incidents. It has the capacity to provide e-identification but scores less well on providing a secure environment for services or dealing with cybercrime. Kenya scores well on its ability to react to cyber security incidents and for dealing with cybercrime, but lacks the potential to analyse cyber threats or provide a secure environment for e-services. It does have some capacity to develop policies and provide education.[66]

Cybercrime legislation exists or is being developed in many African countries. Mauritius as well as Senegal have joined the Council of Europe Convention on Cybercrime, the so-called Budapest Convention. South Africa was among the initial signatory States but has not ratified the convention.[67] Nigeria has a Cybercrimes (Prohibition, Prevention etc) Act from 2015 that provides a legal, regulatory and institutional framework for the prohibition, prevention, detection, prosecution and punishment of cybercrimes in Nigeria.

With the limited effect of regional instruments, countries look at examples of countries in the region for inspiration in creating legislation. The South African Protection of Personal Information Act is regarded as meeting best international standards.[68] The Act was based on, and is compatible with, the EU Data Protection Directive and includes an Information Regulator and an independent national privacy regulator.[69]

For any legal provisions related to e-governance, it is important to stress that it is not essential to have similar types of acts in different countries, but the focus should be on enabling provisions and absence of obstacles – not on form or name of the acts.[70]

3.2.3 Coordinating institutions

The existence and efficiency of supporting organisations cannot be measured with quantitative indicators but is based on eGA experts´ analysis. The UN Networked Readiness Index (2016)[71], as one possible indicator, was also used (see Annex 8).

The lack of a clear focal point for introduction of e-governance and coordination of digitisation, creation of interoperability as well as e-services, is a common problem in

66 Ibid.
67 http://www.coe.int/en/web/conventions/full-list/-/conventions/treaty/185/signatures (2017)
68 UNCTAD (2016) p. 4
69 UNCTAD (2016) p.46
70 K. Nyman Metcalf "e-Governance: A new reality for legislative drafting" (2017) in International Journal of Legislative Drafting and Law Reform, Volume 5, Issue 1, pp.39-51 at p. 40.
71 World Economic Forum Networked Readiness Index Report 2016, http://reports.weforum.org/global-information-technology-report-2016/networked-readiness-index/ (Accessed August 2017). The Networked Readiness Index (NRI) looks at what the different actors in society, both private and public, can do to contribute and coordinate the country's networked readiness. The four key categories of indicators are: (1) the overall environment for technology use and creation (political, regulatory, business, and innovation); (2) networked readiness in terms of ICT infrastructure, affordability, and skills; (3) technology adoption/usage by the three groups of stakeholders (government, the private sector, and private individuals).

countries all over the world, including Africa. The types of organisations that can be responsible for e-governance varies significantly between countries.

However, in recent years several African countries have developed further and have either created special agencies or designated some organisations in government structures to help introduce e-government elements. For example, in 2017 Senegal created an agency for ICT development (Agence de Développement d´Informatique de l´Etat – *ADIE*) at the President´s Office. Nigeria has the National Information Technology Development Agency (*NITDA*), set up in 2007, as the national authority responsible for planning, developing and promoting the use of ICT and, which among other things, issues guidelines on data protection. As far as the eGA experts are aware, good governance principles are applied to some extent in these agencies. Supervisory regimes have not been analysed in this report.

3.2.4 Political will and change management

Overcoming resistance to change is one of the greatest challenges for implementing effective e-governance. Some reforms may interfere with behaviours that are deeply ingrained in the culture of public institutions or even contradict the corporate interests of government bureaucracies. The cross-governmental nature of the changes that need to be implemented further adds complexity to this. To navigate this scenario, political leaders need to stay engaged and commit time, budget, and even political capital to the cause of e-governance. While there is no perfect measure of political will towards e-governance across African countries or change management, the following can signal the level of commitment from the political leadership:

- Publication of a government-wide e-governance strategy;
- Institutionalisation of a coordination mechanism for e-governance;
- Existence of a Government Chief Information Officer or a similar position;
- Public statements from the head of government in support of e-governance;
- Index of Importance of Government Vision of the Future[72].

Within these parameters that can signal the level of commitment from the political leadership, some African countries have demonstrated political commitment to e-governance, particularly through the publication of medium or long-term e-governance strategies. In Western Africa, Senegal stands out for its comprehensive "Digital Senegal Strategy 2016-2015"[73] and the inclusion of a chapter on ICTs and e-services in its Emerging Senegal Plan,[74] which aims to make Senegal an emerging country by 2035. In December 2015, the Senegalese president volunteered the country to be the first ECOWAS member to start issuance of the new ECOWAS Biometric Identity card, a promise it has already started to fulfil. Another Western African country, Nigeria has attributed political priority to e-governance – it has a "National e-Government Strategy" (*NeGSt*)[75] and a well-formulated ICT policy – the Nigeria ICT Roadmap 2017-2020.[76]

72 http://www3.weforum.org/docs/GITR/2014/GITR_DataTable8_2014.pdf
73 https://www.sec.gouv.sn/IMG/pdf/sn2025_final_31102016.pdf (2016)
74 https://www.sec.gouv.sn/IMG/pdf/PSE.pdf (2014)
75 http://www.negst.com
76 http://www.commtech.gov.ng/Doc/Nigeria_ICT_Roadmap_2017-2020.pdf (2017)

Presently, an e-governance section is prominently displayed on the Nigerian national web portal and the NeGST has a dedicated website (http://www.negst.com).[77]

In Eastern Africa, the highlights are Mauritius, Kenya, Rwanda and Zimbabwe. These four countries currently have government-wide strategies for e-governance: Kenya's National ICT Master Plan 2014-2017,[78] Rwanda's SMART Rwanda Master Plan 2015-2020,[79] Mauritius' e-Government Strategy 2013- 2017,[80] and Zimbabwe's National Policy for ICT.[81] In Central Africa, the enthusiasm for ICTs among political leaders has been more limited, with the possible exception of Cameroon,[82] which has articulated a long-term vision for e-governance in the country through the Strategic Plan Digital Cameroon 2020. The EAC has several ongoing projects concerning e-governance, including the "East African Community Broadband ICT Infrastructure Network", a project aiming to establish and operate a cross-border broadband infrastructure network within the EAC.[83]

COMESA is working to promote the use and awareness of ICT with the aim of contributing to socio-economic integration. They have developed a regional framework concerning e-governance, as well as a portal to "harmonise e-Government efforts in the region and to assist the Member States in implementing e-Government". A key partner for COMESA in the implementation of their e-governance programme is the United Nations Public Administration Network (UNPAN).[84]

In the southernmost sub-region of the continent, South African presidents have reinforced yearly their political commitment to provide digital services to the country's citizens in their State of the Nation addresses. The country also has a "National Strategy and Roadmap for Digitizing Government Services",[85] whose most updated version was published in April 2017. Another worthy mention in the region is Namibia, which successfully implemented a data exchange platform based on the Estonian X-Road in 2016 and has an "e-Government Strategic Action Plan".

Finally, in North Africa, e-governance seems to have lost importance among the priorities of political leaders in Algeria and Morocco. The strategies e-Algeria 2013[86] and Digital Morocco 2013[87] have not yet been replaced by more updated planning exercises. Tunisia has a current Digital Strategy with a vision for 2020, but as of 2017, only 5% of the projects had been executed and 20% were ongoing, though political commitment

77 C. K. Ayo, I. T. Fatudimu "The Nigerian e-Government Strategies (NeGST): A Strategic Approach to Poverty Eradication in Nigeria" in A. T. Al Ajeeli, Y.A.L Al-Bastaki (eds.) Handbook of Research on E-Services in the Public Sector: E-Government Strategies and Advancements (Information Science Reference, IGI Global) pp. 93-105 at p. 100.
78 http://www.ict.go.ke/wp-content/uploads/2016/04/The-National-ICT-Masterplan.pdf (2014)
79 http://www.myict.gov.rw/fileadmin/Documents/Strategy/SMART_Rwanda_Master_Plan_v2.5.pdf (2015)
80 http://mtci.govmu.org/English/Documents/eGovStrategyfinalv201393.pdf (2017)
81 Zimbabwe National Policy for Information and Communications Technology (ICT) (2016)
82 http://cameroundigital.com/en/strategic-plan/ (2016)
83 https://www.eac.int/infrastructure/communications-sector/ongoing-projects
84 http://www.comesa.int/what-we-do/#information-networking
85 https://www.gov.za/sites/www.gov.za/files/40772_gon341.pdf (2017)
86 http://www.algerianembassy.ru/pdf/e-algerie2013.pdf (2013)
87 http://www.egov.ma/sites/default/files/Maroc%20Numeric%202013.pdf (2013)

seems to remain.[88] Similarly, Egypt has its comprehensive ICT 2030 Strategy,[89] but so far implementation has also been a challenge.

On a broader and international level, the World Economic Forum[90] has made a comparative analysis about the vision and implementation plan regarding information society, extensive use of ICTs and recognition of the leading role of government in this process. The "Index of Importance of Government Vision of the Future" assesses to what extent the government has a clear implementation plan for utilising ICTs to improve a country's overall competitiveness (see Annex 10). This indicator shows the government effort to improve the regulatory environment. The higher the index - the clearer the vision a government has. The top ranking of African countries with a high index are: Rwanda, with Government Vision of the Future Index 5,8; Kenya (with respective index 4,8); Cote d´Ivoire (4,5); Cape Verde (4,5); Mauritius (4,4); and Morocco (4,3). In addition, these countries have enforced more developed and sophisticated laws pertaining to ICTs, supported by the Index assessing Laws relating to ICTs (see Annex 9).

3.2.5 Access to services and awareness raising

Properly introduced and applied e-governance can increase efficiency, make authorities more accessible to people and help to combat corruption. Such progress will make the country more attractive for business, including foreign investment. E-services must be part of a general overhaul of regulation, as only digitising services that are overly complex or un-transparent will not by itself solve all problems. There are no quantitative indicators for the quality of services, although it is possible to make assessments of the quality of a government's delivery of online services and how effectively the public sector is using digital technologies to deliver services to citizens. The UN E-Government Development Index (2016) was used as one possible indicator (see Annex 8). [91] The existing assessments are supplemented by EGA expert analysis.

Many African countries suffer from slow and inefficient bureaucracies, making them unattractive for conducting business. In eight countries, the time required to start a business is 50 days or more (Chad, Republic of Congo, Equatorial Guinea, Eritrea, Gabon, Namibia, Somalia and Zimbabwe). Time spent by senior management dealing with government regulations reaches up to 46,5% of time in Tunisia and is nearly a quarter of time in Algeria, Burkina Faso, Mail and Niger.[92]

88 http://www.huffpostmaghreb.com/2017/02/16/tunisie-digitale_n_14796854.html (2016)
89 http://www.mcit.gov.eg/ICT_Strategy (2015)
90 The Global Information Technology Report available at http://reports.weforum.org/global-information-technology-report-2016 (2016)
91 United Nations E-Government Knowledge Data Base, E-Government Development Index, 2016, https://publicadministration.un.org/egovkb/Data-Center (Accessed August 2017). The E-Government Development Index (EDGI) measures e-government instructions' effectiveness in the delivery of basic economic and social services to people. Namely consists of three most important dimensions of e-government: (1) scope and quality of online services (Online Service Index, OSI), (2) development status of telecommunication infrastructure (Telecommunication Infrastructure Index, TII), and (3) inherent human capital (Human Capital Index, HCI).
92 http://data.worldbank.org/indicator (2017)

The fact that Tunisia is one of the more advanced countries on the African continent as far as e-governance is concerned illustrates that the introduction of e-services by itself does not reduce bureaucracy, but it needs to be coupled with a thorough overview of how e-services can really be employed for greater efficiency. The information also illustrates that there are no regional differences, but there are variations within regions.

Chapter 4. Categorisation of countries

The methodology used for the categorisation of African countries based on their current status of e-governance is described in Chapter 1.2 Methodology.

Groups
The first group consists of twelve countries that have implemented various services, that have an organisational structure and at least basic regulation, and that in most cases have some form of digital ID and interoperability. These countries also have the necessary preconditions for continued development. They can act as regional examples and leaders. The second category consists of 26 countries that we have further sub-divided into three tiers (8-10-8 countries). These countries have undertaken some work toward e-governance but not reached the same level as those in the first group. Finally, we have in our third group listed 16 countries that have a very low level of development, that due to unrest or extreme poverty are lagging behind in many respects and where in most cases the development can be expected to be difficult or slow. For these countries, some specific and more limited work may be possible.

The ranking is made based on expert evaluation of all relevant factors, of which quantitative or quantifiable data makes up only a relatively small part. Existing indexes have also been used as a supporting rather than as a decisive element, as the value added of this report is to provide information that is not available simply through a merger of existing rankings into one. Such explanations are added here and in Annex 6.

Group 1 (292-840points)

The group of countries that ranks high in the UN, ITU and WEF indexes (see Annexes 8 and 12) are Egypt, Morocco and Tunisia in North Africa; Cape Verde, Mauritius and Seychelles; as well as Botswana and South Africa. To this advanced group Namibia is added since it scores high in the mentioned indexes and has implemented an advanced system of interoperability of databases through a bilateral Estonian-Namibian project. To this group of countries Ghana and Kenya are also added since they are near the top ten on the various indexes plus have many e-governance initiatives. Rwanda is not very high in the various indexes, but their development is very are rapid. And the level of services is quite high and well organised.

The countries are:

1. Botswana
2. Cape Verde
3. Egypt
4. Ghana
6. Kenya
6. Mauritius
7. Morocco
8. Namibia
9. Rwanda
10. Seychelles
11. South Africa
12. Tunisia

If a country shows signs of serious attention paid to e-governance by political and other leaders, including organisational structures or plans for development of such structures, this is a reason to lift the country higher in the ranking than what would be the case based only on existing rankings or quantifiable elements. Accessibility and good presentation of on-line services is another aspect that merits additional points, through which some states have moved up in the ranking. Some of the indicators used in existing rankings are somewhat outdated and/or not suited to African realities - like the existence of fixed broadband, which is largely supplanted by mobile – which is why the rankings are not suitable as the only or main element based on which categorisation is made. It is essential to recall that the evaluation is for e-governance, with in this context a stress on "governance" and not on technologies.

Group 2

Group 2 is the largest group and the one in which the differences between the states are the biggest. These are countries that are not as advanced or where the progress is more uneven than for those in our first group, but where there are examples of projects, reforms and initiatives, which can be built upon. We have divided this group into three tiers, to illustrate the difference that exists between the states in this group. The first tier is close to the first group but for various reasons these countries are somewhat less advanced. As for the third tier, these are countries where there has not been very much development, or it has been halted for different reasons, but there are still better prospects than for the countries we have included in our third group. Consequently, tier 2 of group 2 is between these mentioned groups.

The countries are:

Tier 1 (207-292 points)

1. Algeria
2. Benin
3. Lesotho
4. Nigeria
5. Swaziland
6. Tanzania
7. Uganda
8. Zimbabwe

Tier 2 (142- 207 points)

1. Angola
2. Burkina Faso
3. Cote d´Ivoire
4. Gabon
5. Madagascar
6. Mozambique
7. Sao Tome and Principe
8. Senegal
9. Togo
10. Zambia

Tier 3 (97-142points)

1. Cameroon
2. Comoros
3. Ethiopia
4. Gambia
5. Liberia
6. Libya
7. Mali
8. Sudan

Group 3 (< 97)
There are a number of countries in Africa that come in at the low end of all rankings, even if the exact positions at the low end of the scale vary more than at the high one. Several of these countries are not included in many of the indexes and data is to a large extent lacking. Concerning our test case of tax administrations, for most of these countries there is either no available website or if there is, it contains very limited information or is not updated. Many of these countries lack government portals or have limited portals, for example just for the presidency or similar, with no services available. These countries to a large extent are experiencing or have recently experienced armed conflict and/or famine, and/or are among the least developed and poorest states of the world. Even if e-governance initiatives can be very useful for such countries and in some cases, may allow to leap-frog to faster development, there could be issues with finding adequate national capacity for knowledge transfer and sustainability of reforms. This does not mean that the countries should be excluded from any assistance (and they could well feature in the regional or other grouping that we suggest) but the way assistance is designed might have to look quite different than in countries with a high level of achievements in the sphere of e-governance.

The countries are:

1. Burundi
2. Central African Republic
3. Chad
4. Democratic Republic of Congo
5. Guinea Bissau
6. Djibouti
7. Eritrea
8. Equatorial Guinea
9. Guinea
10. Malawi
11. Niger
12. Sierra Leone
13. Somalia
14. South-Sudan

The reason to place countries in this group, even if the various existing rankings and quantitative data would indicate a different position, is the same as that explained above. In this case, the process of determination of the weight of various factors has meant that these have been seen more negatively than a superficial determination would suggest. Mainly this is due to a lack of credibly expressed political will or external circumstance (like war, famine, absence of governmental control) that make serious reform work impossible or nearly impossible. For some countries, such factors have occurred or been strengthened recently and thus after many of the existing rankings were made. In the selection of countries to be put in the third category, we have evaluated what the actual possibilities of reform would be, looking beyond statements and projects if these do not appear realistic. In this context, the fact that e-governance is a part of governance and not just a technical matter is very important, as there may be situations in which even a country in political crisis can work on infrastructure matters, but it is unlikely that it can undertake sustainable governance reforms.

We have not dealt with the Sahrawi Arab Democratic Republic (Western Sahara), which is not a UN member even if it is a member state of the AU.

The benefit of the grouping of countries is to highlight what type of activities and thus what type of support would suit the respective countries. For the countries in group 1, a number of specific activities already exist. The support can be given in the form of advanced sectoral solutions (for tax administrations, customs, education and so on) or in cross-sectoral enablers (like interoperability of databases, secure digital identity, etc.). For such countries, the next steps will be to build upon such existing solutions to make projects to either increase the e-governance implementation to further sectors or to use the cross-sectoral solutions for more purposes. The choice of which next steps to take is evidently to be made by each county independently and this choice may include requests for expert assistance. As we recommend, projects could include more than one country, both in the sense that several countries at a similar level (but perhaps with existing solutions in different domains) can cooperate and share expertise and experience, but also in the sense that states that have reached a higher level can support others by presenting their examples. Such a presentation of African examples to other African countries promises to be both efficient as well as ethical. The grouping of countries provides a basic indication of which countries are most suitable to be the providers of good examples (Group 1) to other countries (primarily Group 2).

For Group 2, there are some elements of e-governance in place. As opposed to Group 1, it is likely that more basic support may be needed, especially in the lower tier of the Group. This means that projects to support e-governance and the digitalisation of society in the form of more general awareness-raising, basic regulatory adjustment support and basic technical support may be useful, if the state so requests. Projects should, in accordance with our recommendations, be regional or at least involve more than one country – in the manner described above or in an even wider setting, through regional integration organisations (as the more general issues as opposed to details of e-governance can also be handled in a wider regional setting).

What countries in Group 2 should have to do in order to progress to the level of Group 1 depends fully on the situation in each country. As stressed throughout this report, there is no single way to achieve e-governance or a set order of steps to take. As examples of the kind of activities and initiatives that would be expected to proceed to a higher position, mirroring the matters we have taken into consideration in our ranking, can be mentioned:

- Adoption of specific and workable strategies, programmes or other policy documents with clear plans for their implementation
- Creation and/or empowerment of a responsible organisational structure for e-governance
- Improved availability and accessibility of on-line information and services
- Analysis of legislation to identify the need for legal reforms to enable e-governance and if necessary, adoption or amendments of legislation
- Attention to awareness-raising among the population, educational issues
- Introduction or improvement of e-identification

- Improved technical infrastructure
- Increased involvement in international (regional, cross-border) initiatives

For Group 3, the political situation and development level of the countries means that very few solutions have been adopted and there are obstacles to rapid introduction of e-governance. In order, not to leave any countries totally behind, regional solutions, especially via regional integration organisations, can also include such countries, so that a basic knowledge and awareness level can be built up. In practice, this could mean conferences or working groups introducing and discussing basics of e-governance, such as going through the digital and analogue elements listed in Chapters 2 of this report and explaining what they mean in the sense of concrete steps. To do this based on African examples from the countries in Group 1 and to some extent Group 2 will make the discussions more relevant.
The steps to be taken to proceed to the higher category are essentially the same as mentioned above, with a difference in degree rather than substance.

- Adoption of strategies, programmes or other policy documents
- Identification of organisational structure for e-governance implementation (and/or for the creation of the mentioned policy documents)
- Creation or updating and improvement of government web-portals
- Analysis if legislation to identify the need for legal reforms to enable e-governance
- Improved technical infrastructure
- Involvement in international (regional, cross-border) initiatives

Chapter 5. Deployment matrix

The development of e-governance requires the existence of certain organisational and technological capabilities. Any country that wants to build e-governance should assess their level of the required prerequisites and, if necessary, bring them to the appropriate minimum level. We have described the relevant prerequisites previously in Chapter 2, with an overview of the situation in Africa in Chapter 3, which provides examples of how countries have met these pre-requisite key elements. Here we present the matrix - a tool for indicating the level of e-government in a country and to determine the key elements that should be addressed first and foremost even if the work on different issues should proceed in parallel. The first row of the matrix in Table 1 lists the e-government key elements in order of importance, starting with the most important key elements trying to give directions to start with.
In Chapter 6, we present the roadmap to proceed toward the highest level of accomplishment for the key elements and how to advance from one level to another.

Table 1. Deployment matrix

e-government key elements	Minimum level	Basic level	Useful level	Sustainable level
Political will and change management	There is no political support to e-governance and existing digital systems are operating under sectorial ministries functions ☐	High level political leadership, for example, head of state is an e-governance spokesman ☐	Policy documents have been adopted at high level, for example "Fundamentals of Information Policy" or "Digital Agenda" ☐	The development of e-governance has been a national priority for a long time, for example at least 3 years of governance ☐
Coordinating institution	Existing digital systems operate and are developed without coordination ☐	Such institution is established and mandated ☐	• Policy papers and related documents; • E-governance strategy, budget and action plans are drafted ☐	Manages overall e-governance architecture and developments from a holistic point of view ☐
Coordinating institution: Financing model	Existing digital systems budgeting is based on ICT procurement with no impact analysis ☐	Each ministry and government agency have an ICT budget record ☐	At the state level, the e-governance total costs and how much resources are planned for e-governance each year is known ☐	The national e-government financial model is in line with the long-term e-governance strategy which helps ministries and authorities to manage the risks arising from cyclical planning of the state budget ☐
Legal framework	Existing legislation includes basic ICTs related legislation based on international requirements ☐	There is readiness to supplement the existing legislation with details arising from e-governance solutions, for example, add a provision like "… the right to receive information electronically" ☐	A minimum number of legal acts of specific relevance for e-governance have been adopted. For example, regulation for • data protection; • electronic identity and signature; • civil registers ☐	All legal acts take into account the details of e-governance solutions ☐
International frameworks	No or very limited activity in international frameworks ☐	Member in and participating in international frameworks but not undertaking activities related to e-governance ☐	Takes part in and benefits from cooperation ☐	Active participant in projects linked to e-governance ☐

Table 1. Deployment matrix (continue)

e-government key elements	Minimum level	Basic level	Useful level	Sustainable level
Access to services and awareness rising	Poor awareness, few (if any) services available and no demand from people ☐	Some services available, basic information available on how to use them and some limited information campaigns ☐	Information campaigns have been held, many services exist and more concerned people know how to use them ☐	A wide range of services available and very good knowledge on how to use them ☐
Government portal	Information sharing takes place at different government websites with no regular updating ☐	The government portal only shares information ☐	e-services are also available on the government portal ☐	Information and e-services are securely accessible in various e-channels using any devices ☐
Government portal: Catalogue of data and services	No catalogue of data and services available ☐	Technical solution deployed and governance organization established ☐	Significant amount government registers and databases are described in a catalogue ☐	All government registers and databases are described in a catalogue. The coordination process established. ☐
Government portal: Digital database	Some digitised databases are deployed ☐	Some digitised databases are deployed and some of the data shared ☐	Significant amount of government registers and databases are digitised. All digitised data is described and meaning of the data shared ☐	All government registers and databases are digitised. All digitised data is described and meaning of the data shared ☐
Government portal: Secure Exchange of data	Data exchange takes place in some cases with bilateral technical implementation ☐	Technical solution deployed and governance organisation established ☐	Significant amount of government registers and databases exchange data over the secure data exchange layer ☐	All government registers and databases, some private sector information systems are connected to the exchange data layer and reported readiness for cross border data exchange exists. ☐

Table 1. Deployment matrix (continue)

e-government key elements	Minimum level	Basic level	Useful level	Sustainable level
Secure digital identity	There are several, different technological methods for digital user authentication at different government institutions ☐	Identity register established and unique personal identification mechanism agreed. ☐	ID card issuing system established and significant amount of citizens have ID cards. Personal identification information is usable electronically ☐	Secure technology used for digital identity ☐
Digital signature	Technical solution is planned ☐	Technical solution deployed ☐	The regulation is in place ☐	Digital signature is used to a significant degree in everyday life ☐
Secure digital identity and digital signature: Interoperability framework	Interoperability takes place on bilateral agreements between different government institutions ☐	The requirements for technical interoperability are described ☐	The syntactic and semantic interoperability (agreed common data format and sharing meaning of the data) are described ☐	The organisational interoperability is described ☐
Secure digital identity and digital signature: Security framework and the system of security measures	Cyber security responsibility is at ICT systems operations level at different government institutions ☐	Cyber-security has been assessed and the awareness of the actual situation noted. (For example, fulfil questionnaire for cyber security index) The institution that is responsible for coordination of cyber security issues has been established and mandated. ☐	The national CERT has been established and mandated, furthermore the system of security measures has been drafted. ☐	All ministries and government agencies use the system of security measures and an appropriate audit process is established ☐
Infrastructure issues	Access to telecommunication infrastructure and services is limited to selected institutions only ☐	Telecommunication network infrastructure developed by dedicated companies with international connectivity ☐	Competitive telecommunication services market with incentives for continuous innovation and coverage improvement ☐	Private and Public cloud (managed by principle of public-private partnerships) and automated development environment ☐

Chapter 6. Roadmap to implement the matrix

This roadmap aims to show in a brief but comprehensive manner what different steps are included in e-governance development. Both the matrix and roadmap can serve as a checklist for those responsible in a state for e-governance development as well as the EU for evaluation and policy development. Additionally, eGA experts propose set of activities for the capacity building in African countries, which help to raise the level of expertise among persons involved with e-governance development and implementation.

