2023 Africa Domain Name Industry Study

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Executive Summary

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PREFACE

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I invite you to read the 2023 Africa Domain Name Industry Study, a comprehensive report that sheds light on the growth, challenges, and opportunities within the Domain Name System (DNS) across Africa. Building on the initial study conducted in 2016, this study provides critical insights into how the landscape has evolved and where it is headed.

The study is an integral part of ICANN's commitment to support the growth and development of the Internet's infrastructure, namely the DNS infrastructure, in a highly dynamic region. It was also created in response to a request from the African community within the context of the implementation of the ICANN Africa Regional Plan for Fiscal Years 2021-2025.

Detailed analyses, supported by data gathered from various sources are presented in the study, including ICANN's regional reports and independent research findings. The recommendations focus on key areas such as infrastructure development, regulatory adjustments, and capacity building, which are crucial for harnessing the full potential of the DNS industry in Africa.

Additionally, the study proposes a Trial Observatory for consideration, designed to monitor the ongoing status and progression of the DNS industry across the continent. It is our hope that such an observatory could serve as a valuable tool for continuous improvement and engagement with all stakeholders involved.

As we present the findings of this critical study, undertaken as an initiative under the Coalition for Digital Africa and led by ICANN, it is important to recognize its foundation in advocating for a globally secure and stable Internet - a fundamental driver of economic and social advancement. This study highlights the pivotal role that a robust DNS industry plays in achieving this objective, particularly in a diverse and dynamic region like Africa. It identifies both advancements and challenges, providing stakeholders – from government policymakers to local entrepreneurs – with a roadmap to promote a more inclusive digital future.

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This study is a testament to the collective effort and dedication to connect Africa and to ensure that it thrives as a dynamic participant in the global digital economy. Through the Coalition for Digital Africa, we have a spectrum of partners that support this vision, leveraging ICANN's technical expertise and global reach to bring tangible improvements in the Internet ecosystem in Africa. The challenges identified underscore the urgent need for increased collaboration and innovation. As we navigate these challenges, the role of the Coalition for Digital Africa becomes even more critical. It serves as a platform for bringing together diverse stakeholders to foster dialogue, and share best practices, and drive significant investments into the region's domain name industry.

We extend our gratitude to the consultants, participants, and all who contributed to this comprehensive study. Your insights and expertise are shaping the future of the internet in Africa. Together, we can continue to collaborate, innovate, and invest in a connected and thriving Africa.

EXECUTIVE SUMMARY

Background

This Industry Study into the Domain Name System in Africa was commissioned to:

- Highlight the strengths and weaknesses in the Domain Name System (DNS) industry sector in Africa.
- Develop recommendations on how to advance the industry to take better advantage of the opportunities available and address identified challenges; and,
- Develop a Trial Observatory to demonstrate the potential for continuously monitoring the status and growth of the DNS Industry in Africa.

The Internet Corporation for Assigned Names and Numbers (ICANN) described the region as "Africa – made up of 54 countries and boasting a population of over one billion"[1]. Accessing consistently reliable statistical information from all these countries is inevitably challenging due to the large size of the continent, language differences and the huge disparities between and within countries in relation to, for example, levels of development, literacy and skills, infrastructure roll out and access to Internet resources. These disparities are mirrored in some ways in the membership of the African Network Information Centre (AFRINIC), the African Regional Internet Registry (RIR) for Internet number resources. It has, for example, only one member in Eritrea compared to 702 in South Africa.

This Study builds on the baseline established by the 2016 Study commissioned by ICANN.

I.I Methodology

To address the challenges of collecting reliable information, the research team utilised a range of mechanisms to access the information required to fulfil the objectives of the study. This included an online survey, zone file analysis of country code and generic top-level domain (ccTLD and gTLD) registries, extracts from Registrar's and domain monitoring services' databases and extensive desktop research. In addition, several of the research team members have decades of experience in the DNS industry in Africa, and their insights informed many of our conclusions.

