Investigating VPN Blocking and its Impact on Uganda's Preparations for the 2021 General Elections and Responses Afterward

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Introduction

The COVID-19 pandemic that began in early 2020 led to increased demand for internet usage in Uganda, as all citizens were required to stay at home as part of the effort to contain the virus. To communicate with relatives, co-workers, and friends, many Ugandans use popular internet services, such as instant messaging apps and social media. The internet now plays an essential role in how citizens access information, work, education, and entertainment and not only provides vital everyday services, such as communication via social media, video-conferencing, and information access but also enables citizens to exercise their fundamental rights, including freedom of opinion and expression, the right to access information, and freedom of assembly and association.

Despite the internet's significant role during the pandemic, the Ugandan government—in addition to taxing over-the-top (OTT) services—blocked internet access during the 2021 general elections, further exacerbating existing digital inequities and hurting Ugandans at a time when access to information was critical. Many Ugandans had experienced blocking of social media platforms during the previous election in 2016 and knew that they would require tools such as virtual private networks (VPNs) to circumvent potential shutdowns. While many Ugandans installed VPNs in preparation for an expected partial internet shutdown, the majority did so to dodge the OTT tax (also known as the social media tax). The OTT[1] tax, which requires Ugandans to pay a daily subscription of 200 UGX (about $0.05) to access popular social media platforms, such as Facebook, Twitter, Instagram and WhatsApp, was introduced in 2018. The government introduced the OTT tax to "curb gossip" and increase the country's revenue. However, the tax has devastating effects on the lives of internet users in Uganda, widening the digital divide and stifling the rights of freedom of expression and speech and access to information. A year after its introduction, the OTT tax brought in only 17% of the estimated revenue, a drop of five million internet users and a 47%–35% decrease in internet penetration. Many Ugandans installed VPN apps to avoid the tax as a means of expressing their disagreement with the government's policy despite threats of imprisonment. According to Nicholas Opiyo, a human rights lawyer, Ugandans can be jailed for using VPNs.

In spite of the requests made by Ugandans to suspend the social media tax, the government upheld the tax even during the COVID-19 pandemic where access to social media and the internet in general was a lifeline for many.

In advance of the election, those who did not already have Virtual Private Network apps installed rushed to install these applications on their phones, expecting a partial/social media shutdown. Noting this level of interest, after the general elections, the government threatened to block VPNs and arrest Ugandans that use them.

This study examines VPN use in Uganda before and during the 2021 elections as well as the impact of VPN blockage on Ugandans during the lead up to the 2021 general elections. The

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[1] Since July 2018, Ugandans wishing to access over-the-top services, such as Facebook, Twitter, or Instagram, are required to pay a daily tax of 200 Ugandan shillings equivalent to 0.055 USD.

study is part of the Internews OPTIMA Network Measurement Training Fellowship, of which the researcher is a recipient. The study used a mixed-methods approach drawing on network measurement to determine which tools and services were blocked and when in addition to an online survey to collect data about internet users' experiences using VPNs before, during, and after the 2021 Internet Shutdown.

Background

Virtual Private Networks (VPNs) and circumvention tools play a critical role in allowing citizens countries in which online content is blocked or censored to safely access information online and exercise their rights to freedom of expression. Since the Ugandan Parliament introduced the OTT tax in 2018, VPNs have become a lifeline for most Ugandans who cannot afford the tax.

For a country in which most citizens live on less than 1$ a day, the OTT tax negatively affected Ugandans in terms of high costs to access the internet. The OTT tax forced those who did not have the money to pay the daily tax and those who were broadly opposed to the tax to resort to using VPNs, leading to a spike in VPN usage in the country. According to Google search trends, a massive increase in the number of searches for VPNs occurred during the first month of the OTT tax's implementation.

- **On 30 May 2018, the Parliament of Uganda passed the Excise Duty Amendment Bill 2018 into a law. The Act imposed a UGX 200 daily levy on over-the-top (OTT) services, such as WhatsApp, Facebook, Twitter, Telegram, and others.**

- **The social media tax came into effect on July 1, 2018, anticipating revenue of up to UGX 400 billion (USD 108 million) per annum. Projections from the June 14 national budget speech for the fiscal year 2018/19 indicated that up to UGX 486 billion (USD 131 million) could be collected annually by 2022.**

Despite their increased importance, the Ugandan government is developing ways of deterring access to VPN services through the Uganda communications commission (UCC). The Uganda communications commission regulates the Communications sector, which includes Telecommunications, Broadcasting, radio communication, postal communications, data communication and infrastructure.