The components of each key elements contained in the matrix can – and in many instances, should - to a large extent be handled in parallel since the various issues are closely connected. The steps do not need to be taken in any specific order, but each country can decide on the order, the consecutive or parallel nature and so on. It would thus be futile and not in line with best practice to attempt to make an order of importance or a chronological order in which the steps should be taken to advance the level of e-governance in a particular state or group of states. To illustrate what this means, the example may be mentioned that a state can introduce wide-spread interoperability of databases for a more efficient administration even without providing services directly to the public, in which case personal digital identification does not have to be a priority. It is equally possible to provide many electronic services to the public in a sectoral manner, without interoperability of all or the majority of databases. To further emphasis this point, we may refer to some European examples.[93] We can see examples in Europe of a state (the United Kingdom) with a high position in e-governance rankings thanks to a wide availability of electronic information and downloadable forms, even if the country lacks not just a single digital on-line identity but even a single digital identifier as such, as well as of a state with many on-line services despite an absence of interoperability of databases (Sweden).[94] States at different levels in the development of e-governance will have adequately dealt with some of the issues already but the enumeration includes matters that are of relevance for any state – whether starting out or perfecting existing e-governance.

Capacity building

- Transfer of expertise: expert visits, study trips, seminars, presentation of international best practices, education and training of designated officials or other means of consultation. Topics to be considered: opportunities and challenges of a digital society and e-governance, how to use ICT, social media and mobile tools for clean and transparent government, inclusive and participative governance, international best practices regarding catalogue of data and services, digital databases and technical solutions for secure exchange of data, trust services, national CERT responsibilities and system of security measures and an appropriate audit process, best practices of regulatory authorities, etc.

93 Examples are also available from other parts of the world. See A.T. Chatfield and O. Alhujran (2009) "A cross-country comparative analysis of e-government service delivery among Arab countries", Information Technology for Development, 15(3), pp.151-170.
94 https://publicadministration.un.org/egovkb/en-us/Reports/UN-E-Government-Survey-2016

- Practical support through assistance on drafting. Areas to be considered: needs assessment for training and development of e-governance, e-governance strategy and roadmap formulation, e-governance coordination and institutional capacity building plan, budget and financial management to ensure transparency and accountability, legal analysis to help identify potential legal inconsistencies, drafting of law and at more advanced level support for the regional and African Union level legislation harmonisation processes, drafting of cooperation strategy, provide information regarding international organisations and encourage to participate in international cooperation, corporate social responsibility action plans (to support ICT and mobile use among young and less favoured groups), education plan in e-governance related topics, including civic society, Non-Governmental Organizations (NGOs), the telecom-ICT industry as well as government, agile development methods suitable for development and planning, drafting of catalogue, drafting of organisational interoperability, creation and regulatory matters of national CERT.
- Practical support through assistance on: information campaigns or other activities to inform citizens and NGOs of e-government services, provide contacts and twinning opportunities with suitable counterparts in other countries.
- Implementation support on: donor coordination activities, creation of networks for multinational projects for budget planning and compilation of budget, develop open, transparent and competition-supportive ICT regulations, IT development, cyber security assessment.
- Financial support on: digitisation of databases, digital information management, development of physical infrastructure, to cover travel expenses and/or networking expenses, cost of drafting of legal framework.

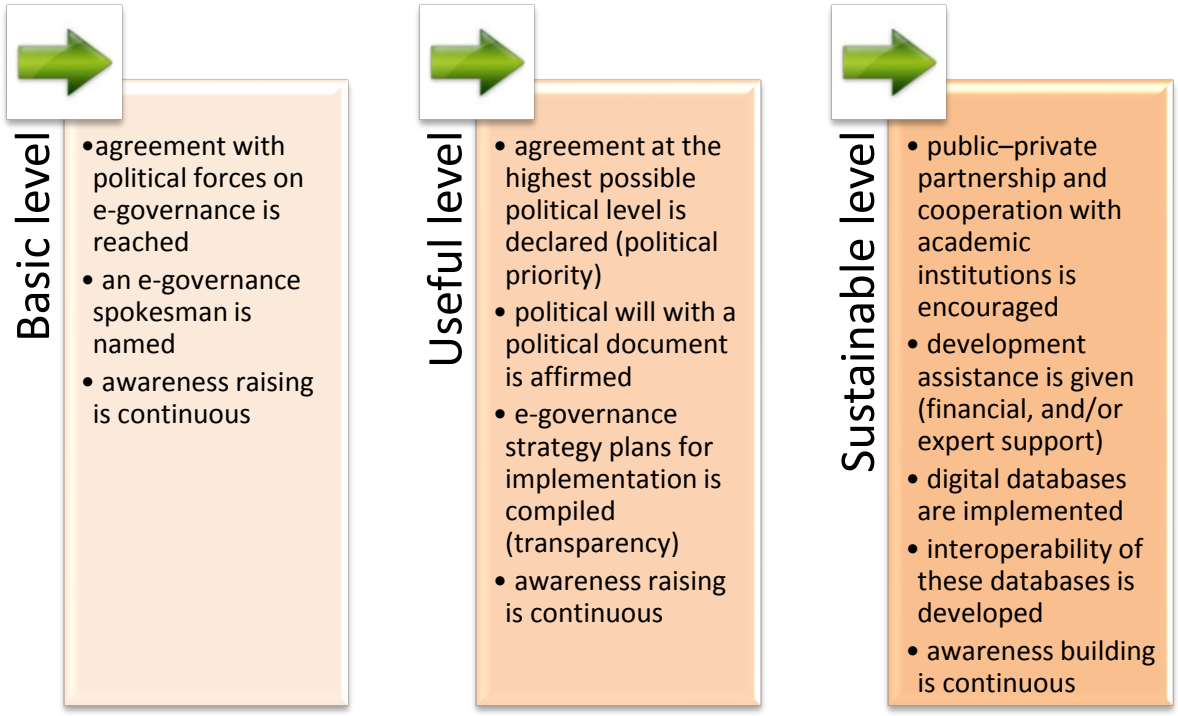
6.1 Political will and change management

This component includes ensuring high-level political leadership that leads to the adoption and implementation of relevant policies and agendas. The introduction of e-governance should be a political priority and an agreement between all political forces in the country is desirable. Political will must be declared at the highest possible political level, for example, the President or the Parliament. For this to have proper effect, it is important to identify roles and determine responsibilities for coordination and implementation; encouraging public–private partnership and cooperation with academic institutions. The agreement shall state the use of digital technologies to be successive and as a main method of developing society as well as addressing the challenges and problems of society. Political will, if possible, should be affirmed with a political document, such as "Fundamentals of Information Policy", which would be a guarantee of such will.

By definition, government is by the people and for the people. It also is run by people. To change the daily routines of the people working in government requires motivation, but government officials can be motivated. Change management is about releasing their energy and stimulating their ideas to re-engineer existing public services and related operations within government. Government and its leaders must be able to change the

mindsets of officials at all levels. As stated above, political leaders need to stay engaged and commit time, budget, and even political capital to the cause of e-governance. [95]

In addition, ongoing open Government and e-governance capacity building is necessary. The steps mentioned below can in most instances beneficially be dealt with in parallel.

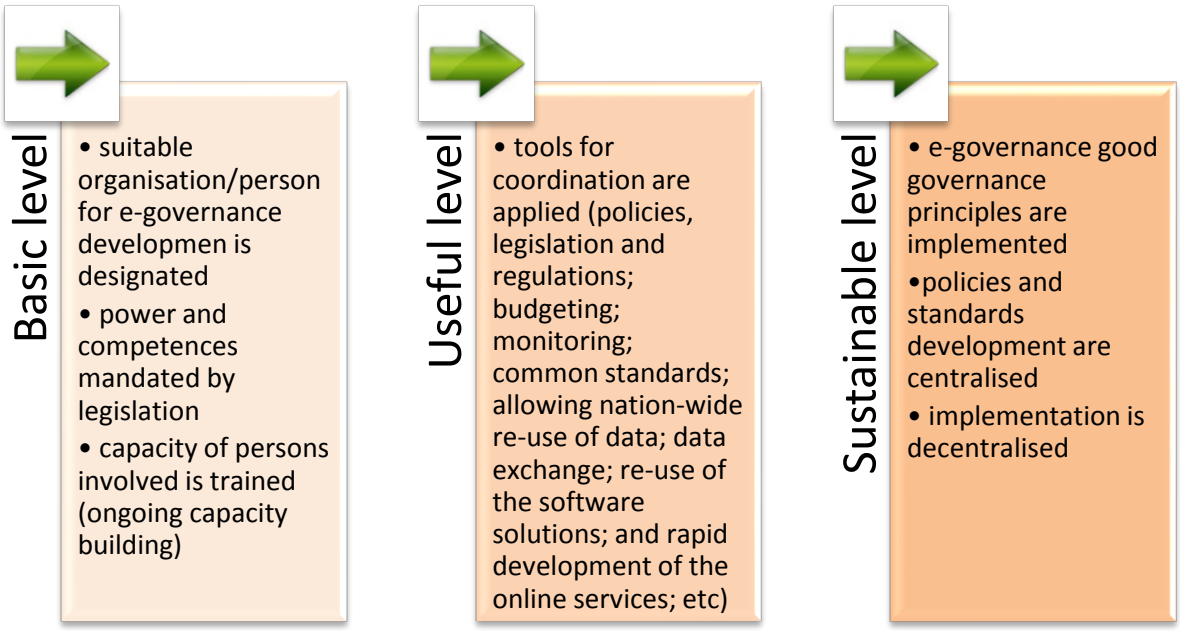


6.2 Coordinating institution including financing model

6.2.1 Coordinating institution

This component includes designating an institution which will have the mandate to take decisions on e-governance for the entire administration. It is possible to have regional (federal state) solutions, but in any event coordination will be needed. This does not mean centralising but ensuring that relevant decisions are properly coordinated. The coordinating institution is responsible for the strategic planning necessary for a state building e-governance and, more generally, an information society. The higher in the hierarchy the appointed unit is, the better the chances of directing ministries and agencies. The power and competences of the coordinating institution should be determined by legislation.

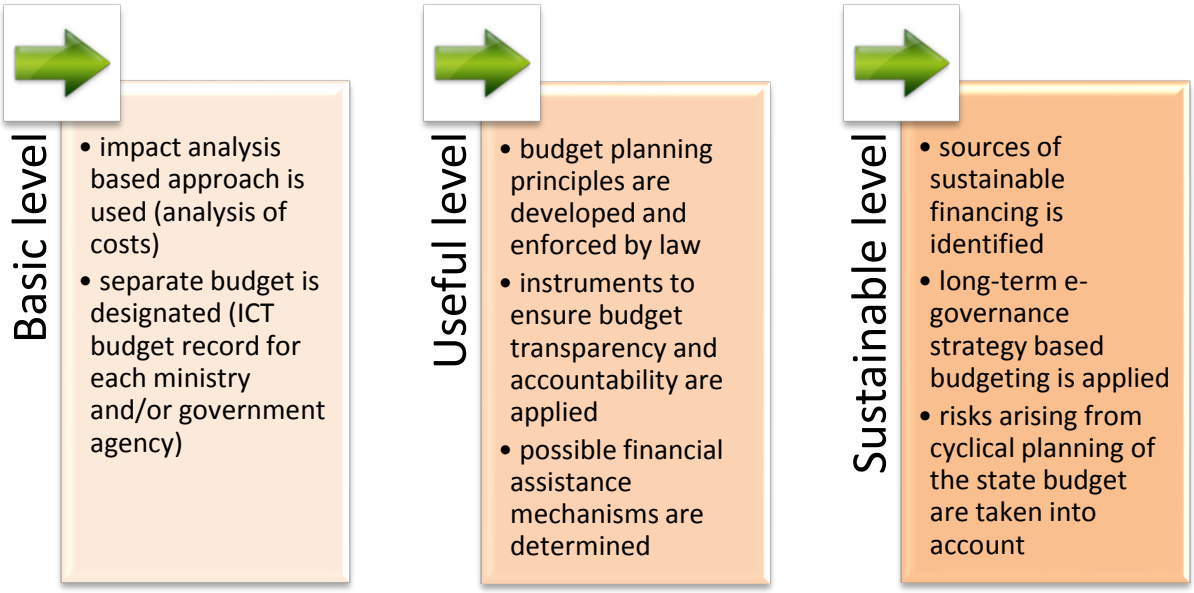
95 Hannes Astok "Introduction to e-Government", e-Governance Academy (2017)



6.2.2 Financing model

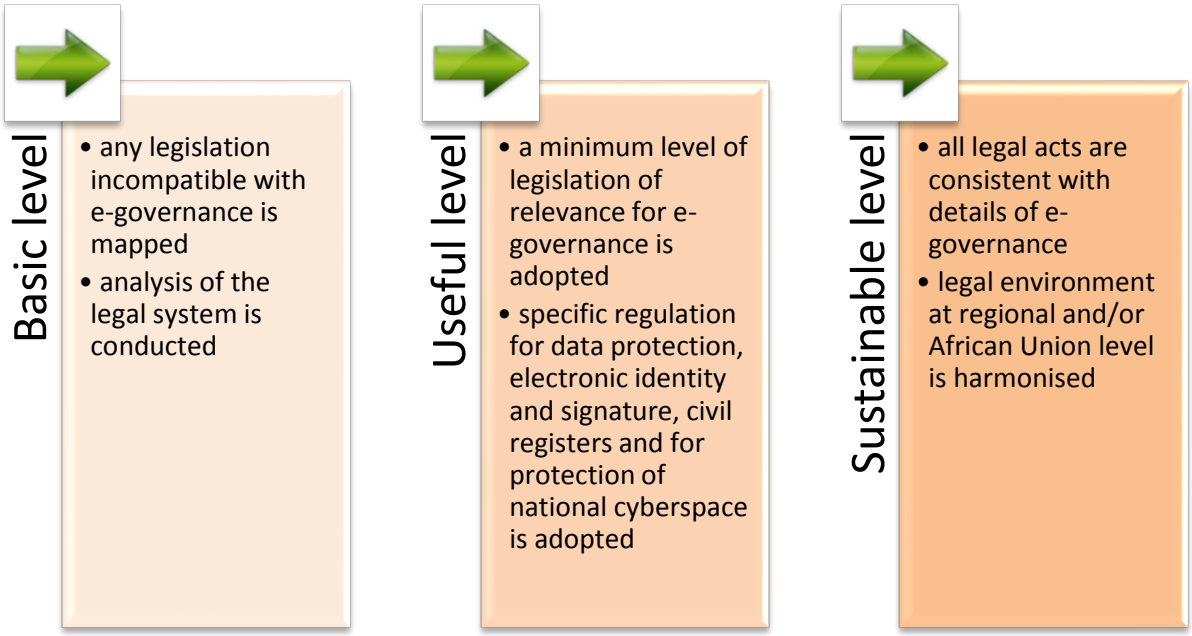
General financing and financial models for e-services need to be developed in order to ensure sustainability. For every e-governance solution, the total cost of ownership of the solution must be planned.[96] The introduction of e-governance will have a cost, even if it will soon lead to savings in other respects, so it is essential that there is adequate provision for the necessary funds in a sustainable manner. The provision can be made centrally but also at the level of specific institutions, but in any event sufficient financing should be provided on a medium- to long-term basis preferably through multi-annual budgeting. Authorities must be able to manage the risks arising from cyclical planning of the state budget. For example, in the state financial forecast a separate budget line is allocated for the development of e-governance. To support that allocation, legislation should establish the procedures of planning the e-governance budget and managing the use of budgetary resources. In principle, transparency and accountability of the financial model needs to be ensured.

96 Service Strategy based on ITIL V3, (5.1 Financial Management)



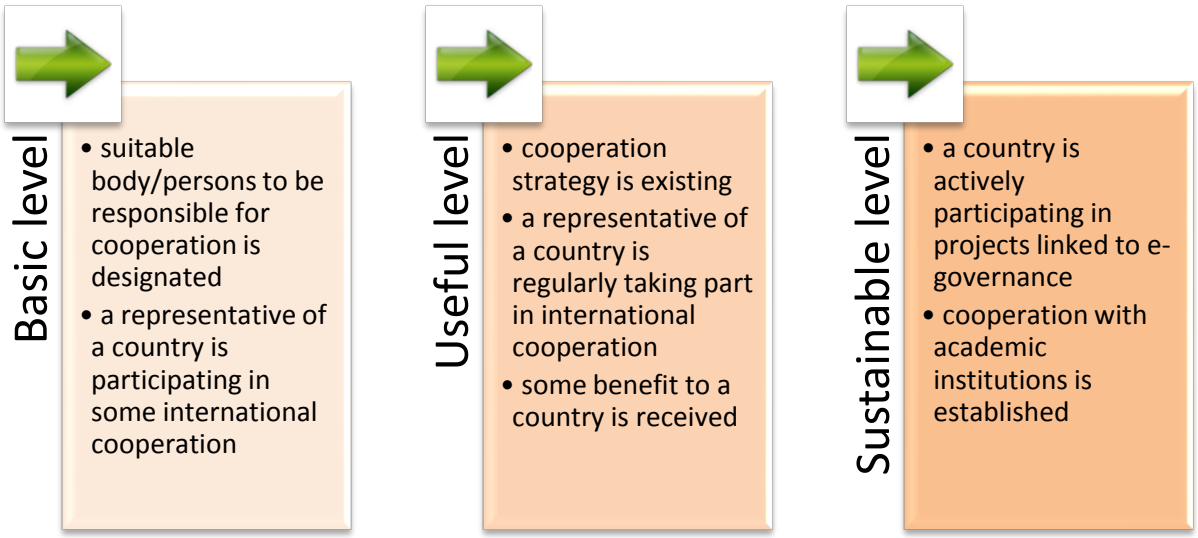
6.3 Legal framework

There are no legal pre-requisites for starting the process of introduction of e-governance. This means that it is irrelevant if the country has a continental or civil law system for example. There are however a number of laws that need to be looked at and this legal overview should be made in the early stages of e-governance development. The more innovative the e-governance solution, the more it changes the existing workflow. Larger changes in the workflow often require more fundamental changes in legislation. It is essential to identify if any changes are needed to be able to accept electronic information for example. Some additional legislation may be needed on electronic signatures and data protection legislation may require strengthening, but what exact legal work is required is very country-specific. In addition to laws, strategies and plans need to be developed and drafted, thus clearly indicating the connection between the legal component and the governance one. Political will plays an important role in changing the legislation.



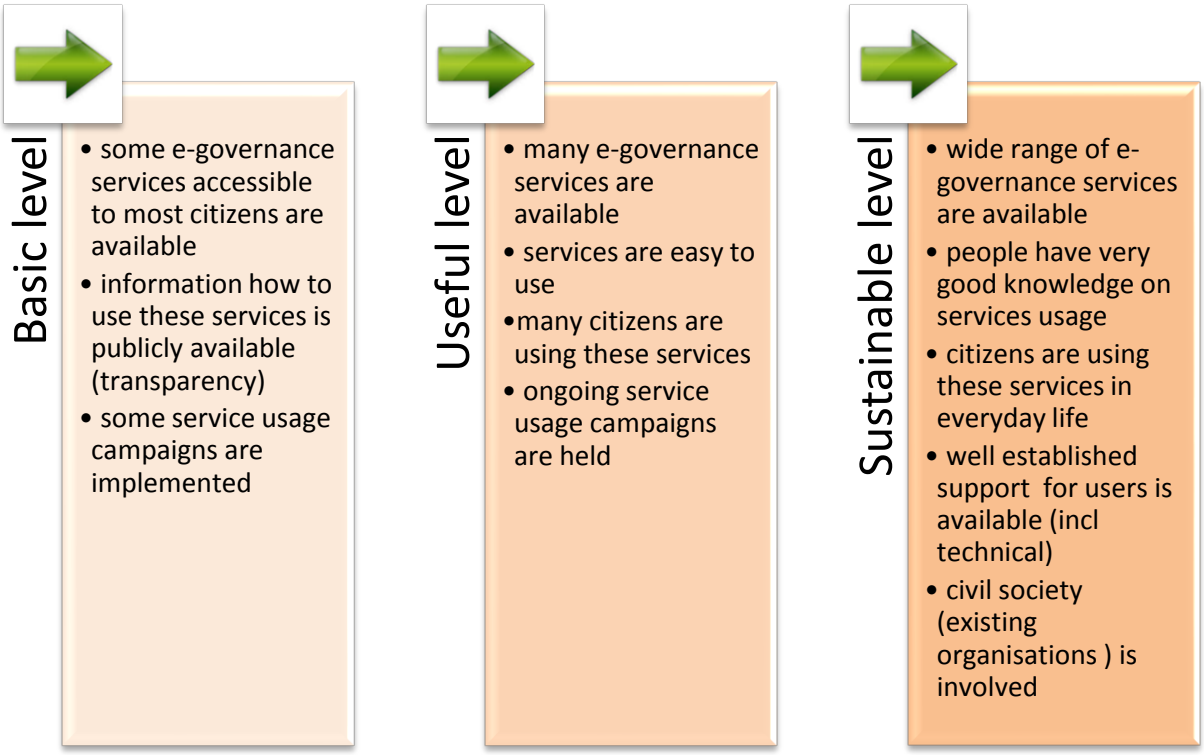
6.4 International framework

In order to benefit from the advantages that e-governance can provide for international relations (trade, free movement, research and education, etc.) it is very good for states to participate in international frameworks (regional or other). In addition, such cooperation can help states to learn from one-another, to create joint projects and similar.