Some 1,800 potential participants in the study were identified and all participants were specifically targeted and sent personal links to an online survey by a total of 48 team members distributed around the continent. We endeavoured to draw on the same people answering the 2016 survey, to ensure maximum consistency in the qualitative analysis. The online survey tool

[1] https://www.icann.org/en/system/files/files/africa-strategy-implementation-2012-2017-03may18-en.pdf

included seven different questionnaires for identified target groups (Registry, Registrar, Registrant, Regulator, Reseller, IXP Manager and Data Centre Manager) translated into six languages (English, French, Portuguese, Arabic, Swahili, and Spanish). A response rate of 22% was received - a total of 308 questionnaires were completed by 209 targeted respondents, noting that some completed more than one questionnaire. Responses were received from all seven identified stakeholder groups, all six AFRINIC regions and five out of six language groups.

Finally, to improve understanding of the trends in the African DNS Industry, the Team built on the data gathered in 2016 with additional questions and languages, aiming to ensure that the reader can easily identify the changes over the 6-year period between the two studies.

I.II The African Ecosystem

It is important to contextualise the DNS industry within the overall African Internet and digital communications infrastructure ecosystem. Key indicators in relation to this include the following:

- Although Africa is a very diverse region, most countries on the continent fall at the bottom of the global rankings of digital uptake and use. For example, of the 33 lowest ranked countries in the 2023 Networked Readiness Report[2], all are in Africa. Within Africa, differing rates of digital adoption now see Kenya surpassing South Africa to claim the top position in the 2023 NRI (Network Readiness Index).
- While it has significantly improved from 2016, Africa continues to lag other regions in relation to Internet access with an average penetration of 43% (29% in 2016) compared to a world average of 68% (50% in 2016). This average penetration level however masks big differences between countries in Africa with Internet access varying from 7% in Eritrea to 85% in Kenya.
- Backbone fibre networks are gradually spreading across most African countries, and all coastal countries except Eritrea have access to at least one submarine fibre cable and most countries have at least two. According to Hamilton Research, by mid-2022 there were over 1.1 million kilometres of terrestrial fibre cables installed on the continent, and cross-border fibre is also increasing. As a result, almost all countries are now connected to their neighbours by fibre – the only country left without cross border terrestrial fibre interconnection is Eritrea.
- Local access to broadband remains problematic in almost all African countries. Outside of South Africa, major deployments of metro fibre have largely focused on capital cities, particularly Accra, Dar es Salaam, Kigali, Harare, Kampala, Lomé, Lusaka, and Nairobi, and more recently in some secondary cities. Wi-Fi deployments follow a similar distribution, often preceding Fibre to the Home (FTTH). However, even in these cities, most people still rely on mobile access.
- Although broadband uptake in Africa has been increasing, high Internet access costs continue to be the biggest factor limiting usage in most countries. We estimate that for only 1

[2] https://networkreadinessindex.org/

GB of monthly data — enough to watch just four minutes of video a day — the average African must pay about 4% of their monthly income, which is twice the Broadband Commission's target of 2%. This, together with the fact that African Internet access is primarily via mobile devices where every Byte of use adds to the bill, further contributes to a low demand for domain names.

- In terms of IP resources, out of the global usage, Africa accounts for only 2.4% of IPv4 and 1% of IPv6 addresses.
- Nevertheless, growth in local Internet infrastructure is speeding up, with 63 fully operational IXPs in 38 countries (up from 36 in 26 countries in 2016) and an increasing number of fully-fledged data centres being built. In 2016 the research had already confirmed that there is a correlation between the number of IXPs in a country and the maturity of the local industry: i.e. countries with more IXPs had a more mature DNS industry and respondents to the survey identified the absence of local IXPs as one of the barriers to development of the DNS industry. The 2023 study continues to underline these conclusions.
- An analysis of the volumes of web page content indexed by Google found that 66% of 644 million African pages indexed are in just ten African countries: - South Africa, Nigeria, Egypt, Morocco, Kenya, Tunisia, Tanzania, Algeria, Mauritius, Sao Tome & Principe. The spread is better, now, as previously 75% of content was concentrated in just seven countries.