The Uganda Communications Commission (UCC) has been threatening to block VPNs since 2016. During the general election of 2016, Ugandans experienced the country's first-ever social media shutdown, followed by another similar shutdown during the swearing-in of the president-elect. Tech-savvy citizens resorted to using VPNs to using VPNs to bypass the blockage to access and share information online. After the election period and the president's swearing-in, social media platforms were restored. Although the 2016 social media blockage

forced many Ugandans to use VPNs to circumvent it, the majority of the country's citizens remained unaware of the existence and the potential of VPN applications.

Internet usage in Uganda

- There were 12.16 million Internet users in January 2021. This amounts to 25.9% of the total population (46.94 million people).
- The number of Internet users in Uganda increased by 1.5 million (+14%) between 2020 and 2021.
- Internet penetration in Uganda stood at 26.2% in January 2021.

Social media users in Uganda

- There were 3.40 million social media users in Uganda in January 2021, equivalent to 7.3% of the total population.
- The number of social media users in Uganda increased by 900,000 (+36%) between 2020 and 2021.

Mobile connections in Uganda

- There were 28.01 million mobile connections in Uganda in January 2021. The number of mobile connections in Uganda increased by 1.1 million (+4.0%) between January 2020 and January 2021.
- The number of mobile connections in Uganda in January 2021 was equivalent to 60.3% of the total population.

Source: Digital Rights Report: https://datareportal.com/reports/digital-2021-uganda

When the tax came into effect, many social media users turned to VPN applications to access social media sites without paying the tax. A year later, the OTT tax brought in just 17% of the hoped-for revenue and the number of Internet users had dropped by 30%. In response, on July 1 (2018), the former UCC executive director, Mr. Godfrey Mutabazi, vowed to order Internet service providers (ISPs) to block VPN applications one by one. An Internet service provider (ISP) is a company that provides customers with Internet access.

On June 16, the Uganda Electoral Commission issued a press release banning public rallies for the 2021 political campaigns as part of the country's Covid-19 containment measures. Moreover, the electoral commission issued guidelines that suggested candidates use of traditional media and the internet as the main avenues through which candidates can reach the electorate. During the electoral campaigns, many Ugandans, especially in Central Uganda, relied on social media and other internet platforms to access the candidates' information and manifestos. During the political campaigns, the Ugandan Police blocked opposition candidate Hon Kyagulanyi Robert, aka Bobi Wine, from accessing radio stations, leaving him with no alternative but to use social media and the Internet. Bobi Wine made extensive use of social

media platforms to convey information to his supporters, using hashtags such as #WeAreRemovingaDictator.

The above occurrences demonstrate that Ugandans avidly sought information pertaining to their candidates' platforms and electoral updates. This in turn led to a spike in the number of Ugandans downloading and using free VPNs for the purpose of engaging online and avoiding the OTT tax.

On January 9, 2021, Ugandans began reporting that they had experienced difficulties downloading apps from the [Google Play Store and Apple's App Store](#). Two days before the presidential elections on January 14, 2021, the UCC [ordered ISPs](#) to block social media and instant messaging platforms. Despite some attempts to block VPN app downloads, Ugandans still tried to use [VPNs](#) to bypass the social media blockage, leading to an upsurge in the number of times Ugandans [searched for the key term 'VPN'](#) on Google's search engine. Following the blockage of social media websites and apps, the UCC [reportedly](#) ordered the blocking of more than 100 VPNs on January 12, 2021.

Internet access was partially restored on January 18, 2021, but social media platforms like Facebook were still inaccessible even if the user paid OTT tax. On January 21, 2021, the government of Uganda, through the state minister for ICT, [warned Ugandans](#) using VPNs that it had acquired resources to monitor and switch off the sites of the VPN service providers. These occurrences threatened Ugandans' rights to freedom of expression and speech and the right to access information online and further challenged Ugandans' ability to access information and express their views on the Internet.

This study outlines the extent to which VPNs were blocked during the 2021 general elections period and offers a clearer picture of how Ugandans use VPNs in their daily lives.