6.5 Access to services and awareness raising

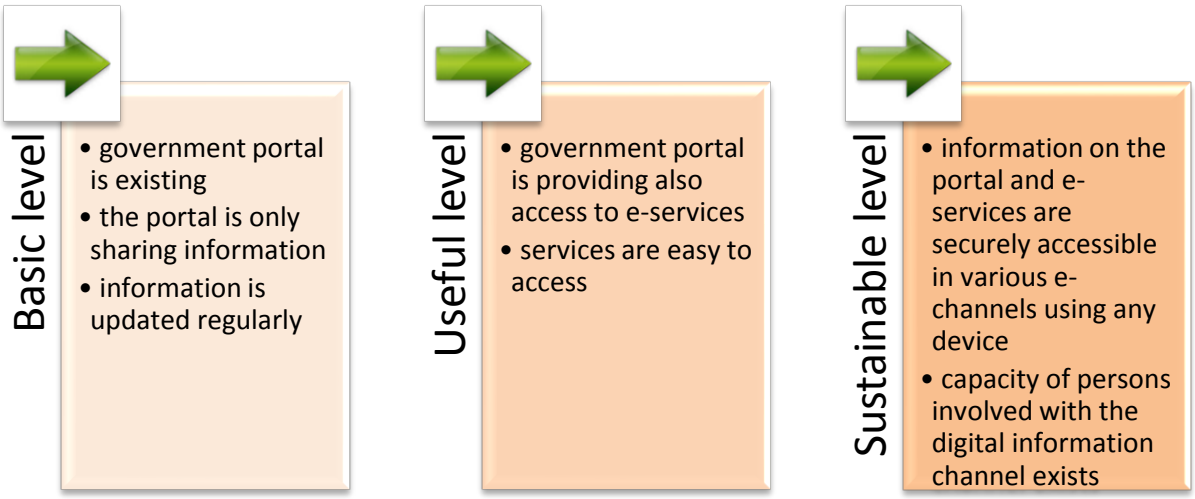
A parallel and overarching issue is that of citizen engagement. For successful e-governance it is beneficial to examine how it may be possible to support civil society and encourage citizen engagement. This is a part of the process of awareness raising about the digital society and general computer literacy development.



6.6 Government portal, including catalogue of data and services, digital databases and secure exchange of data

6.6.1 Government portal

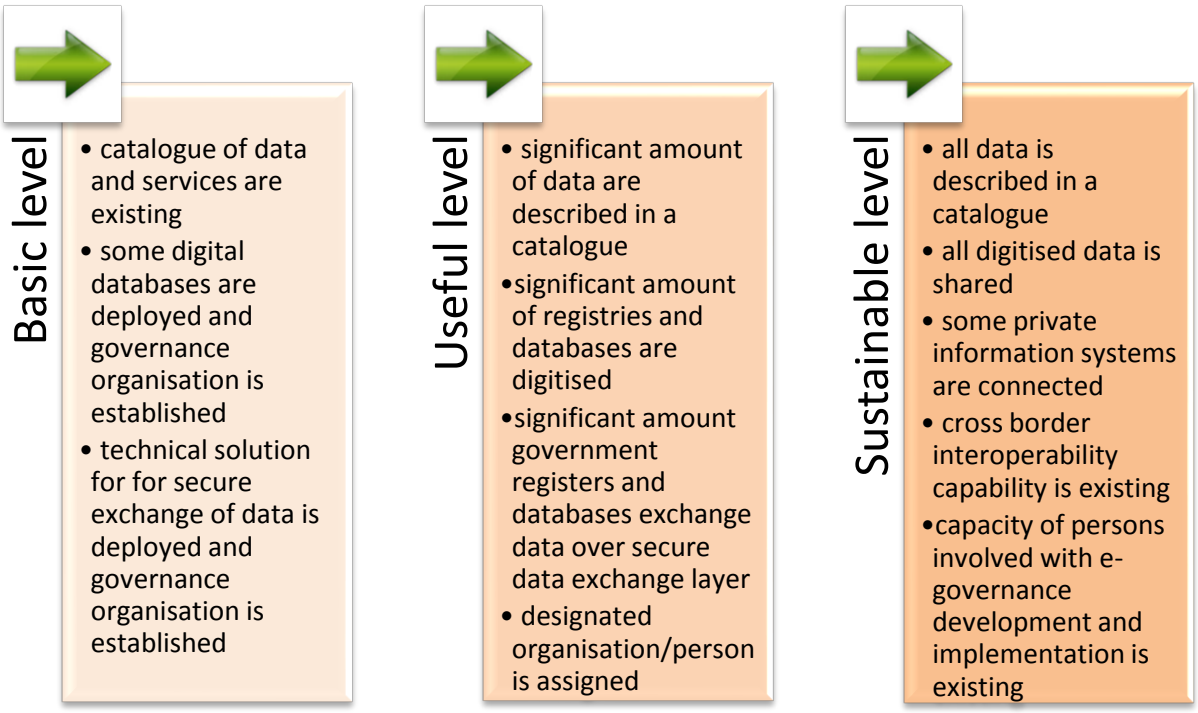
In order to communicate with the public, the administration must establish a device- and technology-neutral digital information channel, such as a government portal operating on different devices. The information channel is used to provide both information services and procedural services. A well-functioning digital information channel will transform government services into a single whole and improve the availability of public services. In Africa, the priority is to develop services for mobile devices.



6.6.2 Catalogue of data and services, digital databases and secure exchange of data

A clear overview of the existence of data and services is essential to be able to continue the complete digitisation of databases and establish means for secure exchange of data. At the same time, the catalogue provides a service in itself, by giving an overview of what is available so that new services can be established, usefulness of services determined and so on. The digitisation of public services means that ministries and government agencies capture and process data in a machine-readable form. Developing e-governance requires at least some digital databases and the needs for digital data exchange between databases. It is desirable to create or organise a personal identity database as soon as possible.[97]

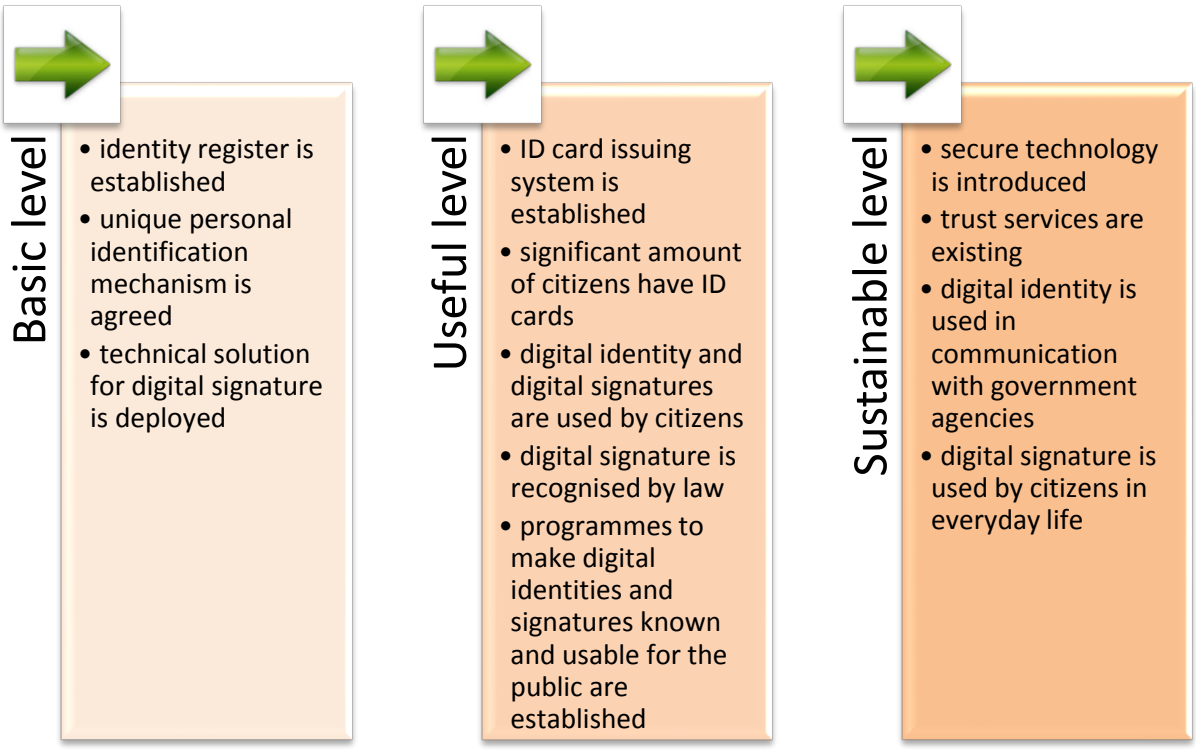
97 http://www.id4africa.com/ (2017)



6.7 Secure digital identity and digital signature, including interoperability framework and security framework

6.7.1 Secure digital identity and digital signature

Development of the digital identity concept and tools must be made. If e-governance services are to be useful for all types of governance tasks, it is essential that the persons using them can identify themselves in a secure manner. This includes mobile ID or digital ID via computers, including a digital signature. Signatures must be secure enough to be recognisable as evidence in court or similar situations.

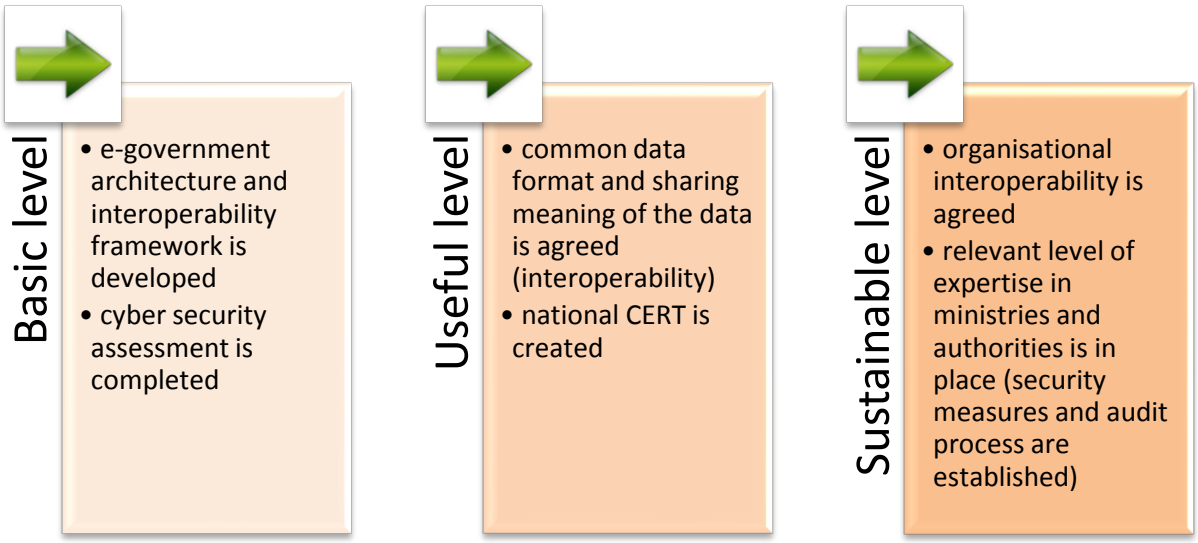


6.7.2 Interoperability framework and security framework

Interoperability framework is part of the secure digital identity. Requirements of technical interoperability need to be described at an early stage. Syntactic, semantic and organisational interoperability need to be developed gradually. E-governance solutions that create value for society are created in various ministries and government agencies. It is necessary to agree on a minimum set of rules that will ensure the development of the emerging e-governance solutions. The necessary rules for co-ordination need to be agreed in political, organisational, legal and technical terms.[98] The design of the interoperability framework should be the responsibility of the coordinating institution. The initial version of the interoperability framework should be established as soon as possible, and compliance with it must be made compulsory for all parties. Compliance with the agreed rules helps to use the existing state resources expediently. The interoperability framework will evolve with the development of e-governance key elements.

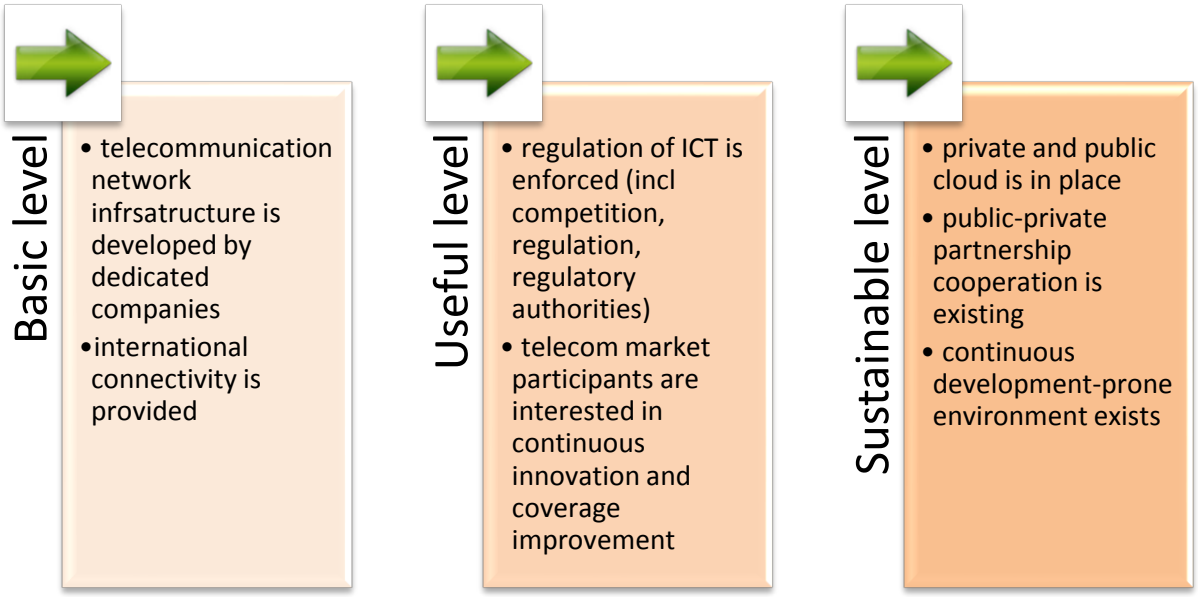
The growing cyber threats in the world require the administrations to focus on ensuring e-governance security measures. It is important to be aware of the threats and the security level of the e-governance. The coordinating institution is required to organize the development, monitoring and supervision of relevant cyber-security rules and measures. A designated organisation in the form of a CERT should be established, proper audit processes established, and all ministries and authorities should be aware of and use adequate security measures. The cybersecurity framework and the system of security measures should be established by legislation.

[98] https://ec.europa.eu/isa2/eif_en (2017)



6.8 Infrastructure issues

Access to ICT is essential as a basic prerequisite for e-governance. It is however not the core focus of this report as access to ICT is not only or primarily linked to e-governance, but a much wider issue. Assistance to infrastructure capacity building should consequently not normally be part of e-governance support activities. A minimum level of ICT infrastructure capacity is instead a prerequisite to be able to proceed with e-governance projects. Communications networks are built by commercial companies. The state's task is to regulate the development of the networks and provide favourable conditions for the residents to access the network. For example, electronic communications legislation should be developed and enforced. It is the responsibility of the state to connect all state and local government agencies, schools, libraries, hospitals and other public authorities, using the existing network. In order to accomplish this task, for example, an agency should be set up to plan and manage the usage of existing, or construction of new, broadband network connections necessary for public authorities.



Chapter 7. Guidelines and recommendations

The guidelines and recommendations presented in the current chapter should be seen in relation to the roadmap and aim to provide guidance for the comprehensive development of the digital transformation of African continent. There is no consecutive or necessary order of preference in which to introduce or increase use of e-governance as they depend on the present level of the e-governance deployment but also on the national priorities and roadmaps that in most cases are yet to be defined. These recommendations suggest general ways in which it is possible to proceed in a more effective fashion, given the above-mentioned diversity and plurality in the way states will move towards increased e-governance. This section also include some recommendations tailored to specific group of countries; it needs to be stressed, however, that these recommendations are only broadly indicative. eGA firmly believes that whether/not to implement different components of e-governance and the exact type of support needed are issues to be decided/established in consideration of each country's needs and will, and therefore, the roadmap and set of recommendations may vary considerably within groups as well as resemble between groups.

1. **Support national capacity building and the creation of clear organisational structures** for the implementation of e-governance in the country. It is essential that there are clear structures with an established mandate and competence for e-governance implementation. In the absence of this, there is a risk of uncoordinated work and a lack of sustainability. The relevant organisations would also be responsible for the national coordination and international cooperation mentioned above. The designated organisation would have the main responsibility for the implementation of the roadmap and will be able to participate in regional initiatives to support such implementation.

Specifically for Group 1: Political and technical awareness and capacity building.
Support to the development and capacity building of designated organisation(s) through study trips, expert visits, seminars, drafting assistance. Support to establishment of the roadmap for e-governance deployment that is in harmony with broader national development policy goals and supports them with digital capacities. Drafting assistance to budget and financial management to ensure transparency and accountability, legal analysis to help identify potential legal inconsistencies, legal drafting assistance.

Specifically for Group 2: Roadmap planning and implementation support.
Assistance with designation of and/or initial training of the designated organisation(s); education and training of designated officials or other means of consultation. E-governance coordination and institutional capacity building plan. Budgeting e-governance roadmap with clear financial and organisational plan for implementation. Financial support on: digitisation of public administration working processes and databases, digital information management, development of physical infrastructure. Drafting enabling legal frameworks that support the implementation of the e-governance roadmap with enforcement capacity building.

Specifically for Group 3: Initiation of flagship initiatives with high digital impact on national development goals.
Advanced knowledge-transfer on the specific competences to help design, planning, implementation and administration of the e-governance services under the responsibilities of national coordination authorities. Roadmap management, private-public partnership models, advances sandbox regulations drafting support that facilitates the innovation in e-governance.

2. **Support the idea of regional cooperation outside of existing regional organisations**, especially for knowledge transfer between countries. The level of development of e-governance in the African continent varies, but there is a lot of relevant expertise in many countries. Examples from one country may be very useful for another country, especially in the same region. There can be similarities that can benefit from a similar treatment or potential for cross-border services and harmonisation. Centres of excellence can be created in some countries, providing a focal point for the region.

   Although there are many benefits from using existing structures as set out above, there may be a need to create new bodies either independently or in some form as part of existing organisations. The reason may be the need to have a focused expert body for the specific tasks needed to introduce and strengthen e-governance, with the ability to design projects, attract the relevant competence, form suitable teams and so on. Such centres of excellence may group together countries at different levels of e-governance development for transfer of ideas and knowledge and to carry out technical assistance projects for countries at a lower level. Projects should normally be designed so that they include countries from all different categories in

our categorisation of states. Such varied participation can be a condition for financial support for projects, from external or African donors and funders.

Although it is not advisable to make pilot projects for the reasons explained in the Introduction above (as the process of governance is too country-specific), it is possible to benefit from models and examples from other countries. The best way to do this without risking an excessively top-down and inadequately culture-conscious approach, is to conduct projects in groups of countries that transfer knowledge and experience as elements of the cooperation.

Specifically for Group 1: Identify the specific strengths of these countries, together with the countries, and suggest best ways to share these best practices in the region. Seminar, development of material for sharing of best practices.

Specifically for Group 2: Practical support through assistance on: information campaigns or other activities to inform citizens and NGOs of e-government services; provide contacts and twinning opportunities with suitable counterparts in other countries.

Specifically for Group 3: Practical support (travel or networking costs) as well as education to enable benefiting from regional best practices. Implementation support on donor coordination activities. Enabling the knowledge transfer initiatives, learning from and teaching to peers. In cases of need practical support on managing particular advanced support services for the less advances countries in areas like practical cyber security, hosting of data centres and managing specific applications.

3. **Support existing regional structures in Africa**, such as primarily the African Union (AU), so that a regional approach can be taken, making use of the benefits of scale, the added attraction of e-governance solutions thanks to their cross-border effect, and ensuring a seamless introduction of e-services. Fragmentation is avoided, and e-governance can support businesses as well as individuals in the whole continent, by laying the groundwork for permitting mutual recognition of documents, facilitated cross-border trade and travel, simplified cross-border transfers of assets, mutual cooperation on cyber security and so on.

   The AU has launched a number of initiatives concerning different e-governance related issues. These initiatives could be supported as well as built upon, thus benefiting from the work already undertaken as well as making use of existing institutional structures. Matters that benefit especially from a cross-border approach include e-identities, harmonisation of standards and the creation of interoperability frameworks that can be used internally or cross-border. The AU – given its pan-African nature – is especially useful for the adoption of common principles for future development of e-governance. The use of the AU with its wide membership permits all countries to benefit from the activities, in the manner and to the extent that it is suitable for their level of readiness for e-governance (as described in our categorisation).

Specifically for Group 1: In conjunction with the states of this group, provide advanced level support for the regional and African Union level legislation harmonisation processes, drafting of cooperation strategies.

Specifically for Group 2: Creation of networks for multinational projects for budget planning and compilation of budget, develop open, transparent and competition-supportive ICT regulations, IT development, cyber security assessment

Specifically for Group 3: Recognising the evolving best practices and flagship initiatives, supporting the knowledge transfer for the most experiences cases. Covering travel expenses and/or networking expenses. Implementation support on donor coordination activities.

4. **Support sub-regional organisations in Africa**, like EAC, ECOWAS, SADC and others, in addition to the pan-African cooperation through the AU. The sub-regional organisations have in many cases been active on specific solutions for practical matters in their regions, linked e.g. to free movement and trade. Such initiatives can benefit from e-services.

   Several sub-regional initiatives exist that are related to matters of importance for e-governance and it is efficient to build on existing initiatives as well as the organisational set-up related to these. The smaller and more focused organisations may provide a more workable environment for the implementation of specific projects compared to the AU. Similarly, as with the AU, albeit in the smaller contexts, the use of organisations permits many states to benefit from the activities. Also, states that currently for different reasons are unlikely to be able to undertake projects can gain some insight through their membership of regional organisations and have a framework in which to participate when circumstances allow.

   Specifically for Group 1 and 2: In conjunction with the states of this group, provide advanced level support for the regional and African Union level legislation harmonisation processes, drafting of cooperation strategies. Creation of networks for multinational projects for budget planning and compilation of budget, develop open, transparent and competition-supportive ICT regulations, IT development, cyber security assessment

   Specifically for Group 3: Recognising the evolving best practices and flagship initiatives, supporting the knowledge transfer for the most experiences cases. Covering travel expenses and/or networking expenses. Implementation support on donor coordination activities.

List of Annexes

Annex 1 – Government portals[99]

Country	Government portal
Algeria	http://www.el-mouradia.dz/
Angola	http://www.governo.gov.ao/
Benin	http://gouv.bj/
Botswana	http://www.gov.bw/
Burkina Faso	http://www.gouvernement.gov.bf/
Burundi	http://www.burundi.gov.bi/
Cameroon	http://www.spm.gov.cm/
Cape Verde	http://www.governo.cv/
Central African Republic	http://www.rca-gouv.net/
Chad	http://www.gouvernement.td/en/
Comoros	http://beit-salam.km/
Congo	http://www.presidence.cg/accueil/LenouveaugouvernementduCongo.php
Cote d'Ivoire	http://www.gouv.ci/
Democratic Republic of the Congo	http://www.presidentrdc.cd/
Djibouti	http://www.presidence.dj/
Egypt	http://www.egypt.gov.eg/
Equatorial Guinea	http://www.guineaecuatorialpress.com/
Eritrea	http://www.shabait.com/
Ethiopia	http://www.ethiopia.gov.et/
Gabon	http://www.gouvernement.ga/
Gambia	http://statehouse.gov.gm/
Ghana	http://www.ghana.gov.gh/
Guinea	http://www.presidence.gov.gn/
Guinea-Bissau	http://www.gov.gw/
Kenya	http://www.mygov.go.ke/
Lesotho	http://www.gov.ls/
Liberia	http://www.emansion.gov.lr/

[99] Accessed August 2017.