I.III African DNS Industry

The African continent top level DNS address space consists of 54 top level country code ccTLDs plus six Internationalised Domain Names (IDNs): Algeria (الجزائر), Egypt (مصر), Mauritania (موريتانيا), Morocco (المغرب), Sudan (سودان) and Tunisia (تونس) as well three city codes (.CAPETOWN, .DURBAN and .JOBURG). No other African cities have been added since 2016.

ICANN delegated the .AFRICA domain to the South African administrator, the ZA Central Registry (ZACR), supported by the African Union and registrations were fully opened in July 2017.[3]

Data from November 2023 indicates that the total number of domains registered under African ccTLDs was just over 4.33 million. In addition, there are about 1.4 million registrations in the gTLDs by African entities.

Other key findings of the research are summarised below.

- Since 2016 the total number of African ccTLD domains has doubled (203%). However, the role of Freenom obscures the general trend for domestic ccTLD registrations because in 2016 almost all (93%) of the increase was in fact in the four Freenom 'domain hack' countries. Nevertheless, the statistics quoted in the remainder of this Report are based on the November 2023 figure of 4.33 million ccTLD domain names.

[3] https://registry.africa/dotafrica-africa-roadshow-launches-african-union-headquarters/

- Approximately 1% of gTLD domains are registered by Africans and registrations by Africans of gTLD domains total approximately 1.4 million, the bulk of which (~1.2 million) are .COM domains.
- According to responses to the survey, the use of IDNs is reasonably widespread with at least 46% of Registries offering non-Latin scripts and more than a third of Registrars (34%) doing so.
- Our research indicates that high Internet access costs, the lack of digital infrastructure and the fact that African Internet access is primarily via mobile devices has constrained demand for domain names. This was confirmed by responses to the survey, with respondents citing high prices as the biggest barrier to the development of the DNS industry in most African countries followed by lack of underlying Internet infrastructure.
- Other issues that were identified as high barriers by respondents include unreliability of Internet connections and unclear or restrictive policy and regulatory environments.
- The highest number of domain name registrations by African entities takes place mainly in countries where the local hosting industry and web development sector has developed sufficiently to create demand for local domains, i.e. mostly in South Africa, Egypt, Mauritius, Nigeria, Kenya, Zimbabwe, Uganda, Tunisia, and Morocco. The research also confirmed zero or low levels of local hosting in many countries in the region: 41 countries hosted over 95% of their gTLD domains outside Africa.
- The research found 51 fully functioning[4] ccTLD Registries, leaving only Eritrea (ER[5]), the Comoros (KM[6]) and South Sudan (SS[7]), which each have under 300 domains, but have no apparent method of registering new domains via the Internet.
- Compared to other regions, Africa has a very small number of ICANN accredited Registrars. According to the ICANN web site, in total, there are only 12 ICANN accredited registrars in the region - three in South Africa, two each in Morocco and Nigeria and one each in Burundi, Ghana, Mauritius, Senegal, and Tunisia out of a global total of 1,122.
- There are many more Registrars than 12 ICANN accredited ones that are active in Africa. South Africa has the most, at 622 Registrars accredited by the ZARC[8], for example. Unless specified otherwise, in the remainder of this report, the term “accredited Registrar” means a Registrar accredited by the relevant ccTLD Registry.

[4] By “functioning" we don’t just mean that a Name Server exists, with a zone file, but that Registrants are able to register domains.

[5] The website doesn’t work, and Registrars report that registrations are suspended.

[6] One Registrar says that registrations are suspended. Another allows them but is unable to do a WHOIS lookup.

[7] One Registrar says that registrations are suspended. Another allows them but is unable to do a WHOIS lookup.

[8] ZARC: ZA Registry Consortium, the operator of the .CO.ZA, .NET.ZA and .ORG.ZA zones, and others.