Methodology

This study used an online questionnaire to determine whether Ugandans experienced cases of VPN blockage and assess the impact of the blockage. The online questionnaire gathered responses from a sample of Internet users. The survey targeted groups of Ugandans who regularly use the Internet, such as journalists, social media influencers, students, and other people who use social media platforms as part of their work. We used available email lists to contact the journalists who participated in this survey. We also used social media platforms to publish posts that requested users, particularly students and other netizens, to complete the survey. We also contacted social media influencers independently through direct messaging and phone calls. The survey comprised 19 questions designed to collect the target group's opinions about the VPNs that they most commonly used to circumvent the Internet shutdown during the 2021 general elections and contained multiple-choice questions with predefined answers and open-ended questions. The questionnaire was completed by 100 respondents from four regions of the country: Greater Masaka, West Nile, Kampala Metropolitan, and Kigezi Region. It should be noted that this survey is not geographically representative of the country at large, and the population surveyed is skewed toward those

who have better access to the Internet. Thus, the survey respondents represented are for the most part male, urban, and young, with greater access to economic resources and education.

In addition, the Open Observatory for Network Interference (OONI) explorer was used to collect measurements from Uganda during the general elections period on the blocking of specific applications and services (January 9–21). The OONI Probe app is free open-source software designed to measure various forms of network interference. OONI measurements are regularly collected and contributed by the OONI Probe app's users.

At the time we carried out the OONI measurements and tests, the OONI Probe app was designed simply to conduct blockage tests on the Tor and Psiphon circumvention tools. Other circumvention tools were tested using OONI's web connectivity test, with which we assessed whether the official websites of the circumvention tools were blocked.

This study's findings from OONI measurements were restricted by the volume and number of tests that were carried out by the people in Uganda between January 9 and 18, 2021. Since the study focuses only on VPN blockage, we used the OONI Probe app specifically to carry out tests on circumvention tools such as Psiphon and the official websites of the VPN service providers.

Findings

In this section, we analyze the data that we collected from the online questionnaire and OONI measurements. The data that we collected support our initial findings that the majority of Internet users in Uganda are familiar with and regularly use VPNs. Findings from the online questionnaire indicate that most Ugandans use free VPNs downloaded from app stores to circumvent the Internet blockages. However, most Ugandans have limited knowledge about the corresponding security and privacy risks associated with free VPNs, such as loading malware onto users' computers or mobile devices, and selling users' data to third parties for marketing.

Summary of Findings

- Most Ugandans use free VPNs downloaded from Google's Play Store and Apple's App Store. The most commonly used VPNs include ThunderVPN, SecureVPN, and Psiphon.
- Of the respondents, 64.6% indicated that they experienced network disruption challenges or censorship while using VPNs during the 2021 general elections in Uganda.
- The majority of the respondents (79%) used VPNs at least once during the 2021 general election period.
- More than half of the respondents (52%) indicated that there was a blockage of VPNs that prevented them from accessing information about the elections and other subjects online.
- Despite the state's consistent threats to arrest VPN users, the majority of the respondents reported their intention to continue using VPNs even after access to social media platforms has been fully restored.

- Many respondents chose free VPNs because of their fast connections, security, and freemium model.
- A high percentage of respondents, 79% indicated that they used VPNs to bypass the blockade imposed by the government.
- A majority of respondents (51.9%) indicated that they are worried about the risks of using VPNs, particularly the legal consequences associated with their use. However, some respondents (41.8%) reported that they experienced no concerns about any consequences that might arise from their use of VPNs.
- While some network measurements from OONI presented anomalies, they were too few to conclude that a blockage of either Tor or Psiphon had occurred.
- We were unable to collect substantial data about the blockage of other VPNs due to data limitations around connectivity tests carried out during the research period (January 9–29).

Online Survey Findings

The survey's main objective was to better understand VPN use in Uganda before, during, and after the 2021 shutdown. The survey also aimed to understand Ugandans' attitudes toward VPNs and whether they experienced blockage of the VPNs that they used during the general election period (January 9–21, 2021).

Demographics of Survey Respondents

Gender

A total of 100 people responded to the online questionnaire. Of the 100 respondents, 63 identified themselves as male, 36 as female, and one individual preferred not to divulge their gender identity.
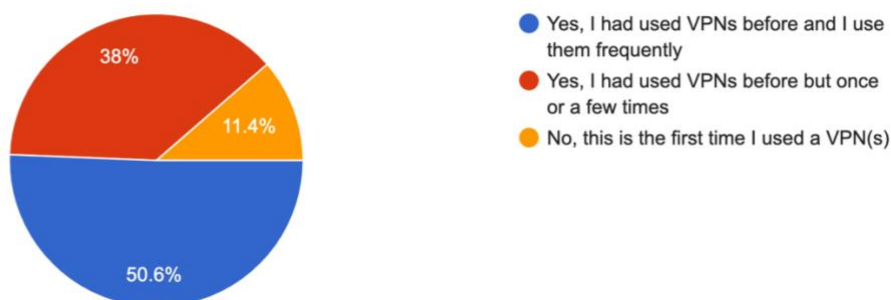
Age

Of the 100 respondents, the largest percentage (50%) were aged between 26 and 35 years, followed by 44 respondents aged between 18 and 25 years, four respondents in the 36–45 age range, and two respondents above the age of 45.