Libya	http://www.pm.gov.ly/
Madagascar	http://www.presidence.gov.mg/
Malawi	http://www.malawi.gov.mw/
Mali	http://www.gouv.ml/
Mauritania	http://www.mauritania.mr/
Mauritius	http://www.govmu.org/
Morocco	http://www.maroc.ma/
Mozambique	http://www.presidencia.gov.mz/
Namibia	http://www.gov.na/
Niger	http://www.gouv.ne/
Nigeria	http://www.nigeria.gov.ng/
Rwanda	http://www.gov.rw/
Sao Tome and Principe	http://www.saotome.st/
Senegal	https://www.sec.gouv.sn/
Seychelles	http://www.gov.sc/
Sierra Leone	http://www.statehouse-sl.org/
Somalia	Different ministries websites available
South Africa	http://www.gov.za/
South Sudan	http://www.goss-online.org/
Sudan	http://sudan.gov.sd/
Swaziland	http://www.gov.sz/
Togo	http://www.republicoftogo.com/
Tunisia	http://www.tunisie.gov.tn/
Uganda	http://www.statehouse.go.ug/
United Republic of Tanzania	https://www.tanzania.go.tz/
Zambia	http://www.statehouse.gov.zm/
Zimbabwe	http://www.zim.gov.zw/

Annex 2 – Digital Identity in African Countries

The following table lists general comments on e-governance in African Partner Countries plus specific information on digital identity, if and when such information is available. The information provides additional data on the situation in the various countries concerning matters that are not included in the quantitative tables made by various international organisations, as it is based on narratives by different organisations, media outlets, academic articles and so on. Sources are provided so the relevance and veracity of the information can be assessed. The table is not intended to replace rankings, but to provide additional narrative. The absence of information is consequently also informative as this shows that thorough searches of various sources by eGA experts have not given any information. This indicates that no plans exist or if they do, they are not transparent. The searches for information were carried out throughout the writing of the report in 2017.

Scale: no reference – NO National ID; National ID - exists but it is NOT e-ID (at least on card); e-ID – electronic national ID exists (at least partially).

Country	General comments on e-Governance	ID cards	Sources
Algeria	**E-Algeria:** The Algerian action plan is organised around 13 major axes, for each axis a portfolio was developed followed by a definition of specific- and key objectives list to achieve by the year 2013. Algeria has opted for a highly centralised and closed structure with many (all of them public) players with overlapping prerogatives and without much coordination. Designed in 2000, the process was expected to result in the deployment, by 2013, of more than 300 online services to the benefit of Algerian citizens and businesses. Unfortunately, many set goals were never achieved mainly because of a shift in priorities dictated by regional changes (such as security issues) and delays in the deployment of the necessary infrastructure.	e-ID (electronic national ID) Launched in January 2016, the new Algerian biometric identity card is emblematic of the country's modernisation goals.	Accessed November 2017, http://www.sobiad.org/eJOURNALS/journal_IJEBEG/arhieves/2013_1/Djilali-Idou.pdf November 2017, http://www.gemalto.com/govt/customer-cases/new-national-identity-card-algeria
Angola	**Angola National ID Card Program –** The Angolan government decided to replace its outdated national identity documents in the mid-2000s with an ID card system that was not only counterfeit-resistant and durable, but would also provide proof of identity to its entire population of 24.3 million citizens - a daunting task given that 62% of the population lives in widely dispersed urban areas and 38% live in hard to access rural areas.	e-ID The ID Card program was implemented by 2015.	HID case study, https://www.hidglobal.com/sites/default/files/resource_files/hid-gov-id-angola-cs-en.pdf

Benin	Benin's government plans to convert the country into a platform of digital services for West Africa by 2021. One of the goals is to ensure nationwide and affordable access to Internet, a systematic and stepwise establishment of a national plan that is likely to enable over 3000 km installed fibre optics by 2019.	National ID The Republic of Benin has been issuing national ID (NID) cards (carte d'identité), which are paper-based IDs, since 1992.	May 2017, http://news.xinhuanet.com/english/2017-05/18/c_136293525.htm World Bank, The State of Identification Systems in Africa - Country Briefs, 2017: http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf
Botswana	The e-Government strategic plan faces big infrastructure challenges, lacks a variety of front-end e-governance applications which individual citizens can access, creating a top-bottom approach, where citizens and businesses might feel "left out".	e-ID Government of Botswana in May 2017 selected a contractor, Morpho South Africa, to develop a single multi-biometric platform for all the identification requirements of various government departments. Currently in Phase IV of the original project	Accessed November 2017, https://books.google.com.br/books?id=YwmXBQAAQBAJ&pg=PA160&lpg=PA160&dq=botswana+digital+government&source=bl&ots=hTZBQYKNTw&sig=uuGN9TVBcVYNwM6xrig3Ra8KLBw&hl=pt-BR&sa=X&ved=0ahUKEwjqwtXetfHVAhXEDZAKHRpsDREQ6AEIQTAE#v=onepage&q=botswana%20digital%20gover"&"n";"Book

			Accessed November 2017, http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf February 2017 https://www.morpho.com/en/media/government-botswana-selects-morpho-south-africa-provide-single-multi-biometric-platform-all-identification-requirements-various-government-departments-20170502
Burkina Faso	**eBurkina:** Going digital is seen by the government as an engine of growth and a high-potential sector for the country; therefore, it should come as no surprise that ICT is part of the five key points of the development programme set forth by the presidency. Some of the e-services were developed with support from the World Bank.	National ID The National Identification Office is the government agency responsible for issuing of national ID cards. There is a project outline by a government agency, for upgrading of the ID card, but it is a vision for 2020.	http://blogs.worldbank.org/ic4d/burkina-faso-s-digital-ambition-transforming-through-egovernment-and-digital-platforms World Bank, "THE STATE OF IDENTIFICATION SYSTEMS IN AFRICA, Country Briefs" 2017, http://pubdocs.worldba

			nk.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf
Burundi	No initiatives were found.	e-ID In 2013, Burundi launched a pilot program to issue machine-readable national identity cards to individuals who are 16 and older. The current status of this initiative is unclear. However, in 2014, the Independent National Electoral Commission (CENI) of Burundi announced that Burundians would no longer need the National biometric ID card to register for general elections in 2015. Thus, in 2014, Burundi started a pilot for machine readable IDs, but people were reluctant to provide all information asked, such as bank accounts and properties, resulting in low turnout. Has not been possible to find data on the current status of the project.	http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf March 2014, http://mobile.nation.co.ke/news/Burundi-National-Identity-Cards-East-African-Community/1950946-2254804-format-xhtml-r004q3z/index.html

Cameroon	Cameroon has the ambition of becoming a tech hub in Africa, therefore, they created the **Digital Cameroon** initiative. Expected to be fully implemented by 2020, its goals are developing broadband structure; raising production and offer of digital contents; promoting digital culture; improving governance and institutional support among other things.	e-ID Cameroon began issuing electronic ID cards in 2013. These electronic IDs were meant to be used for multiple electronic services such as civil identification and health and social services. Biometric ID cards have been introduced in August of 2016. As of early 2017, Cameroon was in the process of reviving its national identification programme.	Strategic Plan for a Digital Cameroon by 2020, May 2016, http://cameroundigital.com/en/strategic-plan/ http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf August 2016, http://www.yourcommonwealth.org/social-development/democracy-participation/cameroon-introduces-new-id-cards/
Cape Verde	Cape Verde started its first steps of e-governance solutions in 1998. In almost 20 years many goals have been accomplished: (i) a private telecommunication network (ii) a data centre (iii) a "factory" for software development (iv) more than 70 e-governance applications, and counting, some of them award-winning	e-ID National identity card was implemented in 2014, incorporating electronic storage of biometric information Biometric Technology on the Card: Digital photograph, fingerprints, digital signature.	http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf August 2016, http://www.identity-cards.net/record/cabo-verde

Central African Republic	No initiatives were found.	National IDs are paper-based. Biometric passports since 2012. Recently, there has been discussion regarding a partnership between the government and a private firm to launch biometric identification and delivery of electronic IDs to all Central African Republic citizens.	http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf
Chad	No initiatives were found.	National ID Chad has had a national identity system since 2002. There are two generations of national IDs in circulation and Chad is currently using biometric voter's cards.	http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf May 2016, http://theconversation.com/biometric-voting-in-chad-new-technology-same-old-political-tricks-58663
Comoros	Very few Comoros government institutions have developed websites and only 50% of these satisfied the web presence phase of the e-Government implementation models. They deal with providing basic online information of Government activities. Telecommunication infrastructure and human capital are key limitations. Since 2008, Comoros started the development of an e-Government strategy focused on the transformation of the public-sector finance by 2019.	National ID For biometric enrolment of a national ID card, a citizen must submit request for authentication, capture all 10 fingerprints, take a digital photograph, and provide personal data.	https://books.google.com.br/books?id=kFC5BgAAQBAJ&pg=PA133&lpg=PA133&dq=comoros+electronic+government&source=bl&ots=VBVBY-yvh6&sig=waYMzgFH24IzwmTEbC8oJOVMGnk&hl=pt-BR&sa=X&ved=0ahUKEwj8rani5_HVAhUDF5AKHVOuCM0Q6AEIUTAF

			#v=onepage&q=comoros%20electronic%20government&f=false http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf
Congo	No initiatives were found.	e-ID Congo has an electronic national registry and database to store information about its biometric ID card, e-passport, resident card, police card, voter registration, and electronic access control. The biometric database centre, including AFIS, serves as a base for a variety of government ID applications, including census, elections and ID documents, e-Passports, driver's licenses, and health cards.	http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf
Cote d'Ivoire	No initiatives were found.	e-ID Two systems exist. The National Identification Office (Office national d'identification, ONI), the public institution that since 2001 has issued identity documents to Ivorians and foreigners in Côte d'Ivoire. Another is the biometric identification system for the almost 4 million people covered by Caisse Nationale d'Assurance Maladie, the	http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf The United Nations Refugee Agency, February 2016, http://www.refworld.org/docid/585a87444.ht

		national health insurance fund. The latter e-ID card, among other things, also provides a mechanism for authentication.	ml
Democratic Republic of the Congo	No initiatives were found.	The main form of identification is the paper. The Ministry of Interior set out to issue national ID cards in 2014, to this date this has not been possible. There have been efforts by private parties such as banks to issue their own, robust forms of identification. A refugee ID card exists, which is equivalent to a residence permit.	http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf
Djibouti	Government-run Djibouti Telecom has made an agreement with Europe to boost data traffic through French internet exchange operator France-IX, helping the connectivity of another six countries - Ethiopia, Somalia, Yemen, Madagascar, Mauritius and Seychelles.	Djibouti does not have a robust identification system. Instead, it has a few separate, insular identification programmes, with their own databases. These databases are fragmented and are neither interoperable nor harmonised. In 2012, a new national identity card was introduced, but due to high cost, instead of expected 250,000–300,000 individuals, only 9,000 had been issued as of 2014 (World Bank report). The only new initiative found was the delivery of a multi-biometric ID documents platform, February 2017.	August 2017, https://data-economy.com/djibouti-telecom-turns-south-europe-boost-content-traffic-africa/ http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf February 2017 http://www.securitydocumentworld.com/article-details/i/13085/

Egypt	**Egypt's ICT 2030 Strategy -** MCIT strives to achieve the digital economy through the use of ICT tools to provide prosperity, freedom and social equity for all. Its mission is to enable the development of a knowledge-based society and a strong digital economy relying on equitable and affordable access to knowledge; digital rights; and the development of a competitive, innovative national ICT industry. Vision 2030 is a national strategy by the Egyptian government that plans to achieve the goal of a creative and innovative society producing science, technology, innovation and knowledge to face challenges and meet national objectives. It also looks for technological transformation in the various stages of education, developing interactive content, providing training to raise the efficiency of teachers and administrators, and integrating Persons with Disabilities (PwDs) into the community, especially with modern technology and high-speed Internet access to schools.	The only initiative found was the news from 2014 of the world leader in government identity solutions Morpho, of signing of a contract with the Arab Organisation for Industrialisation to locally produce national e-ID cards for Egypt. Accordingly, in 2014 the Egyptian eID card was planned to be designed to be one of the most secure in the world. In addition to embedding a smart chip allowing e-services, digital signature applications with match-on card, the Egyptian e-ID card inlay should incorporate other complex security features to protect against fraudulent use, including 3D technology.	May 2017, http://www.itwebafrica.com/ict-and-governance/254-egypt/237883-egypts-vision-2030-hinges-on-it-in-education November 2014 https://www.morpho.com/en/media/20141128_morpho-signs-contract-aoi-electronics-locally-produce-national-eid-cards-egypt
Equatorial Guinea	Equatorial Guinea's Head of State has agreed on the fact that Africa needs to embrace the use of ICT to provide solutions to challenges in various sector, but no concrete initiative has been found. As of 2010, the only government website was the federal one.	Na	May 2017, http://gov.rw/news-detail/?tx_ttnews%5Btt_news%5D=1761&cHash=2a76ff80eddf730b81138fbb0bfa1888 Government Information Quarterly, http://www.global.asc.upenn.edu/fileLibrary/PDFs/Carnegie_Rorissa.pdf

Eritrea	No initiatives were found.	National ID In 2010, Eritrea began issuing electronic ID cards, for replacing the old paper IDs. In an effort to curb illegal migration, false documentation, and forged paper IDs, the government announced that it will retire ID cards issued before 1993, the year Eritrea declared independence. According to the World Bank, it is not clear how the current system is migrating to the electronic cards as the paper IDs are phased out.	http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf
Ethiopia	The **e-Government strategy for Ethiopia** has been designed, with a focus on facilitating effective delivery of government services to customers (residents, businesses and visitors). The strategy envisages implementation of 219 e-services comprising of 77 informational and 134 transactional services over a five-year period. The implementation is proposed to be done through twelve priority projects and service delivery would be through four channels (Portal, Call centre, Mobile devices and Common service centres). The plan was approved in 2011 and all 219 e-services were slated to completion by 2015.	Only paper cards exist and they differ in content and appearance across the country and have no security features. The issuing officer verifies the card after confirming the user's identity. These cards are used for many private and public-sector transactions (for food aid).	2013, http://unctad.org/meetings/en/Presentation/CSTD_2013_WSIS_Ethiopia_E-Gov_Strategy.pdf September 2014, http://aigaforum.com/articles/Ethiopia-stride-e-government.pdf http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf

Gabon	Gabon has adopted a plan for the development of e-government, but it is slow to implement due to many challenges including lack of budget, aggravated by the oil crisis; inadequate broadband communication infrastructure; lack of regulation on the sectors of information society, electronic transactions, cyber criminality; and insufficiently qualified manpower. The country's e-government plan has 3 main components: a "front-office" platform consisting of on-line services for citizens and companies; a "back office" platform consisting of business and administration applications, services and collaborative tools to enhance the government staff productivity; dashboards and decision-support tools for state decision-makers.	National ID **Gabon's eID** was approved in 2011 and introduced in 2013 for local elections. A reliable national biometric registry was built to replace paper-based records with digital records. According to the World Bank, Gabon's government is currently implementing a public key infrastructure to facilitate integration of the national biometric ID programme into future e-government services.	May - June 2017, http://www.ijettcs.org/Volume6Issue3/IJETTCS-2017-05-19-22.pdf Public sector case study, accessed November 2017, http://www.gemalto.com/brochures-site/download-site/Documents/gov_gabon_bio_id.pdf http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf
Gambia	No initiatives were found.	National ID In 2009, The Gambia introduced a new biometric national identity, which is a chip-based smart card with biometric and biographic information, and captures two thumbprints. **-** Gambian government introduced biometric electronic passport, **Gambian E-Passport,** in 2014.	http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf ZETES case study, accessed November 2017, http://peopleid.zetes.com/en/reference/gambian-e-passport

Ghana	Ghana's e-Government Interoperability Framework (**e-GIF**) is a set of policies, technical standards, and guidelines covering ways to achieve interoperability of public-sector data and information resources, ICT, and electronic business processes.	e-ID Ghana national e-ID cards enable identification of individuals based on biometric information, specifically fingerprints. The card also carries the holder's signature. According to the World Bank report 2017, the National Identification Authority is planning to upgrade the existing identification system to accommodate institutional identity services requirements, and to harmonize all ID systems in Ghana.	Ghana e-Government Interoperability Framework, accessed November 2017, https://www.ghanahealthservice.org/downloads/Ghana_eGIF_Main.pdf 2016, http://waset.org/publications/10003316/overview-of-e-government-adoption-and-implementation-in-ghana October 2014, https://www.ghanaweb.com/GhanaHomePage/regional/artikel.php?ID=329552 http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf

Guinea	No initiatives were found.	National ID 2D bar codes based national identification cards have been issued. Currently, there is an initiative under way supported by the World Bank to provide all residents with a unique ID number associated with biometric data. Thus, the national ID register exists, which serves the purpose of the identity database. By the end of 2014, it contained data on nearly 5 million individuals of voting age. The registry includes biometric and biographic data and date of birth.	http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf
Guinea-Bissau	No initiatives were found.	e-ID In 2013 the new integrated ID card was introduced. It includes a civilian automated fingerprint identification system (AFIS) to reduce potential internal fraud, eliminate duplicate identities and precisely verify the identity of legitimate cardholders. According to the World Bank, Guinea-Bissau plans to issue more than one million national ID cards in the next five years.	http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf
Kenya	Kenya is a successful case of e-governance, with a strategy that was planned in 2013 and in 2015 had already led to these e-governance platforms: **a new website; an e-citizen platform; an open data platform containing census data and government reports; one-stop shops (Huduma centres)** for those who need individualised IT	e-ID According to the World Bank, thus far, Kenya has issued 24 million ID cards, but this total may include duplicates as well as the inactive cards of deceased individuals. There are about 1.2 million new registrations each year. National	September 2014, https://www.itworld.com/article/2694577/it-management/kenya-increases-e-government-efforts--burnishing-

	support to engage with government services, such as filing tax returns online. The Kenyan government has sought to engage the public through social media and mobile services, most notably the development of applications that integrate with the nation's company registry, allowing people to search company and business names via mobile.	e-ID is central to multiple civic activities. In 2015, MasterCard planned to develop a **Smart Card ID** with Kenyan banks that will be used to pay for government services and distribute welfare, according to regional media. The programme contained a goal to integrate all services offered through the centres providing a cash payment option for government services.	international-image.html http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf August 2015 http://www.securitydocumentworld.com/article-details/i/12290/
Lesotho	The objective of the **Lesotho eGovernment Infrastructure project** is the enhancement of good governance by the deployment of a modern and secure e-government broadband infrastructure. The project focuses on the utilisation of ICT on governance frameworks that underpin the effectiveness of public sector institutions. Specifically, the project shall: i) enhance coordination across ministries, key agencies and local governments; ii) strengthen existing Government data centres and portals; iii) and improve provision of e-services for state building such as automated administrative services including e-payroll, civil registration, e-health, eProcurement, e-customs and revenue management. As of 2014, Lesotho now issues an **E-Passport**.	e-ID According to the World Bank, as of early 2017, around 800,000 national ID cards had been issued out of an estimated eligible population aged 16 and above of about 1.2 million (out of a total population of about 2 million) and this is growing steadily. E-ID card contains a machine-readable fingerprint and biographical information as well as on-line deduplication check, integrated with the birth and death registration. In 2013, Lesotho started issuing comparable national IDs that would consolidate all important information about its citizens in one secure document. Lesotho has launched a nation-wide project, aiming at cleaning the national citizen database and	AFRICAN DEVELOPMENT FUND, October 2013, https://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/Lesotho_-_E-Government_Infrastructure_Project_-_Appraisal_Report.pdf http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf July 2013,

		ensuring that abuse of the country's official documents (mainly in the form of passports) ends. The project is scheduled to be fully implemented by the end of 2018.	http://www.saiia.org.za/opinion-analysis/african-integration-what-do-new-national-ids-in-lesotho-and-south-africa-mean
Liberia	The United States Agency for International Development (USAID), in collaboration with the Government of Liberia (GoL) launched the **USAID Digital Liberia and e-Government Project** in March 2017. In support of the GoL's e-Government Strategy, the Digital Liberia and e-Government Project will improve the GoL's performance and bring it closer to the people through the development of internet and computer technology capability. This USAID funded project will improve the GoL connectivity and institutional capacity that is necessary for the provision of effective services, progressing Liberia towards the creation of a sound national ICT platform now and for future generations. The Project will also help identify sustainable government digital initiatives and help the GoL take advantage of various technologies to digitise	National ID Issued since 2011. Starting from October of 2015 a management team has been assigned to establish or acquire the technical infrastructure and control procedures that will serve as the platform for implementation of the National Biometric Identification System. This system will collect, organise, store, secure, and grant access to secure biometric data collected from individuals applying for national biometric identification cards and other key documents, such as passports, driver's licenses, and social security cards.	March 2017, https://lr.usembassy.gov/usaid-government-liberia-launch-new-ict-support-project/ http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf

	institutional systems and processes.		
Libya	No initiatives were found.	The Libyan government has implemented in 2013 a National Identity Number - NID and e-Passport.	2016, https://bradscholars.brad.ac.uk/bitstream/handle/10454/10689/khamallag_et_al_2016.pdf?sequence=1&isAllowed=y
Madagascar	No initiatives were found.	Since 1961, paper-based ID card has been issued to all the citizens over 18 years of age. There are no data available regarding the issuance and coverage of the paper-based carte nationale d'identité.	http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf

Malawi	The Malawi government has been implementing an e-governance model for the past five years, as a public-sector reform initiative to harness ICTs in the provision of government services and enhance efficiency, transparency and accountability to its citizens. The overall aim is to promote the country's socioeconomic development, supporting the aspirations of Vision 2020, with priority being given to ICT activities contributing to poverty reduction. The e-Government element focuses on the modernisation and improved efficiency of public services. Specific strategies have been designed to improve productivity, efficiency, effectiveness and service delivery through institutional and organisational reforms. **An e-Legislation** project currently exists to set up a responsive ICT Legal framework to facilitate competition, development and participation of Malawi in the Information Society	e-ID The United Nations Development Programme (UNDP) is spearheading an effort to launch an electronic identity initiative program known as National Registration and Identification System (NRIS). This initiative will issue chip-based smart ID cards and set up a multi-modal biometrics database to register all Malawians 16 years older. According to the World Bank, after completion of the design of the infrastructure to use biometrically secure smart cards, and obtaining of necessary equipment, Malawi will begin mass registration of all eligible Malawians within the country—an estimated 9 million individuals. Malawi hopes to transition to a system of continuous registration in 2018. The mass registration process was planned in June 2017.	April, 2017, https://malawi24.com/2017/04/26/mass-national-id-registration-start-june/ http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf
Mali	No initiatives were found.	e-ID Mali has been issuing national IDs since 2010, and it introduced an electronic ID card in 2013. The e-ID card has been used for civil identification and voting. The credential is a static bar code enabled card with biometric authentication. Thus, according to World Bank, there is a need for interoperability and the inter-linking of databases in Mali.	http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf July 20, 2016, https://findbiometrics.com/oberthur-mali-e-passport-307203/

		In addition, the Malian government is developing also biometric and electronic e-passports. In addition, an e-Passport is under development	
Mauritania	No initiatives were found.	e-ID National ID cards have been issued since 2001. The present Mauritanian national e-ID card is a smart card that uses biometric and facial recognition. It can be used for e-services, but it does not contain a digital signature and cannot be used for remote online transactions.	http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf

Mauritius	In its endeavour to develop Mauritius into a Cyber Island and to create an ICT-literate nation, the Government has clearly identified e-governance as a key initiative which can radically transform the way the Government interacts with citizens and businesses and define the nature of relationships across various Ministries and departments in providing seamless, consistent and value-added public services. The vision of the Government is to provide an effective and efficient delivery of services, on a 24/7 basis, to citizens as well as to the business community. In this respect, the Government has invested in the necessary infrastructure, namely, the Government Online Centre and the Government Web Portal as a gateway to provide Government services online. Mauritius is home to three mobile operators including Emtel, Orange and Mahanagar Telephone Mauritius. This is in addition to the fixed phone operator, Mauritius Telecom. The establishment of a new techno park, a third submarine fibre optic cable as well as enhanced integration of ICT and business, shows that the country is boosting competitiveness in the ICT sector. The country's ICT strength is in line with the government's **Smart Mauritius Strategy**. The World Economic Forum last year identified Mauritius as the third best country when it comes to telcom and internet connectivity costs in its Global Information Technology Report. For the next years, Mauritius's new e-Government strategy will include initiatives such as Open Government Data to empower citizens and businesses with data building blocks for data analysis and development of mobile apps; as well as a Data Sharing Policy which will	e-ID The national e-ID card is chip based smart card. This card is linked to the population database to serve as an ID document, and prove identity and allow secure and reliable e-service transactions. In 2015, the Registrar-General Department (RGD) announced that Mauritius is planning to implement the second phase of its eRegistry Project (MeRP) to provide e-services and facilitate e-submission of documents, e-payment of fees, e-registration, e-search, and e-delivery of registered documents. According to the World Bank, presently, 99 percent of the population in Mauritius has either has a national ID or a voter ID.	ICT Export Portal, accessed August 2017, http://ictexport.govmu.org/English/ICT_in_Mauritius/E-Government/Pages/E-government-initiatives-in-Mauritius.aspx March 2016, http://www.itwebafrica.com/ict-and-governance/386-mauritius/235982-mauritius-has-highest-ict-development-index-in-africa April 2017, http://www.itwebafrica.com/ict-and-governance/386-mauritius/237677-mauritius-strategises-to-retain-top-e-govt-ranking http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf

	make it possible for Government agencies to capture data once and share it among themselves. The strategy will also include an Open Source Software Policy to outline the country's willingness to develop an open source software industry.		