- As indicated above, 51 countries now have at least one Registrar, with 15 countries having only one, (typically the Registry itself), whereas 36 countries have multiple Registrars. Our analysis shows the number of Registrars is clearly a factor in the number of ccTLD domains sold, although it is also true that a successful industry attracts more Registrars.
- For the Registrants, this review identified over 4.33 million African ccTLD and gTLD domains. This equates to some 3 domains / 1000 population, whereas the global average is about 45 domains per 1000 people.
- The top 10 African ccTLDs by domain numbers have 92% of the domains registered. In this regard it should be noted that there are a few African countries that have relatively high numbers of domain registrations due to what are known as 'domain hacks' or vanity domains (where domains are utilised by entities or individuals outside these countries because the ccTLD forms part of a memorable word). These types of domain markets occur where these ccTLD Registrars offer domain names that cost little or nothing to register or are attractive for special purposes where registering a short or a common word in the ccTLD has more relevance than registration in the more popular gTLDs such as .COM or .NET. Most of these countries have non-restrictive rules that allow registration of domains from entities located outside the country.
- The annual DNS industry roughly equates to a total value of about US$17.5 million for African ccTLD domain names alone based on local rates. Based on international rates the industry size is about US$101 million. Adding in US$16 million for TLDs held by Africans gives a total of some US137 million. Applying a typical multiplier factor means that the African DNS industry is worth just under US$1 billion. About 74% of the total annual revenue on the continent is made by the top 10 countries (South Africa, Nigeria, Morocco, Kenya, Angola, Tunisia, Somalia, Mauritius, and Egypt.)
- Most of the African ccTLDs are available for registration by offshore entities without the requirement for a local presence. In 16 countries there is a requirement for some form of local legal presence (corporate or individual) to register a domain name: Algeria, Benin, Botswana, Burkina Faso, Cabo Verde, Egypt, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Morocco, Senegal, Tanzania, Tunisia, and Zambia. In a few countries, including Kenya, there are additional requirements for Registrars to be locally based, but not Registrants.
- In all countries except South Africa[9] there has been significant growth in the number of African domains as infrastructure rollout has increased in many countries, albeit off a low base. The researchers expect this trend to continue – projecting an average annual overall growth across the continent of 12.4%, based on the annualised growth of domains counted by Domaintools, averaged across all countries. However, it should be noted that this average obscures large variations between countries, ranging from -17% (Gabon) to 57% (Chad).

[9] The DNS industry in South Africa may be considered as "mature", in that it has passed the rapid growth phase and is now in linear growth, constrained primarily by GDP growth.

- This suggests significant growth opportunities for local providers in individual countries – noting that 91% of the Registrants that responded to the online survey said they preferred to deal with local Registrars.

I.IV Success factors

A "Country DNS Success Index" (CDSI) was developed by the researchers to rank countries in relation to the health of their DNS industries. The index used a range of factors to "score" countries:

- Number of domains registered under the ccTLD.
- Number of gTLD domains identified as having an African Registrant.
- Number of web pages indexed by Google.
- Price of registration.
- Number of Registrars.
- Number of locally hosted websites.
- Presence of one or more functioning IXPs; and
- Internet usage as a percentage of the population.

We derived the Country DNS Success Index for the 2016 Study and found it helpful in comparing the relative success of countries in terms of their Domain Name industries. We compare the previous results with those in this Study, where South Africa ranked overall highest of all countries, followed by Nigeria, Kenya, Tanzania, and Morocco.