VPN Usage

VPN usage before 9 January 2021

Had you used a VPN previously before the elections?
79 responses

- Yes, I had used VPNs before and I use them frequently
- Yes, I had used VPNs before but once or a few times
- No, this is the first time I used a VPN(s)

38%

11.4%

50.6%

When asked whether they had used VPN(s) before the general elections period, 50.6% of the respondents replied that they had used them frequently before, and 38% indicated that they had occasionally used VPNs prior to the election. Approximately 11.4% of respondents indicated that it was their first time using VPN(s).

VPN installed before elections period

Did you have a VPN before Google's Play Store was blocked on 9th January 2021

79 responses

- Yes
- No
- Maybe

25.3%

73.4%
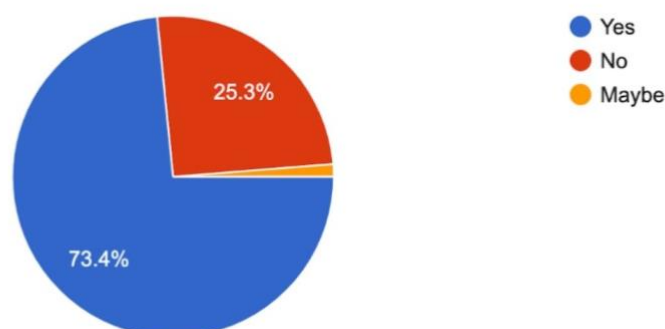
As the figure above illustrates, 59 respondents disclosed that they had installed VPN(s) before apps from the Google Play Store were blocked. Out of 79 respondents, 20 reported that they did not have any VPN app on their phones when the Google Play Store was blocked

VPN usage during the 2021 general election

Did you use a VPN during the 2021 general elections (between 9th - 29th January 2021)?

100 responses

- Yes
- No
- I'm not sure

21%

79%
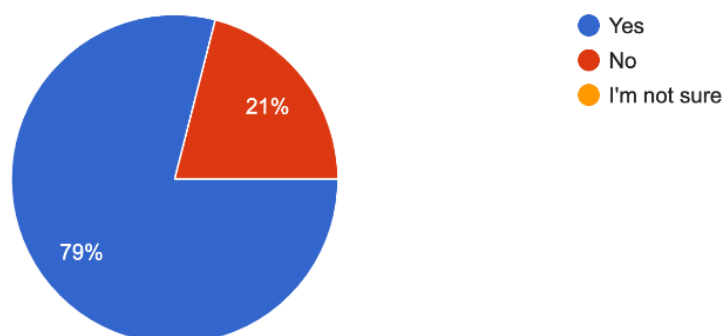
Out of 100 responses, 79 people indicated that they used VPNs during the general election period, whereas 21 respondents did not.

**Respondents' perceptions of VPN security and legal consequences**

Do you feel unsure or worry about using VPNs and the potential legal consequences?
79 responses

- Yes, I worry a lot
- Yes, I worry a little
- No, I don't worry
- I don't know

41.8%

13.9%

38%
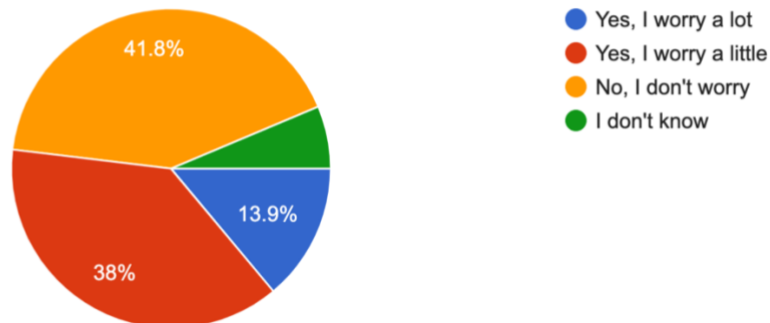
Although the government threatened to arrest VPN users, 41.8% of participants indicated that they do not worry about using VPNs and any associated legal consequences. However, 13.9% indicated that they are considerably concerned about VPN usage, while 38% specified that they worried a little. Additionally, 6.3% of respondents implied that they did not know whether or not they were worried.