Morocco	**eGov Morocco -** The main objective is to use e-governance projects to modernize Government Agencies and local Governments offering services for citizens and businesses. This brings into play ICTs in order to reconfigure the processes in depth, make them more effective and efficient, and fully geared towards serving citizens and businesses. There are currently 80+ operational e-services.	National ID The national identity card is the ID of the citizens of Morocco. This is an official document which allows any citizen to prove his identity. National ID card has the form of a credit card and it has been claimed to be biometric and provides citizens a birth certificate, residence certificate, extract of birth and citizenship certificates.	e-Government Program WWW, accessed November 2017, http://www.egov.ma/en/vision-and-objectives Wikipedia, accessed November 2017, https://en.wikipedia.org/wiki/List_of_national_identity_card_policies_by_country
Mozambique	The Information and Communication Technology Policy for Mozambique was approved by the Council of Ministers' Resolution No. 28/2000, on 12 December 2000. The Information and Communication Technology Policy Implementation Strategy was approved by the Council of Ministers on 27 June 2002. The **eGovernment Interoperability Framework** for Mozambique was published by UTICT in October 2010. The **Mozambique eGovernment and Communications Infrastructure Project (MEGCIP)** is an initiative funded by the World Bank and implemented by the Government of Mozambique during the last six years (2010-2016). The MEGCIP main objectives were: first to support the extension of geographical coverage of data communications networks and reduction of data communication services; second to promote the use of e-governance platforms, applications and services to improve the provision of public services and the participation of the citizen in the governance of the country.	National ID Mozambique's national ID is a laminated card with a magnetic strip that contains among other features also a unique national ID number, biometrics (fingerprints) and signature of the user. In 2017, Mozambique is to adopt a unique identification number system to gather together all the data on citizens. With the new system, the numbers on identity cards, driving licenses, civil registration and passports will be the same, making it easier to obtain citizen's data.	Accessed November 2017, http://www.ist-africa.org/home/default.asp?page=ictpolicies September 2016, http://clubofmozambique.com/news/mozambique-adopt-single-electronic-identification-number-system/ Tallinn e-Governance Conference May 2017, http://2017.tallinnconference.ee/programme/mozambique/

Namibia	The **e-Government Project** provided a platform from which stakeholders could collaborate to develop the Strategic Action Plan (see link on 'Sources' column) to offer online government services on a 24/7 basis through a 'one-stop shop' for the benefit of citizens, businesses, Government institutions and visitors alike. Estimated completion: 2018.	National ID The national ID card based solution contains among other features also personal identification number (quasi-logic number), eye colour, biometrics (fingerprints), and a machine readable bar code. The personal identification number contains the cardholder's date of birth written backwards (YYYY-MM-DD), followed by four automatically generated numbers. Namibia is among a few countries in Africa to have digitised the National Population Register, which is fully integrated, combining the birth, ID, marriage and death registers under one profile. The new e-birth notification system is to be launched in 2017, while the ID track and trace have been showcased as the first in Africa. The new system will notify the National Population Registration System as soon as a baby is born.	April 2014, http://www.gov.na/documents/10181/18040/e-Gov+Strategic+Plan+for+the+Public+Service+2014+to+2018/cce8facc-309d-43cd-ab3d-e5ce714eaf69 http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf May 2017, https://southernafrican.news/2017/05/08/namibia-among-few-countries-to-implement-digital-ids/
Niger	No initiatives were found.	A paper ID card exists, which does not have any additional security features beyond a gold ink print of the "Republic of Niger". The paper ID cards are produced by local commercial printers. Registration is completed manually and maintained in registration books. Although the Ministry of Interior, Public Safety, and Decentralization is responsible for both	http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf

		the civil registration and civil identification, the data gathered under these two pro- cesses are not harmonized or interoperable.	
Nigeria	The **National eGovernment Strategies (NeGST)** project was designed to reduce the bureaucracy that attends to government businesses in the country through the introduction of e-Tax, e-Learning, e-Traffic, e-Procurement, e-Pricing, e-Mail, e-Tourism, e-Payment, e-Revenue, e-Legislation, e-Policing, e-Judiciary, e-Health, e-Agriculture, e-Services, e-Kiosk, e-Buka (e-Cafeteria) etc. Presently the NeGST has online presence at: http://www.negst.com. Similarly, all the Federal ministries are online, and the country has commenced online payment for services in such areas as tax, company registration, online booking, e-Banking etc.	e-ID Nigerian national ID is a microprocessor chip–based general multipurpose ID card, with 13 applications including ID verification, authentication, and payment technology to help promote financial inclusion. The chip stores an individual's biometric information of 10 fingerprints and an iris scan. According to the World Bank report of 2017, so far in Nigeria 16 million of the total population of 173.6 million have been registered (i.e., 3.5 percent) and 418,000 national e-ID cards issued. MasterCard is providing the prepaid payment element and it hopes millions of Nigerians without bank accounts will gain access to financial services.	Accessed November 2017, http://eprints.covenantuniversity.edu.ng/81/3/e-Government%20Strategies%20Final%20by%20Ayo%20C.%20K..pdf March 2015, https://www.dailytrust.com.ng/daily/it-world/49411-from-south-korea-nigeria-takes-in-e-government http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf August 2014, http://www.bbc.com/news/world-africa-28970411

Rwanda	**RwandaOnline** project to avail all government services online. The country shall have on board 74 services online by end of 2107, avoiding long queues of service seekers by using ICT. The 4G internet coverage will cover 95% of the country by 2017.	e-ID Rwanda's national ID system is one the most advanced and well-functioning in Africa. According to the World Bank, in 2017 over 95 % coverage among the eligible population has been achieved. Rwanda's national ID is a secure card with a 2D bar code on the back but without a chip. While there is currently no biometric verification, service providers can access a secure online portal where they can verify identity and biographic data using a person's national ID number. Rwanda is planning soon to introduce an optional multipurpose smart card, among other features enabling biometric verification and machine-readable features. The use of a highly developed system will allow identity to unlock programmes of social protection, healthcare and mobile payments.	May 2016, https://publicadministration.un.org/egovkb/en-us/Resources/Articles/articleId/50073 http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf May 2016, http://www.biometricupdate.com/201605/rwanda-to-introduce-new-eid-card

Sao Tome and Principe	Some early projects in the Sources indicated.	National ID National IDs are not mandatory. The current national ID is laminated and contains an individual number. The national ID cards and birth certificates are not the same. According to World Bank mapping in 2017, Sao Tome and Principe is heading for the next generation of national IDs and planning to upgrade CivID 2.0 software, which will allow for biometric authentication and envisions a contactless chip for new national IDs. No specific dates are known.	November 2013, http://www.apdsi.pt/uploads/news/id703/PPT%20Conferencia%20eGov%20CPLP_São_Tomé_e_Principe.pdf http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf
Senegal	Senegal has an established National Policy for ICT and Policy for Science and Technology. ICT Initiatives are currently ongoing at national level in the areas of eGovernment (eSenegal, Universal Service Fund, Social Impact of ICT in Senegal), Digital Divide (Multimedia Community Centres Programme, Senegal Observatory on Information Systems, Networks and Info highways) Research (Centre de Recherche et d'Essai Programme, Scan ICT project), eInfrastructures (Grid Computing project, Brain Gain Initiative, Education and Research Network, Migration from Analogue to Digital Broadcasting project), Entrepreneurship (CTIC Dakar ICT Incubator) and eEducation (Virtual University of Senegal).	e-ID Senegal has been issuing e-IDs since 2005 and 67 % of the population has either a national ID or voter ID (World Bank report 2017). The electronic ID is used for multiple e-services.	Accessed in November 2017, http://www.ist-africa.org/home/default.asp?page=ictpolicies http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf
Seychelles	No initiatives were found.	e-ID The national e-ID card can be used for remote transactions and to access the E-services gateway.	http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf

Sierra Leone	In 2016, President Koroma announced an e-Governance platform to improve transparency and facilitate access to government services. One of the services created is **Pay no Bribe**, developed in partnership with the UK. Pay No Bribe is a reporting platform, supported by the British government, through which citizens can anonymously report incidents of petty corruption and bribery. Citizens can register an incident via a hotline phone number, the PNB website, or using a mobile app. This data will allow the government of Sierra Leone to monitor public sector corruption trends, and use quantitative evidence to design more effective anti-corruption policies and processes.	e-ID According to Word Bank, Sierra Leone is issuing national e-ID cards with biometric information storing capability. The country is in the process of reforming its civil registration and national ID systems. Sierra Leone aspires to create an integrated national civil registration system, which will enrol the entire population using biometrics, and establish an institutional framework necessary for digital identity. In addition, records with those of the National Election Commission and the National Social Security Insurance and Trust will be harmonised. They are seeking for a multi-application smart card.	October 2016, http://www.publicfinanceinternational.org/opinion/2016/10/sierra-leone-launches-anti-bribery-platform http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf
Somalia	No initiatives were found.	Somalia does not have a single national ID but rather several fragmented identity initiatives including ID card and passports. The World Bank has recommended setting up a foundational identity system that can be used for multiple services such as banking, government transfers to the poor and other programmes. In 2014, Somalia took another step toward the establishment of law and order with the launch of two new citizen ID programs: **a new national**	http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf April 2014, https://www.hidglobal.com/press-releases/somalia-introduces-new-secure-national-id-and-e-passport-hid-global-and-their

		ID card and e-passport.	
South Africa	The South African government has established statutory bodies to co-ordinate implementation of e-Government projects. Amongst these are the State Information Technology Agency (SITA) and Government Information Technology Officers Council (GITO Council). SITA is responsible for the acquisition, installation, implementation, and maintenance of IT in the public sector. The GITO Council, which consists of national and provincial IT officers, is responsible for consolidating and coordinating IT initiatives in government, including e-governance, to facilitate service delivery. For the South African government, the focus is on G2G (government-to-government), G2BC (Government to Business & Citizen) and G2C (government-to-citizen) activities. Improved service delivery is facilitated by building e-governance awareness, being a model user in eGovernment centres of excellence, working towards one government information and communication channel (one portal, one call centre, etc.) and above all providing expertise on e-services. Amongst the ICT initiatives are: Cape Gateway Project, Cape Information Technology Initiative (CITI), Telecentres in rural areas in South Africa, SchoolNet South Africa Project, Mindset Network Organisation and the Khanya Project. Other examples include the e-Natis online vehicle and transport management system, the e-Justice programme to improve judicial processes, the e-Hanis programme to streamline and integrate personal identification data across government departments through the use of unique identifiers, and the National Automated Archival Information Retrieval	e-ID In February 2015, the government of South Africa set up a pilot to roll out the national smart identity card in collaboration with the country's banks. The smart ID roll-out is expected to be a seven-year long process. Some of the goals of the digitisation project launched in 2016 by the Minister of Home Affairs, Mr Malusi Gigaba, are: - 5.8 million birth records to be digitised per year; - Records will be indexed by ID number for easy retrieval; - Immediate access to a digitised document irrespective of office location; - Electronic records can be viewed / accessed by more than one person simultaneously.	April 2014, https://www.dtps.gov.za/index.php?option=com_phocadownload&view=category&id=22:national-integrated-ict-policy-green-paper&Itemid=106 or https://www.dtps.gov.za/index.php?searchword=ict-policy-review-supplementary-insights-eservices&searchphrase=all&Itemid=101&option=com_search http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf November 2016, http://citizenshiprightsafrica.org/south-africa-minister-malusi-gigaba-launch-of-digitisation-of-birth-records/

	System (NAAIRS) to facilitate access to public archived records.		

South Sudan	No initiatives were found.	e-ID South Sudan launched official passports and identity cards in 2012. The national e-ID card is a bar code card that contains biometric (fingerprint) and biographic information, and is presently used for civil and voting purposes.	http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf January 2012, http://www.sudantribune.com/South-Sudan-launches-passports-and,41183
Sudan	A digital government initiative was recently launched. The ministry also announced completing a communication network that is expected to host about 1,000 e-services, which will be launched by the end of next year. Sudan has been on track with dozens of ministries, government departments and the private sector being gradually computerised. Public services have seen a substantial upgrade, with processing being made easier via integrated technology. The e-governance has processed large amounts in government fees in its first year—funds collected by the system have been estimated to be about one billion dollars. A quarter million Sudanese students and citizens were able to gain access and benefit from public electronic services for universities, in a statistic confirming that electronic operations are going smoothly.	e-ID Sudan began issuing electronic passports to its citizens in May 2009; the e-passport contains a microprocessor chip that contains the holder's information in addition to fingerprints. In 2011, Sudan started implementing a new civil registry procedure (Sudan 18 June 2013; IRRI May 2013, 7). According to the International Refugee Rights Initiative (IRRI), an organisation that promotes human rights during displacement and conflict situations (IRRI n.d.), this procedure was introduced in May 2011 and is "required for all residents and citizens" (ibid. May 2013, 7).	July 2017, https://english.aawsat.com/saif/business/e-government-sudan-project-yields-1-bln-six-months http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf

Swaziland	The government of Swaziland, since July 2016, is user-friendly following the launch of e-governance which will enable people to make payments using credit and debit cards. Government transactions should be processed from anywhere at any time without having to go to offices. This followed the introduction of the Point of Sales facility that allow debit and credit card usage when paying for government services. The country also boasts an e-Health Strategy comprising the Client Management Information System which was introduced early 2017 in accordance with the World Health Assembly resolution of 2005.	National ID National ID issued since 2000–01, is an electronic ID card that captures a user's biometric information, which is saved in a database and used for deduplication.	July 2017, http://mobile.apanews.net/en/news/swaziland-launches-e-government http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf

United Republic of Tanzania	The eGovernment Strategy was put in place in September 2012. The eGovernment Agency is responsible for the design and implementation of ICT enabled public services at a local and national level. The digital infrastructure in Tanzania has improved significantly with the fibre-optic network, investment in local Internet Exchange Points, migration to IPv6 and construction of the National ICT Backbone (NICTBB), which is over 95% complete. NICTBB connected to SEACOM in July 2009 and EASSY in April 2010. There is extensive use of VSAT Internet, GSM, 3G, 4G, LTE and Microwave. The Government has introduced a Universal Communication Fund to facilitate telecommunications in rural areas. The cost of connectivity is very high in Tanzania, which creates barriers to the spread and use of the Internet, as a major vehicle for the transfer of data and access to information. Many higher education institutions use VSAT for bandwidth Internet. The Tanzania Education Research Network (TERNET) was established in 2008. Progress to date has been gradual and incremental.	e-ID The biometric national ID project was launched in 2011 with the aim of providing all citizens, legal residents, and refugees who are over 18 years old (approximately 25 million) with contactless multipurpose smart cards having an 80 KB capacity. E-ID as a smart card serves as a driver's license and enable digital payments. From 2013 to 2015, 6.3 million residents were registered and approximately 2.7 million of them received their national ID cards. Tanzania introduced electronic identification cards for its citizens as a way to prevent voter fraud ahead of its 2015 general elections.	Accessed November 2017, http://www.ist-africa.org/home/default.asp?page=doc-by-id&docid=4324 http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf February 2013, http://news.trust.org//item/20130227092500-jm6av/

Togo	Since the year 2012, when the Togolese Government adopted a proposition from the then Post and Telecommunications Ministry - now Post and Digital Economy Ministry - to modernise the public sector, the commitment to an efficient and more citizen-centred public administration has not changed. The e-Government project in Togo has been divided in two phases. The phase 1 was launched in March 2015 and consisted of connecting 500 administrative sites with fibre optics over a 1-year period. These administrative sites include Ministries, Government agencies, public and private institutions, hospitals and schools. Now the Togolese Government can boast of an online presence for almost all its ministries, institutions and government agencies. Other projects have subsequently been put in place to address the problems of access divide and to ensure citizens' adoption of online services. - **Helim Zone project:** This project consists of providing affordable Wifi hotspots in major places of the Country. - **Bluezone Togo:** The project Bluezone Togo is one of the major breakthroughs in the Internet-Access-for-All in Togo. - **e-Village Project:** This project consists of making at the disposals of villages' chiefs and remote communities' leaders a number of free mobile phones with a monthly credit allowance	National IDs have been issued since 2006 and is not an electronic ID card, but rather a plastic card with a personal ID number and a tamper-proof seal. It replaces the old paper ID, which was larger. The national IDs are not mandatory and it is estimated that fewer than 10 % of all Togolese citizens have one. Beginning in 2015, Togo started to issue biometric voter's cards.	Accessed November 2017, https://unpanelearning.wordpress.com/2016/03/21/ensuring-e-government-uptake-through-internet-access-for-all-in-togo/ Contractor ZETE case study 2015, http://peopleid.zetes.com/en/reference/biometric-voter-registration-togo http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf

Tunisia	To further generalise the use of ICTs, the Tunisian government has initiated two major initiatives. It encouraged Tunisian companies to use ICTs to increase their productivity and created specialized research centres and technology parks to strengthen the existing synergy between educational institutions and the private sector. These measures led to the successful widespread use of ICTs as a development tool, improving national productivity and yielding the emergence of new high added value exportable goods (digital products). In 2000, the Tunisian government created the National Agency for Computer Certification (NACC) in charge of setting the legal framework which will govern Tunisian digital activities. This entity was instrumental in the quick implementation (as early as 2001) of the electronic signature, e-payment process and the creation of the Digital Tunisian Dinars (e-Dinar), a virtual currency. **E-governance:** The implementation of the Tunisian e-governance followed two steps: a) Creation of a governance structure b) Definition of a long-term strategy (2009). In the Tunisian case, the first step was to establish trust by enacting the appropriate rules and regulations, this way all involved got a clear view of the direction they were asked to follow, and with the proper guarantees covered by existing laws, the transition to a digital mode of operation presented very little risk.	Tunisian officials have launched an electronic ID card and moved to biometric passports by the end of 2016.	Accessed November 2017, https://www.academia.edu/12758974/The_success_factors_of_e-government_strategy_in_North_Africa_A_comparative_study_between_Algerian_and_Tunisian_digital_strategy

Uganda	An eGovernment Masterplan has been put in place to guide e-governance implementation over the next five years. Uganda is currently implementing ICT-related initiatives in the areas of eInfrastructure (Research and Education Network Uganda, Broadband Services ERT Programme, National Backbone, Migration from Analogue to Digital Broadcasting Project, eNetwork project), eGovernment (Electronic Government Infrastructure, Voter Registration, National Identify Cards project, ICT4Democracy in East Africa project), Technology-enhanced Learning (Connect Ed project, National Curriculum Development Centre, VSAT project, SchoolNet Uganda, Content Development at National Teachers Colleges, Connecting Classrooms project, Improving Learning Outcomes through ICT project, ITELE for ICT project, Helping teachers use ICT for Teaching project), eHealth (Improving health care delivery, Health Child project, Electronic Rural Health Information Project, Malaria Diagnostic Systems project), eCommerce (District Business Information Systems, Reflect ICT Resource Centre, Village Phone Project), ICT for Rural Development and Entrepreneurship (Microsoft Innovation Centre).	e-ID The national ID card is a secure card without a chip. According to the World Bank, at this stage in 2017, biographic verification services before offering biometric verification is planned. In addition, consolidation of data into a single social registry that will use unique identifier based on e-ID together with biometric verification will be implemented.	Accessed November 2017, http://www.ist-africa.org/home/default.asp?page=doc-by-id&docid=2879 http://pubdocs.worldbank.org/en/940071497322166382/ID4D-country-profiles-report-final.pdf
Zambia	President Edgar Lungu launched in 2015 the e-government division which he said will contribute to reducing transaction costs and improve productivity. The country's aim is to leverage on e-governance to increase productivity and reduce the cost of doing business by way of having a centralised and standardised government ICTs infrastructure.	e-ID Since 2013, the Zambian government have issued a national registration card, which today is a low-tech national ID that captures among other features biometric information (right thumbprint) on a chip. More than 83 % the eligible population over 16 years of age have national e-ID. The project for launching the	October 2015, https://www.lusakatimes.com/2015/10/22/president-lungu-launches-e-government-division/ http://pubdocs.worldbank.org/en/940071497322166382/ID4D-

		upgrading of national e-ID was sponsored by the United National Development Programme.	country-profiles-report-final.pdf May 2013, https://www.lusakatimes.com/2013/05/23/government-to-introduce-new-national-registration-cards-next-month/
Zimbabwe	The Zimbabwe Government is implementing the e-governance programme as part of the public sector reforms in order to re-engineer, re-invigorate and modernize the public sector systems and processes to improve service delivery (speed, access, efficiency, effectiveness and affordability of services) to the people using ICTs. The implementation of the e-governance programme brings convenience to the people as these are anytime and anywhere services. The implementation of the programme commenced in 2011 and progress has been made. **ZimConnect** is a Ministry of ICT online service that was launched in 2016 to provide people with an online alternative for accessing some State services. The site, which is fairly simple to use, offers a number of services which include visa applications, company registration, corporate name change, deeds search, the processing of investment and mining licences as well as the licensing for local government services like operating a liquor store.	National ID Zimbabwe's national ID card has a bar code with biometric information (thumbprint) and contains such security features like: a hologram, water- mark, invisible personal information coded on the photo. Individuals have access to the Zimbabwe Population Registration System for acquiring data of registrations of birth, death, national ID number, marriage, voting, passport, and cattle brands. Biometric voter registration (BVR) started in March 2017. It is capturing voters' unique biometric features, specifically fingerprints and facial imaging which will be recorded in a database. However, the Zimbabwe Electoral Commission (ZEC) has announced that there will be no biometric voting or any form of	Accessed November 2017, http://www.zim.gov.zw/implementation-e-government-programme-zimbabwe March 2016, https://www.techzim.co.zw/2016/03/zimbabwes-e-government-takes-shape-country-introduces-online-company-registration-licensing/ January 2017, https://www.techzim.co.zw/2017/01/zimbabwe-rules-biometric-voting-2018-elections-electronic-system-

		electronic voting in 2018 and that the Biometric system being put in place is strictly for registration.	registration/

Annex 3 - Statistics on infrastructure indicators[100]

Country	Fixed Broadband (per 100 people, 2015)	Fixed Telephone (per 100 people, 2015)	Mobile Cellular (per 100 people, 2015)	Investments in telecoms with private participation (current us $, 2014)	Secure internet servers (per 1 mil. People, 2016)
	1	**2**	**3**	**4**	**5**
Algeria	5,58	8	106	742 340 000	4
Angola	0,67	1	61	0	5
Benin	0,67	2	86	51 000 000	3
Botswana	1,79	8	169	0	25
Burkina Faso	0,04	0	81	43 000 000	1
Burundi	0,03	0	46	0	1
Cabo Verde	3,26	11	119	0	59
Cameroon	0,07	5	72	467 000 000	2
Central African Republic	0.013 (2012)	0	26	0	1
Chad	0,08	0	40	29 000 000	0
Comoros	0,26	2	55	N/A	1.349 (2013)
Democratic Republic of the Congo	0	0	53	246 500 000	0
Republic of the Congo	0.011 (2014)	0	112	19 500 000	2
Cote d'Ivoire	0,52	1	119	195 200 000	5
Djibouti	2,69	3	35	N/A	7
Egypt	4,52	7	111	1 065 770 000	5
Equatorial Guinea	0,48	1	67	N/A	3
Eritrea	0.003 (2014)	1	7	0	N/A
Ethiopia	0,48	1	43	0	0
Gabon	0,63	1	161	15 700 000	18
Gambia	0,18	2	138	0	5
Ghana	0,27	1	130	151 000 000	6
Guinea	0,01	0	87	62 000 000	0
Guinea-Bissau	0,06	0	69	10 000 000	2 (2015)
Kenya	0,29	0	81	417 000 000	11
Lesotho	0,1	2	101	0	5

100 http://data.worldbank.org/indicator; https://publicadministration.un.org/egovkb/Data-Center (2016); https://www.itu.int/net4/ITU-D/idi/2016 (2016); http://reports.weforum.org/ (2016), (Accessed August 2017).