By assessing common factors in countries that scored highly and the characteristics of those that scored particularly low in relation to the index, researchers were able to identify several critical success factors for ccTLD Registries, namely: -

- Infrastructure of sufficient expanse and quality to facilitate access to the Internet.
- A general level of digital awareness among the population, with sufficient literacy – both conventional and digital.
- Conducive national policy, regulatory and governance frameworks are in place.
- Payment gateways ensure easy payment of fees. Note that responses to the online survey confirmed the need for easy payment mechanisms, with both Registrars and Registrants indicating they preferred bank transfer or Mobile Money to credit/debit card. Respondents also ranked the absence of easy payment methods as one of the key barriers to growth in the DNS industry.
- Fees for registering a domain should be low and cost-based (but not zero unless restrictions are in place).
- Registration is comparatively easy to complete (including simple automated systems in place for registration and fast payment mechanisms). Note that respondents to the user experience

section of the questionnaire listed slow processing time as the third biggest challenge to development of the DNS industry, and the quality of technical support as the fifth most significant difficulty.

- Information on how to register a domain is easily available, promoting confidence and therefore facilitating a critical mass of domain names.
- Training of industry players in the technical aspects of good DNS management and implementation, as well as in content creation is carried out regularly; and
- There must be an effective business model and a marketing / consumer awareness strategy.

I.V Recommendations

Recommendations on strategies to advance the DNS industry in Africa include proposals on addressing issues in the wider environment that inhibit growth and suggestions specific to the DNS industry. These are summarised below.

I.V.I Infrastructure

The availability of the infrastructure necessary to enable uptake and usage of the Internet, of broadband, and of Internet-enabled goods and services is clearly critical. Without the availability of infrastructure and access to service providers, there is no DNS industry.

Without infrastructure and service providers, there is no DNS industry.

The development of local infrastructure also includes the provision of IXPs and Data Centres. Also vital is the roll-out of fibre networks, likely initially in the more affluent urban centres (and supported by a clear set of universal access and service interventions to obviate the creation of a new digital divide), together with cross-border fibre and the provision of sufficient undersea cable capacity. These challenges have all improved dramatically since the publication of the 2016 Study.

Countries that do not have any local hosting facilities will need to build IXPs, Data Centres and fibre networks – but should ensure in doing so that underlying issues such as the willingness of network operators to interconnect are addressed. Building an IXP is neither technically difficult nor is it expensive. When local network operators sell access to “the Internet”, they are really selling access to everyone else’s networks, including their competitors. Often, they fail to recognise this, especially in less developed markets. It is thus essential that they agree to cooperate sufficiently to interconnect and exchange traffic. If they don’t do so locally, they will do so overseas, often at higher cost and always at lower performance. Once a functioning IXP exists, Data Centres become not only viable but essential. This may then lead to the growth of a local hosting industry, and consequent demand for low cost domains, which in turn is expected to result in social and economic benefits. If ccTLD domains are unaffordable, then gTLD domains will be used, which are mostly hosted overseas. The country thus misses out on the potential ICT industry growth that might have ensued.

Registries, Registrars and Registrants should therefore all engage with operators, Regulators, and policymakers in support of measures that will: a) promote the provision of fixed and mobile networks and services; b) ensure the reduction of prices, in particular data pricing; and c) support a range of universal access and service interventions to promote Internet uptake by disadvantaged individuals and communities in under-serviced areas.

For example, almost all Africans access the Internet using a mobile cellular phone. Indeed, only 5 countries have fewer than 75% SIM subscription rates. It's thus essential that MNOs upgrade their entire networks to a minimum of 3G or 4G. Indeed, nine countries have already launched 5G networks in Africa.

I.V.II Internet Service Demand

Without a sufficient level of digital awareness on the part of individuals and communities, the uptake and usage of the Internet and the online services it enables will remain either stagnant or grow slowly. Similarly, in the absence of an environment where online services - such as e-commerce (online shopping, online banking and more), e-government (online access to government services, including e-filing of tax returns), e-Learning and more - are prevalent, it is difficult to envisage a high degree of local DNS uptake. Local online activity stimulates the local DNS industry and drives Internet demand.

Ensuring and protecting both online freedom of expression and online privacy and security is also key. Such interventions will encourage the creation of local content, and act as an industry driver.