Circumventing the Google Play Store blockage

Others
17.4%

App sharing
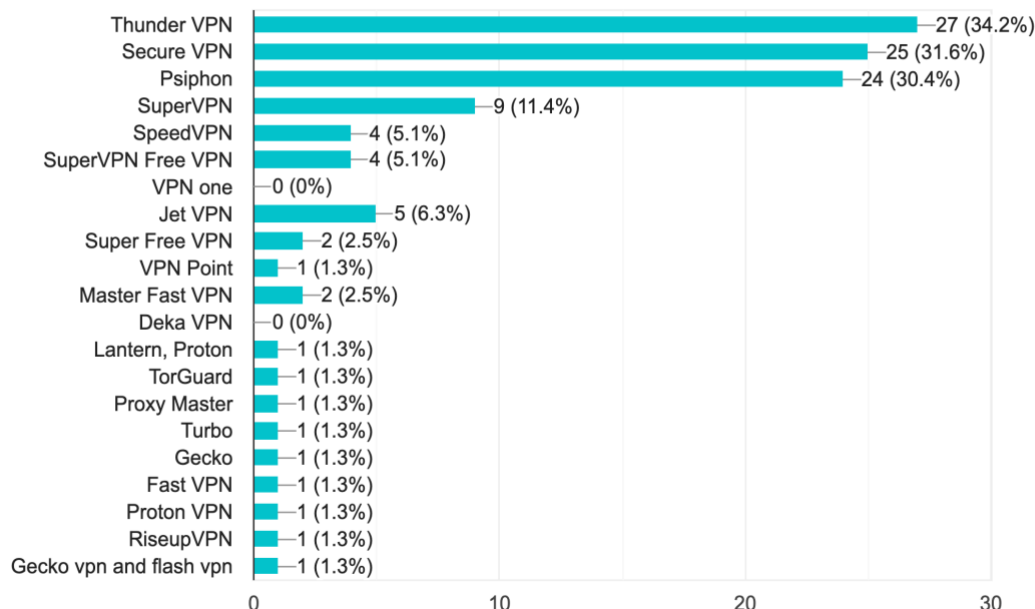26.9%

From other websites
36.5%

Through Bluetooth
19.2%
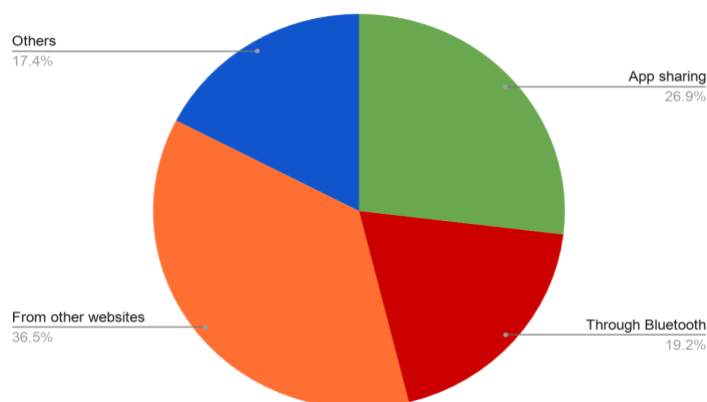
Findings from the survey indicate that the biggest percentage of respondents who did not have VPNs after the Play Store was blocked downloaded VPN mobile apps from websites such as APKpure.com or softonic.com. Other respondents used already-installed app-sharing tools, such as Xender and Bluetooth. Others indicated that they waited until the Internet shutdown was lifted to download the VPNs.