Country	**1**	**2**	**3**	**4**	**5**
Liberia	0,16	0	81	0	4
Libya	0,97	10	157	N/A	4
Madagascar	0,1	1	44	26 000 000	2
Malawi	0,03	0	38	56 000 000	2
Mali	0,02	1	140	75 000 000	2
Mauritania	0,24	1	89	0	3
Mauritius	15,75	30	141	0	187
Morocco	3,38	7	127	881 380 000	7
Mozambique	0,16	0	74	0	2
Namibia	2,94	8	107	0	26
Niger	0,06	1	46	26 200 000	0
Nigeria	0,01	0	82	1 357 000 000	3
Rwanda	0,17	0	70	0	6
Sao Tome and Principe	0,49	3	65	0	10 (2015)
Senegal	0,67	2	100	86 000 000	5
Seychelles	14,31	23	158	0	465
Sierra Leone	N/A	0	90	9 300 000	1
Somalia	0,74	0	52	0	0
South Africa	2,63	8	165	1 240 000 000	125
South Sudan	0	0	24	8 000 000	0
Sudan	0,07	0	71	301 000 000	0
Swaziland	0,47	3	73	0	16
Tanzania	0,2	0	76	108 400 000	2
Togo	0,88	1	68	26 000 000	7
Tunisia	4,34	8	130	113 740 000	13
Uganda	0,18	1	50	132 800 000	2
Zambia	0,15	1	74	39 000 000	5
Zimbabwe	1,09	2	85	129 500 000	8

Annex 4 – Taxation websites analysis outcome in African countries[101]

Ranking from scale 0 to 5, with 5 being the best possible mark, is based on analysis of following indicators:

- Whether the tax administration has a designated web-site;
- If this site looks easy to navigate, has a lot of content and how this is displayed;
- If it is possible to provide information on-line, to download forms, to ask for and/or send information electronically, thus the level of interactivity.

Country	Taxation website (no/yes/partly)		Easy to navigate/ lot of content/ how displayed	Online tools and options	Alternative sites
Algeria	yes	http://www.mfdgi.gov.dz/index.php	3	2	
Angola	yes	http://www.agt.minfin.gv.ao/portalat/faces/institucional	4	2	
Benin	partly	No specific tax office website available, but government website does contain some information on taxation	3	1	http://gouv.bj/ (government website) http://benin.eregulations.org/ (online platform)
Botswana	yes	http://www.burs.org.bw/#	5	2	
Burundi	yes	https://www.obr.bi/index.php http://41.79.226.26/asycudaworld/ (online platform)	1	1	
Burkina Faso	yes	http://www.impots.gov.bf/	1	1	
Cabo Verde	yes	https://www.mf.gov.cv/index.php	4	2	
Cameroon	yes	http://www.impots.cm/index.php?page=accueil&hl=en_US http://teledeclaration-dgi.cm/modules/Common/Account/Login.aspx?s=t (online platform)	3	3	
Central African	no		0	0	http://www.rca-gouv.net/ (government website)

[101] Accessed September 2017

Republic					
Comoros:	yes	http://www.finances.gouv.km/v1/	1	0	
Republic of the Congo	no		0	0	
Democratic Republic of the Congo	yes	http://www.dgi.gouv.cd/	3	1	
Cote d'Ivoire	yes	http://www.dgi.gouv.ci/site/index.php?p=accueil	4	4	https://www.e-impots.gouv.ci/
Djibouti	no		0	0	
Egypt	yes	http://www.incometax.gov.eg/	1	1	
Equatorial Guinea	no		0	0	http://www.guineaecuatorialpress.com/index.php
Eritrea	no		0	0	
Ethiopia	yes	http://www.erca.gov.et/ https://etax.revenue.gov.et/remote/login?lang=en	3	3	
Gabon	no		0	0	
Gambia	yes	http://www.gra.gm/	4	1	
Ghana	yes	http://www.gra.gov.gh/	5	2	
Guinea	no		0	0	http://www.presidence.gov.gn/ (government website)
Guinea Bissau	no		0	0	http://www.guinebissaurepublic.com/ (government website)
Kenya	yes	http://www.kra.go.ke/	5	5	
Lesotho	yes	http://www.lra.org.ls/	5	3	http://ecustoms.lra.org.ls:81/ (customs portal)
Liberia	no		0	0	
Libya	no		0	0	
Madagascar	yes	http://www.impots.mg/en https://entreprises.impots.mg/teledeclaration/index.php (online platform)	5	5	
Malawi	yes	http://www.mra.mw/	4	4	

Mali	no		0	0	http://www.primature.gov.ml/ (government website)
Mauritania	no		0	0	
Mauritius	yes	http://www.mra.mu/ https://eservices15.mra.mu/taxportal/taxpayerlogin.jsp (online platform)	5	5	
Morocco	yes	https://portail.tax.gov.ma/wps/portal/DGI/Accueil	4	3	
Mozambique	yes	http://www.at.gov.mz/por	4	2	
Namibia	yes	http://www.mof.gov.na/home	4	1	
Niger	yes	http://www.impots.gouv.ne/	2	0	
Nigeria	yes	http://www.firs.gov.ng/Pages/Default.aspx	3	3	
Rwanda	yes	http://www.rra.gov.rw/ https://etax.rra.gov.rw/ (online platform)	5	4	
Sao Tome and Principe	no		0	0	http://www.saotome.st/index.php (government website)
Senegal	yes	http://www.impotsetdomaines.gouv.sn/fr https://csfe.dgid.sn/etax/faces/login.jspx?_afrLoop=478098612316162&_afrWindowMode=0&_adf.ctrl-state=srt4gsldo_4 (online platform)	4	4	
Seychelles	yes	http://www.src.gov.sc/Default.aspx https://eservice.egov.sc/egateway/homepage.aspx (online platform)	4	3	https://eservice.egov.sc/BizRegistration/WebBusinessRegsitration.aspx (business registration website)
Sierra Leone	no	http://nra.gov.sl/ (under construction)	0	0	
Somalia	no		0	0	http://mof.gov.so/en/
South Africa	yes	http://www.sars.gov.za/Pages/default.aspx http://www.sarsefiling.co.za/ (online platform)	5	4	
South Sudan	no		0	0	Government websites: http://www.goss-online.org/about.html(archived website) http://www.goss.org/cgi-sys/suspendedpage.cgi

					(supposed new website)
Sudan	no		0	0	
Swaziland	yes	http://www.sra.org.sz/index.php https://etax.sra.org.sz/	5	5	
Tanzania	yes	http://www.tra.go.tz/index.php	5	5	
Togo	no		0	0	
Tunisia	N/A	http://www.tunisie.gov.tn/index.php?lang=english (currently unavailable)	N/A	N/A	
Uganda	yes	https://www.ura.go.ug/	4	4	
Zambia	yes	https://www.zra.org.zm/main.htm?actionCode=showHomePageLnclick	3	2	
Zimbabwe	yes	http://www.zimra.co.zw/ http://efiling.zimra.co.zw/Pages/default.aspx (online platform)	4	4	

Annex 5 - Data Protection Legislation in Africa

Countries not mentioned in the list do not have specific data protection legislation.

Angola

- Data protection law exists (specifically and for ICT services) and is moderately enforced, Data Protection Law (Law no. 22/11of 17 June) and Electronic Communications and Information Society Services Law (Law no. 23/11, of 20 June 2011)

Benin

- Personal Data Protection Act Law No. 2009-09 of 22 May 2009 on the framework of protection of personal data.

Burkina Faso

- Law on the Protection of Personal Data, 2004 (one of the earliest in Africa)

Cape Verde

- Data protection law exists and is moderately enforced, Data Protection Law (Law 133/V/2001 (as amended by Law 41/VIII/2013) and Law 132/V/2001, of 22 January 2001.

Comoros

- Data protection law exists (since 2014)

Cote d´Ivoire

- Protection of Personal Data Law, 2013

Egypt

- No special data protection law but various provisions in different laws and regulations as well as constitutional provisions on right to privacy.
- Draft law on freedom of data exchange and data protection has been drafted, in the process.
- Civil Code governs the collection, use and processing of personal data.
- Penal Code imposes criminal punishment for unlawful collection of images or recordings for individuals in private places.
- Specific provisions in the Labour Law, Banking Law, Civil Status Law, Regulations of Mortgage Finance Law, Telecommunications Law, Physicians Code of Ethics.

Gabon

- Data protection legislation exists and a data protection commissioner is appointed. Moderate enforcement.

Gambia

- Information and communication Act, 2009

Ghana

- Data protection legislation exists and is moderately enforced, Data Protection Act, 2012 (Act 843)

Kenya

- Data Protection Bill, 2013 (not adopted as law until present)

Lesotho

- Data protection legislation exists, Data Protection Act, and a Data Protection Commission is established.
- The right to privacy is recognised and protected in the Constitution of the Kingdom of Lesotho.

Madagascar

- Data protection law exists and is enforced to some extent, Law No. 2014-038 relating to Protection of Personal Data (16 December 2014, promulgated by the President January 2015, expected to enter into full force in 2017).

Mali

- Data Protection Law adopted in 2015, data protection authority inaugurated in 2016

Mauritius

- Data protection law exists and is enforced to some extent, the Data Protection Act 2004 (enacted on July 1, 2004, partially in force December 2004 - fully February 2009). The Act is largely based on the Directive 95/46/EC.
- Member of the Council of Europe Data Protection Convention.

Morocco

- Data protection legislation exists and is enforced, Law 09-08 from 18 February 2009 relating to protection of individuals with regard to the processing of personal data and its implementation Decree n° 2-09-165 of 21 May 2009

Nigeria

- No special data protection legislation, but constitutional protection of privacy and some different laws
- Industry-specific and targeted laws and regulations that provide some protection, like Child Rights Act, Immigration Act, Consumer Code of Practice Regulations issued by the

Telecommunications Regulator (NCC) and other regulations by NCC as well as the Cybercrimes Prevention Act.
- Freedom of Information Act, 2011 protects personal privacy.
- The Agency for ICT, NITDA, issues guidelines for organisations that obtain and process personal data.
- The National Identity Management Commission (NIMC) which establishes, operates and manages the National Identity Management System (NIMS) and operates a National Identity Database has data protection provisions.

Senegal

- Data protection legislation exists and is moderately enforced. A Data Protection Commissioner exist (www.cdp.sn).
- Member of the Council of Europe Data Protection Convention.

Seychelles

- Data protection legislation exists but is not enforced, the Data Protection Act (enacted in 2003 but not enforced until 2015).

South Africa

- Data protection legislation exists and is moderately enforced, the Protection of Personal Information Act of November 2013 (partially in force), which introduces an overarching regulatory framework for the processing of personal information. The Act provides for the establishment of an Information Regulator (established 2016) tasked with monitoring compliance with, and enforcement of, the law.
- The right to privacy is recognised and protected as a fundamental human right in the Bill of Rights of the Constitution of the Republic of South Africa.

Tanzania

- Data Protection Bill, 2013 (not adopted as law until present)

Tunisia

- Data protection legislation exists (modelled on Directive 95/46/EC) and is moderately enforced. A Data Protection Commissioner exist (www.inpdp.nat.tn).
- Member of the Council of Europe Data Protection Convention.

Uganda

- Data Protection and Privacy Bill, 2014 (not adopted as law until present)

Zimbabwe

- The Access to Information and Protection of Privacy Act (Chapter 10:247) contains provisions on data protection, only for use of personal data by public bodies.
- The protection of privacy is enshrined in Zimbabwe's Constitution.

- Other laws include the Courts and Adjudicating Authorities (Publicity Restrictions) Act, the Census and Statistics Act, Banking Act, National Registration Act and the Interception of Communications Act.
- In August 2016 a Revised ICT Policy was adopted according to which the establishment of an institutional framework for enacting legislation dealing specifically with digital data protection matters and cyber security is anticipated.

Annex 6 – Narrative to Categorisation of African Countries

In addition to narrative, the current Annex provides also justification for moving the countries from one group to another. The upgrading or downgrading is based on our expert analysis and expert's personal experience with any country in question. The results of upgrading or downgrading are presented in the table form below, listing the positive and negative key elements which affected the upgrading or downgrading from one group to another.[102]

Group 1:

Botswana

Botswana is No. 8 in the UN e-Government Development Index, No. 9 in the ITU ICT Development Index and No. 11 in the WEF Network Readiness Index. It is not featured in the ITU Review of National Identity Programmes. About 72% of births are registered. According to World Bank data, the level of fixed broadband and fixed telephony is low, as is typical in Africa, even if a bit higher than the average (1.79 fixed broadband and eight fixed telephones per 100 people). Mobile penetration is very high with 169 per 100. The number of secure internet servers is also high. The time needed to start a business or deal with regulations is average to high, according to World Bank data. The country has undertaken some activities regarding e-governance. As for our selected test case of the tax office, it has a professional website that is easy to use: It contains a lot of information for private individuals and businesses about various forms of taxation, and it provides many forms for download. It provides an online portal for private individuals and businesses to log onto, including online tax registration.

Cape Verde

Cape Verde is No. 6 in the UN e-Government Development Index and the ITU ICT Development Index and No. 7 in the WEF Network Readiness Index. It is not featured in the ITU Review of National Identity Programmes. About 91% of births are registered. Cape Verde has undertaken several activities with a view to introducing e-governance, including contacts with eGA. There is a designated body for e-governance. The tax office website contains a lot of downloadable forms and some (albeit rather limited) information, and no online platform appears to be available. Data protection legislation exists.

Egypt

Egypt is No. 7 in the UN e-Government Development Index and the ITU ICT Development Index, No. 9 in the WEF Network Readiness Index (see Annex 8). Its government-issued national ID card is featured in the ITU Review of National Identity Programmes. UNICEF does not include any data on birth registration in Egypt. According to World Bank data, the level of fixed broadband and fixed telephony is quite low, but considerably higher than in most parts of sub-Saharan Africa (4.52 fixed broadband and seven fixed telephones per 100 people); the mobile penetration is very high with 111 per 100. The number of secure internet servers (see Annex 3) is quite low. As for time needed to start a business or deal with regulations, the numbers are lower than average, according to World Bank data. Some data protection provisions exist, even without one designated law.

Ghana

[102] This information – in table format - is only included for countries that are placed in another group than that for which quantitative data appear to place it.

The tax office website is of a high quality, containing quite a lot of information about taxation, as well as downloadable forms and online tax registration platform, and accessible ways to contact the office including a Facebook page. Data protection legislation exists.

Kenya

Kenya has reached quite far in the introduction of e-governance, not least at the regional level; e.g., some provinces have focused not just on introducing services but also on teaching IT skills to vulnerable groups.

Mauritius

Mauritius holds the top position in the UN e-Government Development Index, the ITU ICT Development Index and the WEF Network Readiness Index. It is not featured in the ITU Review of National Identity Programmes, nor is there any data in the UNICEF index on birth registration. Mauritius has had contacts with eGA and held various events on the topic of e-governance. The country has data protection legislation and has joined the Council of Europe convention on data protection.

Morocco

Morocco is No. 4 in the UN e-Government Development Index, No. 5 in the ITU ICT Development Index and No. 4 in the WEF Network Readiness Index—thus well within the first 10 of all indexes. Its electronic national ID is featured in the ITU Review of National Identity Programmes. About 94% of births are registered. E-governance of Morocco is advanced and efforts are made to popularise services. For example, an annual reward is handed out for best e-governance service. Data protection legislation exists.

Namibia

In a bilateral project with Estonia, Namibia has implemented a system of interoperable databases modelled on the Estonian X-road. The office of the prime minister includes a designated office for e-governance. Necessary legislation is being developed to include sub-legal acts for the interoperable system, which is functioning and to which various services can be added. In the various indexes, Namibia is within or just near the Top 10. The actual implementation of services is underway. The tax office website looks quite good, with information available regarding taxation, including downloadable forms, but yet no online platform and limited possibilities to contact electronically.

Rwanda

In Rwanda, procedures for starting businesses are less cumbersome than in many African countries. The tax office website is easy to use; it includes many kinds of information, numerous downloadable forms, an online platform for tax registration and a chat service for resolving questions. In addition, the RwandaOnline project aims to offer all government services online; the goal for year-end 2017 is 74 online services. Also by year-end, 4G internet coverage is estimated to be 95% of the country. Rwanda is high in international indexes (Networked Readiness Index No. 5; Importance of government future vision index 5,8 (highest rank), highest rank in ICT laws index 4,7 and No. 19 in E-Government Development Index).

Seychelles

Seychelles is No. 5 in the UN e-Government Development Index, No. 2 in the ITU ICT Development Index and No. 3 in the WEF Network Readiness Index—thus well within the first 10 of all indexes. It is not featured in the ITU Review of National Identity Programmes. The UNICEF registry contains no data on registration of births. The country has data protection legislation although it is not fully enforced.

South Africa

South Africa is No. 3 in the UN e-Government Development Index and No. 2 in the ITU ICT Development Index and the WEF Network Readiness Index. It is not featured in the ITU Review of National Identity Programmes. About 85% of births are registered. Legislative environment in South Africa is at a high level, including legislation on digital transactions and data protection.

Tunisia

Tunisia is No. 2 in the UN e-Government Development Index, No. 4 in the ITU ICT Development Index and No. 6 in the WEF Network Readiness Index—thus well within the first 10 of all indexes. It is not featured in the ITU Review of National Identity Programmes, although it does have digital signatures. As for birth records, 99% of births are registered. Tunisia is well advanced with many digital solutions, but it has struggled with ensuring that its digital services are used to a greater extent. One problem is that many different identity codes are used in the country, making use of a single digital identity more complex. The country has a designated office for e-governance. Data protection legislation exists. Several projects and events have been organised for e-governance, and there are initiatives for academic and professional training on e-governance.

Group 2:

Tier 1

Algeria

Algeria has launched various plans for introduction of e-services, but the deadlines for implementation have not been met and not many services are available (please see Annex 2). A biometric identity card was launched in 2016.[103] Birth registration is universal. There is a quite good website for the tax office with some possibilities for download but apparently no active online interactivity. Algeria is quite low in the UN e-Government Development Index (No. 24), but it is higher in ITU ICT development (No. 8) and WEF network readiness (No. 18). Legal framework is not developed i.e. no data protection legislation is in place and Laws relating to ICTs index value is quite low (2,8).

Benin

Benin does not score highly in various indexes, but the country has some e-governance initiatives. No specific tax office website is available, but a good government website includes information on taxation with a form of online platform without interactivity but with information about where to go, what forms are needed, etc., for different government procedures. This information is well outlined. The plans both for e-governance services and internet access are good and some contacts have been established in the sphere.

Lesotho

Lesotho ranks near the centre of most indexes. However, it does have an e-government infrastructure project as well as a project to implement national IDs for the whole population and a system of e-passports. The tax office website looks very good, with a lot of information available about taxation and registering businesses, as well as many forms to download and other tools. Online platform is available, but seemingly only for customs. Data protection legislation exists.

[103] http://www.gemalto.com/govt/customer-cases/new-national-identity-card-algeria

Nigeria

Nigeria has a national identity card as well as other forms of identification, including online ID. An ambitious National eGovernment Strategies (NeGST) project was launched to reduce bureaucracy and link a range of services. All federal ministries are online and the country has commenced online payment for services**.** The tax office website looks good, with downloadable forms, although it is somewhat lacking in information and some pages show only an error message. It does link to different online platforms—for tax payment, registration, etc.—providing several alternatives for each one. In indexes, Nigeria is in the upper half but near the middle. Data protection provisions exist but not designated law.

Swaziland

Swaziland claims to have introduced e-government in 2016, although the range of available services appears to be limited. An e-health project began in 2015. The tax office website looks very good, contains downloadable forms and many kinds of information that is easy to find, for both businesses and private individuals. An online platform allows filing taxes online. Contact information is well provided, and it looks easy to ask questions, even providing a link to a professional-looking Facebook page. All questions posed on the Facebook page seem to be swiftly replied to; as it states that typically messages are replied within a few hours. In the various indexes, Swaziland mostly falls in the upper half.

Tanzania

Tanzania has had an e-governance strategy since 2012, and there is a designated agency responsible for e-governance. The country is No. 15 on the UN e-Government Development Index but much lower on the ITU and WEF indexes. The tax office website looks good, with many forms for download. It provides some form of online portal that seemingly provides the ability to file taxes online and provides information for private individuals and business entities, including information on how to register a business. To accomplish this, the process seems to require physically going to various governmental agencies. Although internet access has improved recently, the cost of connectivity is very high, which makes e-services less accessible and attractive.

Uganda

Uganda has an e-governance master plan in place as well as range of planned reforms for better ICT accessibility and use. The country has a wide range of ideas for services that could involve e-governance, but implementation has been limited although contacts have been made and work is in progress. Uganda scores 13 on the UN e-Government Development Index but is somewhat below average on the other indexes and ranks quite low in mobile subscriptions by African standards (50 per 100 people). The tax office website looks good; it provides an online portal, both for individuals and businesses; provides many forms for download; contains a lot of information about various forms of taxation for individuals and business entities; and provides easy ways to submit questions online.

Zimbabwe

Zimbabwe has been successful with various reforms, including implementation of e-governance as part of public administration reform (since 2011). A system called ZimConnect, started in 2016, allows access to various online services. The tax office website looks good, with a lot of information available, downloadable forms and a platform for filling taxes online and submitting questions. Biometric voter registration began in 2017. In indexes the country comes near the middle. Data protection exists.

Tier 2

Angola

Angola tends to come in the middle of different indexes. The country started introducing a new ID system in 2015, although it does not have an electronic ID.[104] The tax office has a good website with a decent amount of information, downloadable forms and other tools as well as links to a supposed taxpayer portal, apparently still under construction. Data protection legislation exists.

Burkina Faso

The country has plans for digitalisation and e-services, partly with World Bank support, but few concrete projects have been established. A biometric voters card exists. The country ranks rather low on most indexes. A simple tax office website provides a decent amount of information about taxation, and downloadable forms. It does not seem to have any online platform.

Cote d´Ivoire

Few e-governance services are available, although there is an initiative to promote ICT in education. The tax office has a good website with much information, an extensive FAQ section, downloadable forms, and a platform for online declaration. The country's position is low in the UN e-Government Development Index but better in the ITU and WEF indexes. Infrastructure is not very advanced (0,52 fixed broadband per 100 people; 1 fixed telephone per 100 people). However mobile penetration is high with 119 per 100 people). The number of secure internet servers is quite low (5 per 1 mill people). Legal framework has some development i.e. the Protection of Personal Data Law since 2013 exists.

Gabon

Gabon ranks in the upper part of indexes. A National ID has been used since 2011, and only for local elections since 2013. Plans for e-governance have been made but many initiatives are halted or moving slowly (please see Annex 2) and there are very few actual and sustainable activities, which indicates the plans have not been set in a context in which they can be followed-up. Although a tax office website should exist, it comes up as unavailable. Data protection legislation at some level exists (please see Annex 5).

Madagascar

Madagascar is low or very low in the indexes, and few e-governance initiatives can be identified. At the same time, the tax office website looks very good, with lots of information available about taxation, business registration and much else. It contains many downloadable forms and an online platform for tax registration and declaration. There is a project for national ID cards. Some data protection legislation exists.

Mozambique

Mozambique adopted ICT policies and strategies in 2000 to improve use of technologies in the country. Various projects, including from World Bank, support reforms. In 2010 an e-governance interoperability framework was published. As of 2017, there is a plan for a system of unique identification numbers. The tax office has a quite good website and an online help service for asking questions, plus downloadable forms but no platform for registration. The country falls in the lower half of the different indexes.