An effective business model and a marketing and consumer awareness strategy about domain name registrations, with appropriate regulatory and governance mechanisms, must be put in place. Registries, Registrars and Registrants should therefore engage with policymakers and with a range of other entities to promote the development of and demand for the fullest possible range of online goods and services. One of the most effective ways of doing this is to require government departments to have functional websites, and to provide their employees with email accounts – all using local ccTLD domain names, of course.

I.V.III Policy and Regulation

The crucial role that ICTs played during the COVID-19 pandemic drew global attention to the necessity for robust and globally integrated policies and regulations to enhance equal access to affordable broadband. Besides, the global trend toward adopting digital economies and digital transformation concepts pushes developing countries to revisit legacy ICT legislation and regulations such as competition, and licensing. There are several areas where special efforts need to be made to improve access to ICT in the region, in particular, lack of trust in cyberspace, limited fixed and mobile broadband penetration, and poor affordability of digital access. In

addition, while the need for cost-based interconnection regulation[10] is declining, the need for cost-based access to infrastructure facilities is increasing[11].

Finally, digital transformation in ICT regulations assists in relaxing the complexity of legacy licensing approaches, which has recently hindered emerging technologies and the digital economy. African regulators are still granting service-specific licenses but are slowly moving toward a more open regulatory framework by adopting multiservice and unified licenses and license-exempt services. In this respect, an ex-post regulation model is crucial to accommodate the economies of scale and scope and the dynamism of the ICT industry.

Underlining these needs, the African Union has developed and published the "THE DIGITAL TRANSFORMATION STRATEGY FOR AFRICA (2020-2030)" aimed to "harness digital technologies and innovation to transform African societies and economies to promote Africa's integration, generate inclusive economic growth, stimulate job creation, break the digital divide, and eradicate poverty for the continent's socio-economic development and ensure Africa's ownership of modern tools of digital management". One of the specified objectives to drive the digital transformation in Africa is to "Promote the management and use of Country Code Top Level Domains as they are critical national resources whilst ensuring that technical and administrative operations are at international standards to foster trust and use of African Domain Names in order to bring financial, economic and sociocultural benefits to Africa".[12]

I.V.IV Local Content

Registration of (especially local) domain names with websites containing local content fosters the growth of the local digital economy in terms of the construction of Data Centres to accommodate the equipment hosting African websites, the IXPs to interchange local data, the telecommunications (especially fibre) infrastructure to interconnect these locations, and, of course, the need for skilled people to design, implement, manage, and maintain these infrastructure elements. A second set of skills is required to develop, update, and maintain suitable content.

The lack of relevant local content in languages spoken in Africa must be addressed as this is crucial to drive uptake and penetration – and therefore to the development of the DNS industry. E-government is a crucial means for increasing local content and the drive to ensure government services are accessible and available online is essential. As an 'anchor client' for the local domain industry, government has an important role to play in fostering its health in this way.

I.V.V Inhibiting Factors

[10] This refers to interconnection between telecoms operators, particularly Mobile Operators, where minimum limits can prevent reductions in costs to the consumer.

[11] More progressive regulatory environments require operators to equitably share facilities at cost.

[12] https://au.int/en/documents/20200518/digital-transformation-strategy-africa-2020-2030

Rules governing who may register a domain and how to do so should be as simple as possible and easily available. For example, rules in place in some countries requiring domain names to match the business / personal name of the entity should be removed. Similarly, those countries requiring registrants to have a legal presence in their country should review these with the aim of

removing such requirements. Requirements, if any, relating to compliance prior to registration of all intellectual property rights laws should be removed and rules should instead focus on addressing violations through alternative dispute resolution mechanisms after registration. This is much cheaper and far faster.

Laws and practices inhibiting freedom of expression online must be scrutinised as these can inhibit content creation and hence demand for websites, blogs, and domain names.

I.V.VI Registry Specific Recommendations

The Registry should have a website with a functioning and easy to use registry landing page. It should provide:

1. Simple and automatic procedures for registration fulfilment and payment,
2. Include payment by bank transfer, credit card and/or mobile money as an option.
3. Fees for registering a domain should be low and cost-based (but not zero unless restricted).