Most common VPNs

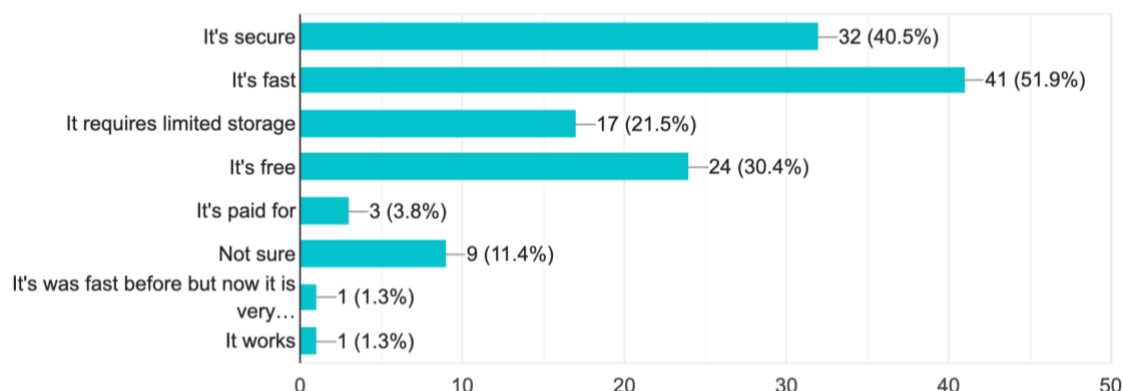What VPN do you use to circumvent the social media blockage? Select all that apply.
79 responses

VPN	Count (Percentage)
Thunder VPN	27 (34.2%)
Secure VPN	25 (31.6%)
Psiphon	24 (30.4%)
SuperVPN	9 (11.4%)
SpeedVPN	4 (5.1%)
SuperVPN Free VPN	4 (5.1%)
VPN one	0 (0%)
Jet VPN	5 (6.3%)
Super Free VPN	2 (2.5%)
VPN Point	1 (1.3%)
Master Fast VPN	2 (2.5%)
Deka VPN	0 (0%)
Lantern, Proton	1 (1.3%)
TorGuard	1 (1.3%)
Proxy Master	1 (1.3%)
Turbo	1 (1.3%)
Gecko	1 (1.3%)
Fast VPN	1 (1.3%)
Proton VPN	1 (1.3%)
RiseupVPN	1 (1.3%)
Gecko vpn and flash vpn	1 (1.3%)

As the graph above illustrates, the highest number of respondents indicated that they mainly use ThunderVPN to access social media platforms, followed by SecureVPN and Psiphon, respectively. The responses to this question verified that the majority of respondents were using more than one VPN at the time they completed this questionnaire.

Rationale for using the chosen VPNs

Why do you prefer that VPN over others?
79 responses

Reason	Count (Percentage)
It's secure	32 (40.5%)
It's fast	41 (51.9%)
It requires limited storage	17 (21.5%)
It's free	24 (30.4%)
It's paid for	3 (3.8%)
Not sure	9 (11.4%)
It's was fast before but now it is very…	1 (1.3%)
It works	1 (1.3%)

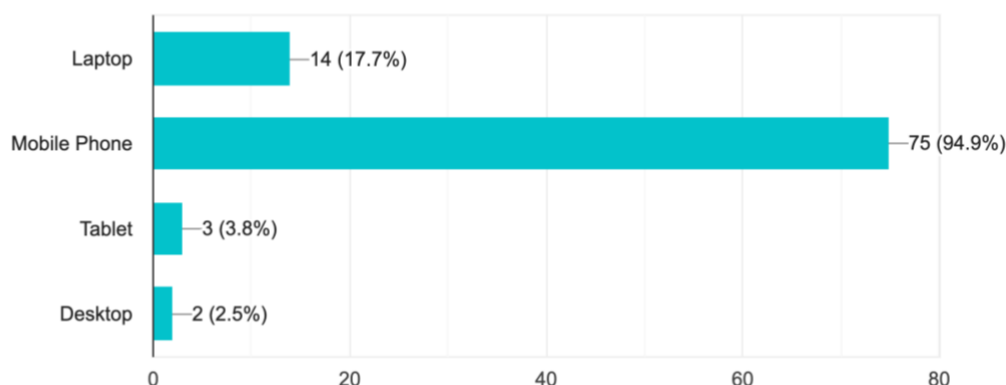Although free VPNs pose risks to data security and privacy, the highest percentage of the interviewees admitted that they use the chosen VPN apps based on the belief that they are fast, secure, and free.

Devices with installed VPNs

What device did you install the VPN on?
79 responses

The findings from this question indicate that most respondents installed VPNs on their mobile phones. This correlates with the fact that the number of mobile connections in the country is increasing sharply.