Sao Tome and Principe

[104]https://www.hidglobal.com/sites/default/files/resource_files/hid-gov-id-angola-cs-en.pdf

Some early projects have been undertaken, including contacts with eGA, and some initiatives on the institutional side. Political will for implementation of e-governance has been demonstated. However, not much is available as services. No designated tax office website is available and the government website is rather rudimentary, mostly containing tourist information. A website about starting a business in the country is under construction. The country holds a low position in the UN e-Government Development Index and is not included in others. The country is heading for the next generation of national IDs and planning to upgrade CivID 2.0 software, which will allow for biometric authentication and envisions a contactless chip for new national IDs. Birth registration is high.

Senegal

Senegal ranks in the upper part of indexes. It has various projects for e-governance in various spheres, most under development. Senegal has been issuing e-IDs since 2005 (please see Annex 2). Projects for smart IDs and voter cards have existed since 2015. The tax office website looks good with a lot of easy-to-use information about different types of taxation, many forms available for download, and an online platform for tax registration (ease of navigation 5/3 and quality of online tools 5/2). Data protection legislation exists. Infrastructure is not very advanced (0,67 fixed broadband per 100 people; 2 fixed telephone per 100 people). However mobile penetration is high with 100 per 100 people). The number of secure internet servers is quite low (5 per 1 mill people).

Togo

The position of Togo in indexes varies, but tends to be just above or just below the middle. A wide-ranging project to introduce e-governance and improve ICT availability was launched in 2012 and implemented in 2015. Biometric voter cards have been issued since 2015. There is a limited online platform for the tax office.

Zambia

Zambia has national, biometric identity cards introduced with UNDP assistance in 2013. The president has created a designated e-governance division, responsible for introduction of e-governance. The country is in the upper half, near the middle, of most indexes. The tax office website contains a decent amount of information about taxation and provides extensive downloadable forms. An online registration service is available to log on to, although it is unclear whether it provides complete online registration (ease of navigation 5/3 and quality of online tools 5/2). Infrastructure is not advanced at all (0,15 fixed broadband per 100 people; 1 fixed telephone per 100 people). Mobile penetration is compared to upper end countries low with 74 per 100 people). The number of secure internet servers is quite low (5 per 1 mill people).

Tier 3

Cameroon

Cameroon began issuing electronic ID cards in 2013. Biometric ID cards were introduced in 2016 in the country, which faces political instability. There are various ambitious plans for e-governance and use of ICT, but few concrete projects. The country tends to be in the middle of indexes (e-government index No. 26, ICT dev index No.23 and networked readiness index No. 24). The tax office has a reasonable website, but with limited and somewhat unclear information (e.g. about the language). There is a limited online platform for declaration. The ease of navigation has been evaluated hood 5/4 but quality of online tools poor 5/1. Infrastructure is not advanced (0,07 fixed broadband per 100 people; 5 fixed telephone per 100 people and mobile cellular penetration 72 per 100 people).The country is experiencing political violence.

Comoros

Comoros uses websites to attract investment, and it has a good website with e-regulations and links to how to deal with various procedures. However, few ministries or authorities have websites. In indexes it either comes in a low position or is not included (e-government index No. 38). The tax office website is limited and largely under maintenance, with seemingly no forms to download and no online declaration (ease of navigation 5/1 and quality of online tools 5/0). Data protection law exists since 2014. Its national ID is featured with biometric features.

Ethiopia

An e-governance plan was adopted in 2011 and an ambitious number of services are to be offered. The plan is in the implementation process but few services are yet available. The tax office website is quite good, with downloadable forms and a lot of information available, although online services are limited and there is some lack of clarity in the FAQ. The level of access to mobile phones is low and the country tends to appear low in indexes or have no information available.

Gambia

There are few e-governance initiatives in Gambia. The tax office website looks quite good, with a fair amount of information available and downloadable forms (ease of navigation 5/4 and quality of online tools 5/1). It links to a page advertising an online platform, but this is only under construction. Biometric passports have been introduced. Access to mobile phones is very high (mobile cellular penetration 138 per 100 people). Access to fixed telephones is low (2 per 100 people in 2015) as well as in case of fixed broadband (0,18 per 100 people). Little information exists on Gambia and the country is absent from many registries, which contributes to the difficulty in accessing credible information on actual activities. The country scores below or near average on most indexes. Regarding legal framework, Information and communication Act, has been enforced since 2009.

Liberia

Liberia in 2017, with USAID, launched a project for digitalisation and e-government. The sustainability of the reform is yet to be seen. In indexes, it is in the second half of lists (e-government index No. 34, ICT dev index No.28 and networked readiness index No. 30). Legal framework is not developed i.e. no data protection legislation is in place and Liberia is not featured in any other key indicators evaluating legal level in the country. No tax office website is available. Infrastructure is not advanced and belongs to second half of groups.

Libya

Libya has made some progress on e-governance. Reforms include an e-passport and national identity number. In the UN e-Government Development Index it is No. 9, but it is not even featured in the other indexes used for our categorisation. The tax office website is under construction. Infrastructure is well advanced with 0,97 fixed broadband, 10 fixed telephone and 157 mobile cellular penetration per 100 people. The number of secure internet servers is quite low (4 per 1 mill people).

Mali

It is difficult to identify any e-governance initiatives in Mali, but the country has made some contacts to explore ideas, including contacts with eGA. There is no tax office website and the government website is quite limited. Infrastructure is not advanced in Mali (0,02 fixed broadband per 100 people; 1 fixed telephone per 100 people). Mobile penetration is good with 140 per 100 people). The processes for starting a business are

not overly cumbersome in an African comparison. The country scores below or near average on most indexes.

Sudan

There is no tax office website. Sudan's position on indexes varies from above or below the middle (or information is missing). Sudan is ranking No. 28 in e-government development index and No. 19 in ICT development index. Legal framework is not developed i.e. no data protection legislation is in place. Sudan is not featured in key indicators evaluating legal level in the country. The level of infrastructure in Sudan is not advanced and is very much at the same level as Cameroon (0,07 fixed broadband per 100 people; and mobile cellular penetration 71 per 100 people). Ambitious reforms for introduction of e-governance exist; some have been tested but little has been applied. New civil registry procedures were introduced in 2011.

Group 3:

Burundi, Central African Republic, Chad, Congo, Democratic Republic of Congo, Djibouti, Eritrea, Equatorial Guinea, Guinea, Guinea-Bissau, Malawi, Mauretania, Niger, Sierra Leone, Somalia, South Sudan.

These countries come in indexes either in a low position or is not included at all. The representation of national and electronic ID-s is very good. Legal framework is at rather inadequate level i.e. no data protection legislation has been enforced. The level of infrastructure is also at the low end. No ratification of Treaties 185 and 108. Very few countries have designated tax websites but in case of existence the level of navigation and quality of online tools are not so well advanced.

Upgrading or downgrading of the countries

In the table below are positive and negative key elements which affected the upgrading or downgrading from one group to another. The quantitative data about the countries can be found in the Annex 12 sheet 1 and grading of the countries in the Annex 12 sheet 2.

Threshold of the groups:

Group 1	292- 840 points
Group 2 -Tier 1	207 -292points
Group 2 -Tier 2	142- 207 points
Group 2 -Tier 3	97-142 points
Group 3	97-

Table: Upgrading or downgrading of the countries

Country	Expert opinion adjustment	+	-
Gabon	G1 to G2-T2 	E-Government Development Index (No. 14 African rank) Infrastructure - ICT Development Index (No. 12) Infrastructure - Mobile Cellular penetration 169 per 100 people	Coordinating institutions – Networked Readiness Index (No. 25) Legal framework - ICT laws index 2,7 Tax administration - No designated tax web-site No evidence of actual activities to implement plans
Algeria	G1 to G2-T1 	• Secure digital identity - Existence of national ID • Infrastructure - ICT Development Index (No. 8) • Infrastructure - Fixed Broadband 5,58 • Infrastructure - Fixed Telephone 8 • Infrastructure - Mobile Cellular penetration 106 per 100 people • Infrastructure - Investments in telecoms 0,7 billion (Arican rank 5) • Tax administration - Existence of designated tax web-site • Tax administration – ease of navigation 5/3 • Tax administration – quality of online tools 5/2	• Importance of gov future vision index 3,1 • Many delays in implementation • Coordinating institutions – Networked Readiness Index (No. 18) • Few services available • Legal framework - (No data protection legislation) • Legal framework - ICT laws index 2,8
Rwanda	G2-T1 to G1 	• Importance of gov future vision index 5,8 (highest rank) • Strong support for business • Coherent implementation of administrative reforms • Coordinating institutions – Networked Readiness Index (No. 5) • Legal framework (ICT laws index 4,7 highest African rank) • E-Government Development Index (No. 19) • Government portal, digital databases and exchange of data – OSI index 0,5 (third African	• Infrastructure – No Investments in telecoms have been recorded

		rank) • Secure digital identity - Existence of national ID • Tax administration - Existence of designated tax web-site • Tax administration – ease of navigation 5/5 • Tax administration – quality of online tools 5/4	
Cote d´Ivoire	G2-T1 to T2 	• Importance of gov future vision index 4,6 (third African rank) • Secure digital identity - Existence of national ID • Infrastructure - Mobile Cellular penetration 119 per 100 people • Tax administration - Existence of designated tax web-site • Tax administration – ease of navigation 5/4 • Tax administration – quality of online tools 5/5	• International framework (No ratification of Treaties 185 and 108) • E-Government Development Index (No. 37) • Government Online Service - OSI index 1/0,17 • Infrastructure – 0,52 fixed broadband per 100 people; 1 fixed telephone per 100 people • Coordinating institutions – Networked Readiness Index (No. 18) • Infrastructure - Secure internet servers 5 per 1 mill people • Few services available
Senegal	G2-T1 to T2 	• Importance of gov future vision index 4,1 (8 African rank) • Legal framework (data protection legislation exists) • International framework- Treaty 185+ 108 is ratified • Secure digital identity - Existence of national ID	• E-Government Development Index (No. 22) • Infrastructure - 0,67 fixed broadband per 100 people; 2 fixed telephone per 100 people • Infrastructure - Secure internet servers 5 per 1 mill people
Zambia	G2-T1 to T2 	• Importance of gov future vision index 4,1 (8 African rank) • E-Government Development Index (No. 16) • Secure digital identity - Existence of e- ID	• Legal framework - (No data protection legislation) • Infrastructure - 0,15 fixed broadband per 100 people; 1 fixed telephone per 100 people • Infrastructure - Secure internet servers 5 per 1 mill people
Mali	G2-T1 to T3	• Secure digital identity - Existence of e- ID	• Difficulty to identify actual measures

		• Legal framework (data protection legislation exists) • Infrastructure - Mobile Cellular penetration 140 per 100 people	undertaken • Coordinating institutions – Networked Readiness Index (No. 28) • E-Government Development Index (No. 42) • International framework- No ratification of Treaties 185 +108 • Infrastructure - fixed Broadband 0,02, 1 fixed Telephone. • Tax administration - No designated tax web-site
Gambia	G2-T1 to T3 	• Secure digital identity - Existence of National - ID • Infrastructure - Mobile Cellular penetration 138 per 100 people • Legal framework - Information and communication Act, 2009	• E-Government Development Index (No. 32) • Infrastructure – ICT development index (No. 21) • International framework- No ratification of Treaties 185 +108 • Not featured in Government Online Service index, difficulty to access credible information • Infrastructure - fixed Broadband 0,18, 2 fixed Telephone, • Legal framework - (No data protection legislation) •

Cameroon	G2-T1 to T3 	• Secure digital identity - Existence of e- ID • Infrastructure - Investments in telecoms 0,46 billion (African rank 6)	• Indexes - e-government index No. 26, ICT dev index No.23 and networked readiness index No. 24 • Infrastructure - fixed Broadband 0,07, 5 fixed Telephone, Mobile Cellular penetration 72 per 100 people • Quality of services low
Libya	G2-T1 to T3 	• Secure digital identity - Existence of National- ID • E-Government Development Index (No. 9) • Infrastructure - fixed Broadband 0,97, 10 fixed Telephone, Mobile Cellular penetration 157 per 100 people	• Not featured in ICT Development and Network Readiness and Government Online Service indexes • Infrastructure - Secure internet servers 4 per 1 mill people • Infrastructure – No Investments in telecoms have been recorded • Tax administration - No designated tax web-site
Sudan	G2-T2 to T3 	• Secure digital identity - Existence of e-ID • Infrastructure - Investments in telecoms 0,3 billion (African rank 8)	• Not featured in Importance of gov future vision index • Legal framework - No data protection legislation • International framework- No ratification of Treaties 185 +108 • Infrastructure - fixed Broadband 0,07, Mobile Cellular penetration 71 per 100 people Tax administration - No designated tax web-site

Liberia	G2-T2 to T3 	• Secure digital identity - Existence of National- ID	• Indexes - e-government index No. 34, ICT dev index No.28 and networked readiness index No. 30 • Legal framework - No data protection legislation • Infrastructure - 0,16 fixed broadband per 100 people; 0 fixed telephone and Mobile penetration 81 per 100 people • Infrastructure – No Investments in telecoms have been recorded • Tax administration - No designated tax web-site • Lack of credible evidence of sustainability of initiated reforms
Sao Tome and Principe	G2-T3 to T2 	• E-Government Development Index (No. 33) • Secure digital identity - Existence of National- ID • Infrastructure - 0,49 fixed broadband per 100 people; 3 fixed telephone and Mobile penetration 65 per 100 people • National strategies as well as actively implemented plans for change, including international projects	• Legal framework - No data protection legislation • Tax administration - NoNo designated tax web-site
Comoros	G3 to G2-T3 	Secure digital identity - Existence of National - ID E-Government Development Index (No. 38) Tax administration - Existence of designated tax web-site Legal framework (data protection legislation exists) Good use of government websites	Not featured in many indexes or other key elements

Guinea	G2-T2 to G3 	Secure digital identity - Existence of National- ID	Legal framework - No data protection legislation Tax administration - No designated tax web-site No identified e-governance reform efforts
Congo	G2-T2 to G3 	Secure digital identity - Existence of e-ID E-Government Development Index (No. 29, highest in G3 countries) Infrastructure - Mobile penetration 112 per 100 people (highest in G3)	Legal framework - No data protection legislation Tax administration - No designated tax web-site No identified e-governance reform efforts
Mauretania	G2-T2 to G3 	• Secure digital identity - Existence of e- ID	• Legal framework - No data protection legislation • Tax administration - No designated tax web-site • • No identified e-governance reform efforts
Malawi	G2-T2 to G3 	• Secure digital identity - Existence of e- ID • Legal framework (ICT laws index 2,5 highest in G3 countries) • Tax administration - Existence of designated tax web-site • Infrastructure- investments (56 mill) • Tax administration – ease of navigation 5/3 • Tax administration – quality of online tools 5/2	• Legal framework - No data protection legislation • No identified e-governance reform efforts
Democratic Republic of Congo	G2-T3 to G3 	• Infrastructure- investments (0,2 billion) • Tax administration - Existence of designated tax web-site • Tax administration – ease of navigation 5/2 • Tax administration – quality of online tools 5/3	• Secure digital identity – National ID only paper based • Legal framework - No data protection legislation
Sierra Leone	G2-T3 to G3 	• Secure digital identity - Existence of e- ID	• Legal framework - No data protection legislation • Tax administration - No designated tax web-site

Guinea Bissau	G2-T3 to G3 	• Secure digital identity - Existence of e- ID	• Legal framework - No data protection legislation • Tax administration - No designated tax web-site
Chad	G2-T3 to G3 	• Secure digital identity - Existence of National- ID	• Legal framework - No data protection legislation • Tax administration - No designated tax web-site • Inadequate infrastructure
Burundi	G2-T3 to G3 	• Secure digital identity - Existence of e- ID • Tax administration - Existence of designated tax web-site • Tax administration – ease of navigation 5/2 • Tax administration – quality of online tools 5/1	• Extreme poverty • Legal framework - No data protection legislation
Equatorial Guinea	G2-T3 to G3 		• Secure digital identity – No national ID exists • Legal framework - No data protection legislation • Tax administration - No designated tax web-site

Niger	G2-T3 to G3 	• Tax administration - Existence of designated tax web-site • Tax administration – ease of navigation 5/2 • Tax administration – quality of online tools 5/2	• Extreme poverty – one of the world´s least developed nations • Inadequate protection of human rights • Secure digital identity – National ID only paper based • Legal framework - No data protection legislation

Annex 7 – Government Online Service index (OSI)[105]

The OSI index captures a government's performance in delivering online services to the citizens.

The index computation methodology is worked out by the United Nations Department of Economic and Social Affairs and is based on expert opinion. There are four stages of service delivery: Emerging, Enhanced, Transactional, and Connected. Online services are assigned to each stage according to their degree of sophistication, from the more basic to the more sophisticated. In each country, the performance of the government in each of the four stages is measured as the number of services provided as a percentage of the maximum services in the corresponding stage. Examples include: online presence, deployment of multimedia content, government's' solicitation of citizen input, widespread data sharing, and use of social networking.

Scale: 0-to-1 (best)

Government Online Service Index (2013)[106]	
Cote d´Ivoire	0.17
Morocco	0.7
Egypt	0.6
Tunisia	0.6
Ethiopia	0.5
Mauritius	0.5
Rwanda	0.5
Kenya	0.4
South Africa	0.4
Botswana	0.3
Ghana	0.3
Mozambique	0.3
Namibia	0.3
Nigeria	0.3
Senegal	0.3
Seychelles	0.3
Tanzania	0.3

[105] The Global Information Technology Report 2016, also available from the Networked Readiness Index database, http://reports.weforum.org/global-information-technology-report-2016/networked-readiness-index/, (Accessed October 2017).
[106] Data Table 8.02 Government Online Service Index, page 255.

Zimbabwe	0.3
Cameroon	0.2
Cape Verde	0.2
Lesotho	0.2
Madagascar	0.2
Malawi	0.2
Algeria	0.1
Benin	0.1
Gabon	0.1
Liberia	0.1
Mali	0.1
Swaziland	0.1
Uganda	0.1
Zambia	0.1
Burundi	0.0
Chad	0.0
Guinea	0.0
Angola	na
Burkina Faso	na
Comoros	na
Gambia	na
Libya	na
Sao Tome and Principe	na
Sudan	na
Togo	na

Annex 8 – Performance of African countries in international indexes

Countries highlighted in green rank among the 10 top performers across the 3 indexes.

E-Government Development Index (by UN)[107]		
#	Country	Global Rank
1	Mauritius	58
2	Tunisia	72
3	South Africa	76
4	Morocco	85
5	Seychelles	86
6	Cape Verde	103
7	Egypt	108
8	Botswana	113
9	Libya	118
10	Kenya	119
11	Ghana	120
12	Namibia	125
13	Uganda	128
14	Gabon	129
15	Tanzania	130
16	Zambia	132
17	Zimbabwe	134
18	Swaziland	136
19	Rwanda	138
20	Angola	142
21	Nigeria	143
22	Senegal	144
23	Togo	147
24	Algeria	150
25	Lesotho	154
26	Cameroon	155
27	Ethiopia	157
28	Sudan	161
29	Congo	162
30	Madagascar	163

[107] United Nations E-Government Knowledge Data Base, E-Government Development Index, 2016, https://publicadministration.un.org/egovkb/Data-Center (Accessed August 2017). The E-Government Development Index (EDGI) measures e-government instructions' effectiveness in the delivery of basic economic and social services to people. Namely consists of three most important dimensions of e-government: (1) scope and quality of online services (Online Service Index, OSI), (2) development status of telecommunication infrastructure (Telecommunication Infrastructure Index, TII), and (3) inherent human capital (Human Capital Index, HCI).

31	Malawi	166
32	Gambia	167
33	Sao Tome and Principe	168
34	Liberia	170
35	Mozambique	172
36	Burundi	173
37	Cote d'Ivoire	175
38	Comoros	176
39	Benin	177
40	Democratic Republic of the Congo	180
41	Guinea-Bissau	181
42	Mali	182
43	South Sudan	183
44	Mauritania	184
45	Burkina Faso	185
46	Sierra Leone	186
47	Djibouti	187
48	Chad	188
49	Guinea	189
50	Eritrea	190
51	Central African Republic	191
52	Niger	192
53	Somalia	193

ICT Development Index (by ITU)[108]		
#	Country	Global Rank
1	Mauritius	73
2	Seychelles	87
3	South Africa	88
4	Tunisia	95
5	Morocco	96
6	Cape Verde	97
7	Egypt	100
8	Algeria	103
9	Botswana	108
10	Ghana	112
11	Namibia	120
12	Gabon	124
13	Kenya	129
14	Cote d'Ivoire	132
15	Zimbabwe	133
16	Lesotho	134
17	Swaziland	136
18	Nigeria	137
19	Sudan	139
20	Senegal	141
21	Gambia	143
22	Zambia	147
23	Cameroon	148
24	Mali	149
25	Rwanda	150
26	Mauritania	151
27	Angola	154
28	Liberia	156
29	Uganda	157
30	Benin	158
31	Togo	159
32	Equatorial Guinea	160
33	Djibouti	161
34	Burkina Faso	162
35	Mozambique	163

[108] International Telecommunication Union ICT Development Index 2016, https://www.itu.int/net4/ITU-D/idi/2016/index.html#idi2016rank-tab (Accessed August 2017). The ITU ICT Development Index (IDI) is a unique benchmark of the level of ICT development in a country. The IDI combines eleven indicators on ICT access, use and skills, capturing key aspects of ICT development. The three key categories of indicators are: (1) 5 **infrastructure and access indicators** (fixed-telephone subscriptions, mobile-cellular telephone subscriptions, international Internet bandwidth per Internet user, households with a computer, and households with Internet access); (2) 3 **intensity and usage indicators** (individuals using the Internet, fixed broadband subscriptions, and mobile-broadband subscriptions);

36	Guinea	165
37	Madagascar	166
38	Tanzania	167
39	Malawi	168
40	Ethiopia	169
41	Congo (Dem. Rep.)	170
42	Burundi	171
43	South Sudan	172
44	Guinea-Bissau	173
45	Chad	174
46	Niger	175

Networked Readiness Index (by WEF)[109]		
#	Country	Global Rank
1	Mauritius	49
2	South Africa	65
3	Seychelles	74
4	Morocco	78
5	Rwanda	80
6	Tunisia	81
7	Cape Verde	85
8	Kenya	86
9	Egypt	96
10	Namibia	99
11	Botswana	101
12	Ghana	102
13	Côte d'Ivoire	106
14	Senegal	107
15	Gambia, The	113
16	Lesotho	115
17	Zambia	116
18	Algeria	117
19	Nigeria	119
20	Ethiopia	120
21	Uganda	121
22	Zimbabwe	122

[109] World Economic Forum Networked Readiness Index Report 2016, http://reports.weforum.org/global-information-technology-report-2016/networked-readiness-index/ (Accessed August 2017). The Networked Readiness Index (NRI) looks at what the different actors in society, both private and public, can do to contribute and coordinate the country's networked readiness. The four key categories of indicators are: (1) the overall environment for technology use and creation (political, regulatory, business, and innovation); (2) networked readiness in terms of ICT infrastructure, affordability, and skills; (3) technology adoption/usage by the three groups of stakeholders (government, the private sector, and private individuals).

23	Mozambique	123
24	Cameroon	124
25	Gabon	125
26	Tanzania	126
27	Mali	127
28	Benin	128
29	Swaziland	129
30	Liberia	130
31	Malawi	132
32	Guinea	134
33	Madagascar	135
34	Mauritania	136
35	Burundi	138
36	Chad	139

Annex 9 – Laws relating to ICTs index [110]

The index is measuring the quality of regulations pertaining to ICTs, the capacity and the role of ICTs in driving innovation as well as represents the level of sophistication for ICT related laws in a country. ICT consists of e.g., e-commerce, digital signatures, and consumer protection areas. The higher the index more developed and sophisticated laws are enforced in a country.