VPN speed perceptions

How quickly / slowly does it work in comparison to using the internet with OTT?
79 responses
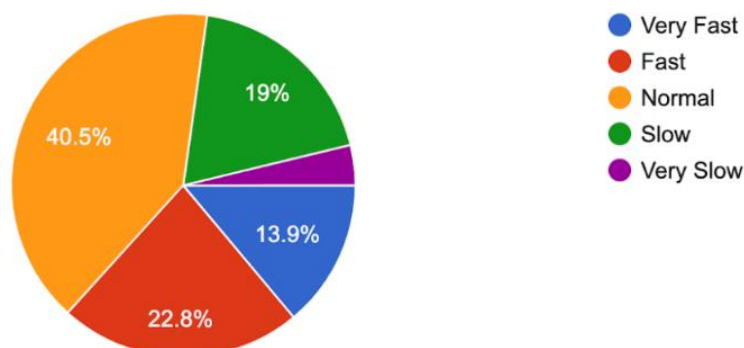
Out of 79 responses, 32 respondents indicated that their Internet connection speed while using the VPNs was normal, 18 indicated that it was fast, and 11 confirmed that it was very fast. However, 18 respondents disclosed that the Internet connection while using VPNs was slow.

Impact of VPN blockage as part of the total Internet shutdown on general election preparations

On a scale of 1 to 5, how did the blockage of the VPNs affect your preparations for the 2021 elections?
79 responses
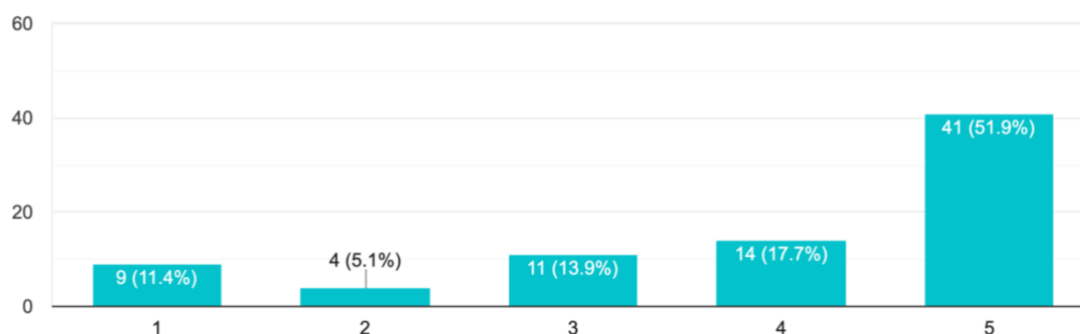
During the lead up to Uganda's 2021 general election, many Ugandans were prepared to access and share information about the elections, such as the number of tallied votes from different parts of the country and any reports of election rigging. On January 2, 2021, Hon. Robert Kyagulanyi, the leader of the National Unity Platform, launched a mobile app (uVote) that would help the party tally votes countrywide during the presidential election on January 14, 2021. The leading party, the National Resistance Movement (NRM), had launched its mobile app a year previously in 2020 with the aim of sharing news about NRM during the electoral process. With these mobile apps in place, Ugandans were eager to use them together with social media and online news websites as the major sources of news and updates about the elections.

With so much content only available online, 52% of participants indicated that there was a blockage of VPNs that prevented them from accessing any information (i.e., they rated the VPN blockage as having affected them a great deal, or 5 out of 5).

Participants Describe How the VPN Blockage and Internet Shutdown Affected Them

According to the 41 responses that we gathered, the blockage prevented the majority of participants from accessing vital information about elections on social media.
Below are some of the perspectives shared by participants regarding how the Internet blockage prevented them from accessing vital information about elections on social media:

"We were locked out from the world, didn't know what was going on in the rest of the world and even in my area. It was like I was living in total darkness, just like the cavemen. Another thing is my online business was greatly affected and lots of things, and it was only then that I realized the globe has gone completely digital. We can't do much without the Internet, therefore, the Internet is very important not only for socializing but for a lot many other."

"I couldn't get any update on election results."

"Because it was a scientific campaign, and most of the information about the election I wanted to send to my friends, I was not able to because they didn't have VPN and could not access their Internet."

"For the country to have a free and fair election, access to election information must be guaranteed and respected. Those VPN blockages stopped users from accessing information about the elections and campaigns, which could have been important to make an informed choice of candidates."

"Affected communication with office colleagues"

"I work online, so this resulted in work backlog and delayed delivery of projects."
"First of all, the government refused any rallies in Wakiso and my last resort was to check most of the aspirants from my social media accounts and due to the blockage of VPNs and Internet shutdown I was not able to access the information."

"I was denied a right to information on what was going on during the election. We were left in the dark."

"I couldn't share my voting experience in real-time on social media."