Scale: 1 = highly undeveloped; 7 = well-developed

Laws relating to ICTs index (2014–2015)[111]	
Algeria	2.8
Angola	na
Benin	2.5
Botswana	3.3
Burkina Faso	na
Burundi	2.4
Cameroon	3.1
Cape Verde	3.7
Chad	2.0
Comoros	na
Cote d´Ivoire	na
Egypt	3.2
Ethiopia	3.1
Gabon	2.7
Gambia	na
Ghana	3.4
Guinea	2.2
Kenya	4.0
Lesotho	3.5
Liberia	

[110] The Global Information Technology Report 2016, also available from the Networked Readiness Index database, http://reports.weforum.org/global-information-technology-report-2016/networked-readiness-index/, (Accessed October 2017).
[111] Data Table 1.02 Laws relating to ICTs, page 203.

Libya	na
Madagascar	2,6
Malawi	2.5
Mali	3.2
Mauritius	4.3
Morocco	3.7
Mozambique	3.0
Namibia	3.6
Nigeria	2.9
Rwanda	4.7
Sao Tome and Principe	na
Senegal	3.9
Seychelles	3.9
South Africa	4.4
Sudan	na
Swaziland	2.6
Tanzania	3.2
Togo	na
Tunisia	3.4
Uganda	3.4
Zambia	3.6
Zimbabwe	2.5

Annex 10 – Importance of government vision of the future index[112]

Index assessing to what extent does the government have a clear implementation plan for utilizing Information and Communication Technologies (ICTs) to improve a country's overall competitiveness. This indicator also shows the government effort to improve the regulatory environment. The higher the index the clearer vision a government has.

Scale: 1 = not at all—there is no plan; 7 = to a great extent—there is a clear plan.

Importance of government vision index (2014–15)[113]	
Algeria	3.1
Angola	Not available (na)
Benin	3.2
Botswana	4.0
Burkina Faso	na
Burundi	3.0
Cameroon	3.6
Cape Verde	4.5
Chad	3.0
Comoros	na
Cote d´Ivoire	4.6
Egypt	3.2
Ethiopia	3.6
Gabon	3.6
Gambia	na
Ghana	3.6
Guinea	3.0
Kenya	4.8
Lesotho	3.3
Liberia	3.3
Libya	na
Madagascar	2.9

[112] The Global Information Technology Report 2016, also available from the Networked Readiness Index database, http://reports.weforum.org/global-information-technology-report-2016/networked-readiness-index/, (Accessed October 2017).
[113] Data Table 8.01 Importance of ICTs to government vision of the future, page 254.

Malawi	3.2
Mali	3.7
Mauritius	4.4
Morocco	4.3
Mozambique	3.6
Namibia	3.9
Nigeria	3.4
Rwanda	5.8
Sao Tome and Principe	na
Senegal	4.1
Seychelles	4.0
South Africa	3.2
Sudan	na
Swaziland	3.2
Tanzania	3.6
Togo	na
Tunisia	3.6
Uganda	4.1
Zambia	4.1
Zimbabwe	2.8

Annex 11 – Glossary

This glossary suggests a selection of appropriate definitions of key terms used in the context of e-governance as adopted by different organisations, with references to the source. There is a multitude of different definitions available from which only a few are universally accepted or adopted in normative documents. Mainly, most up to date ISO standard based terms and definitions are used (https://www.iso.org/obp/ui/#search).

Term	Definition	Source
application	software that is dependent on the services of an operating system	https://www.iso.org/obp/ui/#search
audit trail	data collected for the potential use in a security audit	https://www.iso.org/obp/ui/#search
bar code	optical machine-readable representation of data	https://www.iso.org/obp/ui/#sear
big data	extensive datasets/collections linked data primarily characterised by big volume, extensive variety, high velocity (creation and use), and/or variability that together require a scalable architecture for efficient data storage, manipulation, and analysis	https://www.iso.org/obp/ui/#sear
biometric verification	process of confirming a biometric claim through biometric comparison	https://www.iso.org/obp/ui/#sear
broadband	frequency band that is used for an application requiring a wide range of frequencies	https://www.iso.org/obp/ui/#search
broadband internet	passive infrastructure (ducts, cables, masts, premises) and active equipment component implementing the technology (transponders, routers and switches, control and management servers). On top of that, services are delivered	http://ec.europa.eu/newsroom/dae/document.cfm?doc_id=6908
bulk messages	bulk messaging is the dissemination of large numbers of SMS messages for delivery to mobile phone terminals	https://en.wikipedia.org/wiki/Bulk_messaging
card reader	input unit that reads or senses the holes in a punched card, transforming the data from the hole patterns to electric signals	https://www.iso.org/obp/ui/#search
civil registry	authentic sources of information on the population under the control of a public administration.	https://ec.europa.eu/isa2/sites/isa/files/isa_annex_ii_eif_en.pdf
contactless	radio frequency technology operating at very short ranges so that the user has to perform a voluntary gesture in order that a	https://www.iso.org/obp/ui/#sear

	communication is initiated between two devices by approaching them	
cyber security	(a) the security of cyber devices and; (b) security against threats created through the operation of cyber devices. Security usually means a situation where risks are not materialised.	https://www.mkm.ee/sites/default/files/cyber_security_strategy_2014-2017_public_version.pdf
cybercrime	criminal activity where services or applications in the Cyberspace are used for or are the target of a crime, or where the Cyberspace is the source, tool, target, or place of a crime	https://www.iso.org/obp/ui/#sear
data	reinterpretable representation of information in a formalized manner suitable for communication, interpretation, or processing	https://www.iso.org/obp/ui/#sear
data exchange	storing, accessing, transferring and archiving of data	https://www.iso.org/obp/ui/#search
data linking	matching and combining data from multiple databases	https://www.iso.org/obp/ui/#search
data protection	legal, administrative, technical or physical measures taken to avoid unauthorised access to and use of data	https://www.iso.org/obp/ui/#sear
digital data	data represented by digits, possibly together with special characters and the space character	https://www.iso.org/obp/ui/#search
digital identification system	or electronic identification scheme - a system for electronic identification under which electronic identification means are issued to natural or legal persons, or natural persons representing legal persons	http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32014R0910&from=EN
digital identity	a set of data and software, protected with cryptographic means	Current report
digital information asset	management of agreed descriptions of services, data, registries	http://eur-

management	and interoperable solutions	lex.europa.eu/resource.html?uri=cellar:2c2f2554-0faf-11e7-8a35-01aa75ed71a1.0017.02/DOC_3&format=PDF
digital signature	signature based upon cryptographic methods of originator authentication, computed by using a set of rules and a set of parameters such that the identity of the signer and the integrity of the data can be verified	https://www.iso.org/obp/ui/#search
e-commerce	transaction of buying or selling online	https://en.wikipedia.org/wiki/E-commerce
e-governance	or electronic governance is the application of information and communication technology (ICT) for delivering government services, exchange of information, communication transactions, integration of various stand-alone systems and services between government-to-customer (G2C), government-to-business (G2B), government-to-government (G2G) as well as back office processes and interactions within the entire government framework	Saugata, B., and Masud, R.R. (2007). Implementing E-Governance Using OECD Model(Modified) and Gartner Model (Modified) Upon Agriculture of Bangladesh. IEEE. 1-4244-1551-9/07
e-government	using the tools and systems made possible by information and communication technologies (ICTs) to provide better public services to citizens and businesses	European Interoperability Framework (EIF) for European public services. https://ec.europa.eu/isa2/sites/isa/files/isa_annex_ii_eif_en.pdf
e-ID	electronic identification means - a material and/or immaterial unit containing person identification data and which is used for authentication for an online service	http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32014R0910
e-identification	or electronic identification - the process of using person	http://eur-lex.europa.eu/legal-

	identification data in electronic form uniquely representing either a natural or legal person, or a natural person representing a legal person	content/EN/TXT/HTML/?uri=CELEX:32014R0910&from=EN
e-services	electronic services - library services delivered via electronic means, whether from local servers or provided via networks	https://www.iso.org/obp/ui/#sear
electronic document	electronic representation of a page-oriented aggregation of text, images and graphic data and metadata useful to identify and understand that data, that can be reproduced on paper or other substrates, as well as rendered electronically on display devices, without significant loss of its information content	https://www.iso.org/obp/ui/#sear
electronic identity	see e-ID	
electronic signature	data in electronic form which is attached to or logically associated with other data in electronic form and which is used by the signatory to sign	http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32014R0910&from=EN
encryption	process of encoding messages (or information) in such a way that only authorized parties can read it	https://www.iso.org/obp/ui/#search
fixed broadband	an internet connection delivered via phone line or through the provider's network of cables	https://www.broadbandchoices.co.uk/reviews/mobile-broadband-vs-fixed-line-broadband
ID	IDentifier - a number, whether personal, for businesses or property, aiming to help to differentiate persons with the same name, keep track of a company in case of change of the name or to identify a specific property	Current report
identification system	identification system consisting of all, and only, the following:	https://www.iso.org/obp/ui/#sear

	— owner code: three letters; — equipment category identifier: one letter; — serial number: six numerals; — check digit: one numeral.	ch
interoperability	ability of two or more systems or components to exchange information and to use the information that has been exchanged	https://www.iso.org/obp/ui/#search
login	process by which an initiator obtains access to a set of device fetch agents	https://www.iso.org/obp/ui/#search
mobile communication	the use of technology that allows us to communicate with others in different locations without the use of cables	https://www.igi-global.com/chapter/communicame/81100
mobile internet	a general term used to describe high-speed Internet access from mobile providers for portable devices	https://www.lifewire.com/what-is-mobile-broadband-p2-2377422
mobile messaging gateway	mobile messaging gateway allows a computer to send or receive Short Message Service (SMS) transmissions to or from a telecommunications Network	https://en.wikipedia.org/wiki/SMS_gateway
mobile network	wireless WAN or MAN that provides continuous connectivity to mobile terminals	https://www.iso.org/obp/ui/#search
NMT, 2G, 3G, 4G, 5G	generations of wireless cellular technology (mobile telecommunications)	http://www.ijarcce.com/upload/2014/april/IJARCCE1C%20%20%20a%20%20Sachin%20Panchal%20%20Evolutionary%20steps.pdf
offline	pertaining to the operation of a functional unit when not under the direct control of the computer	https://www.iso.org/obp/ui/#search
online	operating in direct connection to the data processing	https://www.iso.org/obp/ui/#sear

		ch
online services	service which is implemented by hardware, software, or a combination of them and provided over a communication line or network	https://www.iso.org/obp/ui/#sear
payment gateway	service located on a distant server for the acceptance of mobile remote payments	https://www.iso.org/obp/ui/#sear ch
personal identification number	numeric code used to authenticate an identity	https://www.iso.org/obp/ui/#sear ch
physical identity	The definition depends on the context. Here the general definition is used: the qualities that make someone or something what they are and different from other people	https://www.macmillandictionary. com/dictionary/british/identity
PIN number	Personal Identification Number - string of numeric digits established as a shared secret between the cardholder and the issuer, for subsequent use to validate authorized card usage	https://www.iso.org/obp/ui/#sear ch
portal	web-based interface that provides a single access point to dispersed information	https://www.iso.org/obp/ui/#sear ch
radio frequency	frequency within the range of frequencies suitable for utilization in radio communication	https://www.iso.org/obp/ui/#sear
Secure Data Exchange Solution	solution that ensure that all data exchanges are done in a secure and controlled way. Transfer mechanisms should facilitate information exchanges that are: registered and verified, encrypted, time stamped, logged	https://ec.europa.eu/isa2/sites/is a/files/isa_annex_ii_eif_en.pdf
shareware	software usually free of charge and publicly available	Current report
SIM cards	Subscriber Identification Module - integrated circuit that securely	https://www.iso.org/obp/ui/#sear

	stores the international mobile subscriber identity (IMSI) and the related key used to identify and authenticate subscribers on mobile telephony devices (such as mobile phones and computers)	ch
smart card	device of credit card size incorporating an integrated circuit with microprocessor and memory	https://www.iso.org/obp/ui/#search
SMS	Short Message Service that enables a mobile phone or a server to send messages of limited length to one or several mobile phone(s)	https://www.iso.org/obp/ui/#search
timestamp	time variant parameter which denotes a point in time with respect to a common time reference	https://www.iso.org/obp/ui/#search
trust services	means an electronic service normally provided for remuneration which consists of: (a) the creation, verification, and validation of electronic signatures, electronic seals or electronic time stamps, electronic registered delivery services and certificates related to those services, or (b) the creation, verification and validation of certificates for website authentication; or (c) the preservation of electronic signatures, seals or certificates related to those services	EU REGULATION 910/2014, http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R0910&from=EN
USB	Universal Serial Bus, is an industry standard that defines cables, connectors and communications protocols for connection, communication, and power supply between computers and devices	https://en.wikipedia.org/wiki/USB
webpage	digital multimedia object as delivered from the internet on request to a client system	https://www.iso.org/obp/ui/#search
website	collection of logically connected webpages managed as a single	https://www.iso.org/obp/ui/#sear

	entity and accessed through the same base	ch
wired network	a physical connection to a physical location through a cable	https://broadbandmatters.com/what-are-wired-broadband-technologies
wireless access point (WiFi)	device or piece of equipment that allows wireless devices to connect to a wired network	https://www.iso.org/obp/ui/#search

Annex 12 – List of indicators per country

Ranking of African countries by e-governance readiness

838	G1	Seychelles
567	G1	Mauritius
537	G1	South Africa
371	G1	Morocco
363	G1	Tunisia
361	G1	Cape Verde
359	G1	Botswana
338	G1	Egypt
336	G1	Ghana
301	G1	Kenya
292	G1	Namibia
216	G1	Rwanda
304	G2-T1	Algeria
267	G2-T1	Zimbabwe
265	G2-T1	Nigeria
240	G2-T1	Lesotho
228	G2-T1	Tanzania
212	G2-T1	Swaziland
222	G2-T1	Uganda
209	G2-T1	Benin
289	G2-T2	Cote d´Ivoire
332	G2-T2	Gabon
281	G2-T2	Senegal
240	G2-T2	Zambia
164	G2-T2	Mozambique
101	G2-T2	Sao Tome and Principe
154	G2-T2	Burkina Faso
164	G2-T2	Madagascar
144	G2-T2	Angola
162	G2-T2	Togo
264	G2-T3	Mali
183	G2-T3	Sudan
218	G2-T3	Libya
163	G2-T3	Liberia
237	G2-T3	Cameroon
251	G2-T3	Gambia
138	G2-T3	Ethiopia
81	G2-T3	Comoros
170	G3	Congo
155	G3	Malawi
178	G3	Guinea
156	G3	Mauretania
134	G3	Democratic Republic of Conge
127	G3	Sierra Leone
124	G3	Guinea Bissau
114	G3	Chad
110	G3	Burundi
94	G3	Equatorial Guinea
94	G3	Niger
78	G3	Djibouti
74	G3	South Sudan
55	G3	Somalia
31	G3	Central African Republic
14	G3	Eritrea

Threshold of the groups

Group 1	292- 840 points
Group 2 -Tier 1	207 -292points
Group 2 -Tier 2	142- 207 points
Group 2 -Tier 3	97-142 points
Group 3	97-

Country scores per key e-governance element (analogue)

Pre-requisite key element	Political will and change management	Coordinating institutions	Legal framework	Legal framework	International framework	International framework	Access to services and awareness raising
Country/ indicator	Importance of government vision of the future index 2014-2015 (scale 1-7, 7 best)	Networked Readiness Index (WEF Global Rank) 2016	Existence of data protection legislation (scale 1-5, 5 best) 2017	Laws relating to ICTs index 2014-2015 (scale 1-7, 7 best)	Signatures and ratifications of Treaty 185 (1= signature 2= ratification) 2017	Signatures and ratifications of Treaty 108 (1=signature 2= ratification) 2017	E-Government Development Index (UN Global Rank) 2016
Algeria	3.1	117	na	2.8	0	0	150
Angola	na	na	3	na	0	0	142
Benin	3.2	128	3	2.5	0	0	177
Botswana	4	101	na	3.3	0	0	113
Burkina Faso	na	na	2	na	0	0	185
Burundi	3	138	na	2.4	0	0	173
Cameroon	3.6	124	na	3.1	0	0	155
Cape Verde	4.5	85	4	3.7	0	0	103
Central African Republic	na	na	na	na	0	0	191
Chad	3	139	na	2	0	0	188
Comoros	na	na	1	na	0	0	176
Congo	na	na	na	na	0	0	162
Cote d´Ivoire	4.6	106	1	na	0	0	175
Democratic Republic of Conge	na	na	na	na	0	0	180
Djibouti	na	na	na	na	0	0	187
Egypt	3.2	96	3	3.2	0	0	108
Equatorial Guinea	na	na	na	na	0	0	na
Eritrea	na	na	na	na	0	0	190
Ethiopia	3.6	120	na	3.1	0	0	157
Gabon	3.6	125	3	2.7	0	0	129
Gambia	na	113	1	na	0	0	167
Ghana	3.6	102	4	3.4	0	0	120
Guinea	3	134	na	2.2	0	0	189
Guinea Bissau	na	na	na	na	0	0	181
Kenya	4.8	86	4	4	0	0	119
Lesotho	3.3	115	5	3.5	0	0	154
Liberia	3.3	130	na	0	0	0	170
Libya	na	na	na	na	0	0	118

Madagascar	2.9	135	4	2.6	0	0	163
Malawi	3.2	132	na	2.5	0	0	166
Mali	3.7	127	2	3.2	0	0	182
Mauretania	na	136	na	na	0	0	184
Mauritius	4.4	49	4	4.3	2	2	58
Morocco	4.3	78	5	3.7	0	0	85
Mozambique	3.6	123	na	3	0	0	172
Namibia	3.9	99	na	3.6	0	0	125
Niger	na	na	na	na	0	0	192
Nigeria	3.4	119	2	2.9	0	0	143
Rwanda	5.8	80	na	4.7	0	0	138
Sao Tome and Principe	na	na	na	na	0	0	168
Senegal	4.1	107	4	3.9	2	2	144
Seychelles	4	74	3	3.9	0	0	86
Sierra Leone	na	na	na	na	0	0	186
Somalia	na	na	na	na	0	0	193
South Africa	3.2	65	4	4.4	1	0	76
South Sudan	na	na	na	na	0	0	183
Sudan	na	na	na	na	0	0	161
Swaziland	3.2	129	na	2.6	0	0	136
Tanzania	3.6	126	3	3.2	0	0	130
Togo	na	na	na	na	0	0	147
Tunisia	3.6	81	4	3.4	0	2	72
Uganda	4.1	121	4	3.4	0	0	128
Zambia	4.1	116	na	3.6	0	0	132
Zimbabwe	2.8	122	1	2.5	0	0	134

Country scores per key e-governance element (digital)

Pre-requisite key element	Government portal, digital databases and exchange of data	Secure digital identity	Infrastructure	Infrastructure	Infrastructure	Infrastructure	Infrastructure	Infrastructure	Infrastructure	Tax administration	Tax administration	Tax administration
Country/ indicator	Government Online Service Index 2016 (OSI, scale 0-1, 1 best)	Existence of National ID (scale 1=No; Yes; 2 = yes and e-ID at least partly) 2017	ICT Development Index (ITU Global Rank) 2016	Fixed Broadband (per 100 people) 2015	Fixed Telephone (per 100 people) 2015	Mobile Cellular (per 100 people) 2015	Investments in telecoms with private participation (USD, per capita) 2010-2014	Investments in telecoms with private participation (USD current prices, 2014)	Secure internet servers (per 1 mil. people) 2016	Existence of designated tax web-site, 2017	Evaluation for navigation (scale 0-5, 5 best) 2017	Evaluation for online tools (scale 0-5, 5 best) 2017
Algeria	0.1	2	103	5.58	8	106	19	742,340,000	4	yes	3	2
Angola	na	2	154	0.67	1	61	6	na	5	yes	4	2
Benin	0.1	1	158	0.67	2	86	5	51,000,000	3	partly	3	1
Botswana	0.3	2	108	1.79	8	169	13	na	25	yes	5	2
Burkina Faso	na	1	162	0.04	0	81	2	43,000,000	1	yes	1	1
Burundi	0.0	2	171	0.03	0	46	3	na	1	yes	1	1
Cameroon	0.2	2	148	0.07	5	72	21	467,000,000	2	yes	3	3
Cape Verde	0.2	2	97	3.26	11	119	10	na	59	yes	4	2
Central African Republic	na	0	na	0.013 (2012)	0	26	2	na	1	no	0	0
Chad	0.0	1	174	0.08	0	40	2	29,000,000	0	na	na	na
Comoros	na	1	na	0.26	2	55	na	na	1.349	yes	1	0
Congo	na	2	na	0.011 (2014)	0	112	4	19,500,000	2	no	0	0
Cote d´Ivoire	0.17	2	132	0.52	1	119	9	195,200,000	5	yes	4	4
Democratic Republic of Conge	na	0	170	0	0	53	3	246,500,000	0	yes	3	1
Djibouti	na	0	161	2.69	3	35	na	na	7	no	0	0
Egypt	0.6	0	100	4.52	7	111	12	1,065,770,000	5	yes	3	1
Equatorial Guinea	na	na	160	0.48	1	67	na	na	3	no	0	0
Eritrea	na	1	na	0.003 (2014)	1	7	na	na	N/A	no	0	0
Ethiopia	0.5	0	169	0.48	1	43	na	na	0	yes	3	3
Gabon	0.1	1	124	0.63	1	161	8	15,700,000	18	no	0	0
Gambia	na	1	143	0.18	2	138	na	na	5	yes	4	1
Ghana	0.3	2	112	0.27	1	130	6	151,000,000	6	yes	5	2
Guinea	0.0	1	165	0.01	0	87	5	62,000,000	0	no	0	0
Guinea Bissau	na	2	173	0.06	0	69	6	10,000,000	2	no	0	0
Kenya	0.4	2	129	0.29	0	81	9	417,000,000	11	yes	5	5
Lesotho	0.2	2	134	0.1	2	101	13	na	5	yes	5	3
Liberia	0.1	1	156	0.16	0	81	4	na	4	no	0	0
Libya	na	0	na	0.97	10	157	na	na	4	no	0	0

Madagascar	0.2	0	166	0.1	1	44	1	26,000,000	2	yes	5	5
Malawi	0.2	2	168	0.03	0	38	3	56,000,000	2	yes	3	2
Mali	0.1	2	149	0.02	1	140	4	75,000,000	2	no	0	0
Mauretania	na	2	151	0.24	1	89	37	na	3	no	0	0
Mauritius	0.5	2	73	15.75	30	141	29	na	187	yes	5	5
Morocco	0.7	1	96	3.38	7	127	26	881,380,000	7	yes	4	3
Mozambique	0.3	1	163	0.16	0	74	3	0	2	yes	4	2
Namibia	0.3	1	120	2.94	8	107	11	0	26	yes	4	1
Niger	na	0	175	0.06	1	46	1	26,200,000	0	yes	2	0
Nigeria	0.3	2	137	0.01	0	82	8	1,357,000,000	3	yes	3	3
Rwanda	0.5	2	150	0.17	0	70	3	na	6	yes	5	4
Sao Tome and Principe	na	1	na	0.49	3	65	12	na	10	no	0	0
Senegal	0.3	2	141	0.67	2	100	6	86,000,000	5	yes	3	2
Seychelles	0.3	2	87	14.31	23	158	9	na	465	yes	4	3
Sierra Leone	na	2	na	N/A	0	90	1	9,300,000	1	no	0	0
Somalia	na	0	na	0.74	0	52	na	na	0	no	0	0
South Africa	0.4	2	88	2.63	8	165	23	1,240,000,000	125	yes	5	4
South Sudan	na	2	172	0	0	24	1	8,000,000	0	no	0	0
Sudan	na	2	139	0.07	0	71	8	301,000,000	0	no	0	0
Swaziland	0.1	1	136	0.47	3	73	9	na	16	yes	5	5
Tanzania	0.3	2	167	0.2	0	76	2	108,400,000	2	yes	5	5
Togo	na	0	159	0.88	1	68	4	26,000,000	7	no	0	0
Tunisia	0.6	na	95	4.34	8	130	10	113,740,000	13	na	na	na
Uganda	0.1	2	157	0.18	1	50	3	132,800,000	2	yes	4	4
Zambia	0.1	2	147	0.15	1	74	2	39,000,000	5	yes	3	2
Zimbabwe	0.3	1	133	1.09	2	85	8	129,500,000	8	yes	4	4