*"I had limited access to timely updates of the elections."*

"I use social media platforms, especially WhatsApp, to contact my people, do my business, and relieve stress. So the blockage stopped all this and I was not happy about it."

"The kind of work I do is in regards to reaching out to different communities through Internet communications. Having VPNs blocked stops me from communicating my work and interests to the members of the community."

Top Reasons for Using VPNs

Why did you use VPNs during that period? (9th - 21st January)
79 responses
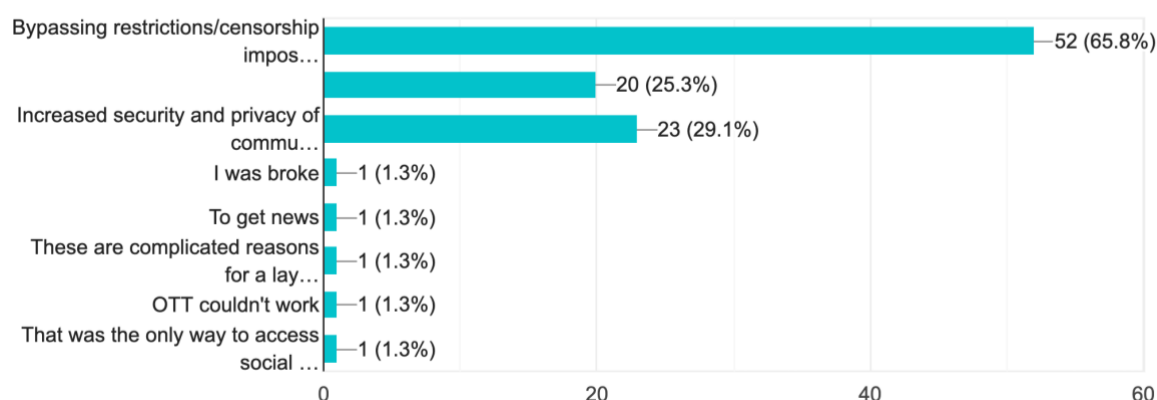
A high percentage indicated that they used VPNs to bypass the blockade imposed by the government, 23 respondents confirmed that they used VPNs to enhance their security and privacy while using the Internet, and 20 participants indicated that they used VPNs to access restricted networks. Other respondents disclosed that they used VPNs to avoid the OTT tax, making the VPNs the only means of accessing social media platforms.

Connectivity Challenges When Using VPNs

Did you encounter any connectivity challenges (ex, slow, disruptions) when using VPNs to access social media?

79 responses

Legend:
- Yes
- No
- I'm not sure

64.6%
31.6%
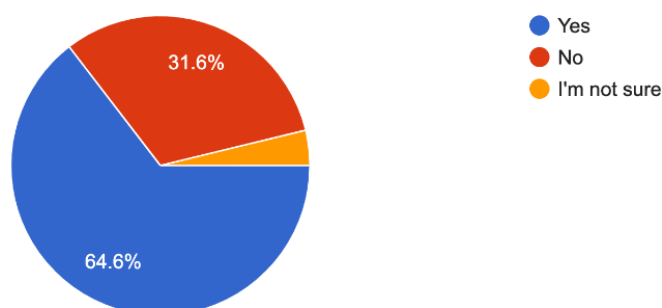
A total of 51 participants agreed that they faced connectivity challenges such as slow Internet speed or network disruptions while using VPNs. However, 31.6% of the participants indicated that they encountered no connectivity challenges while using VPNs.

VPNs That Respondents Reported as Presenting Connectivity Challenges

On which VPN did you find challenges connecting to the social media platforms during the election period (9th - 29th Jan, 2021)?

75 responses

| VPN	Count
Thunder VPN	25 (33.3%)
Secure VPN	17 (22.7%)
Psiphon	20 (26.7%)
Speed VPN	3 (4%)
SuperVPN	7 (9.3%)
SuperVPN Free VPN	2 (2.7%)
VPN one	1 (1.3%)
Jet VPN	1 (1.3%)
Super Free VPN	1 (1.3%)
VPN Point	1 (1.3%)
Master Fast VPN	2 (2.7%)
Deka VPN	2 (2.7%)
None	2 (2.7%)
Turbo	1 (1.3%)
Gekco	1 (1.3%)
Netcapsule	1 (1.3%)
1.1.1.1	1 (1.3%)
	1 (1.3%)
Gecko vpn	1 (1.3%)
Didnt use a variety of them	1 (1.3%)
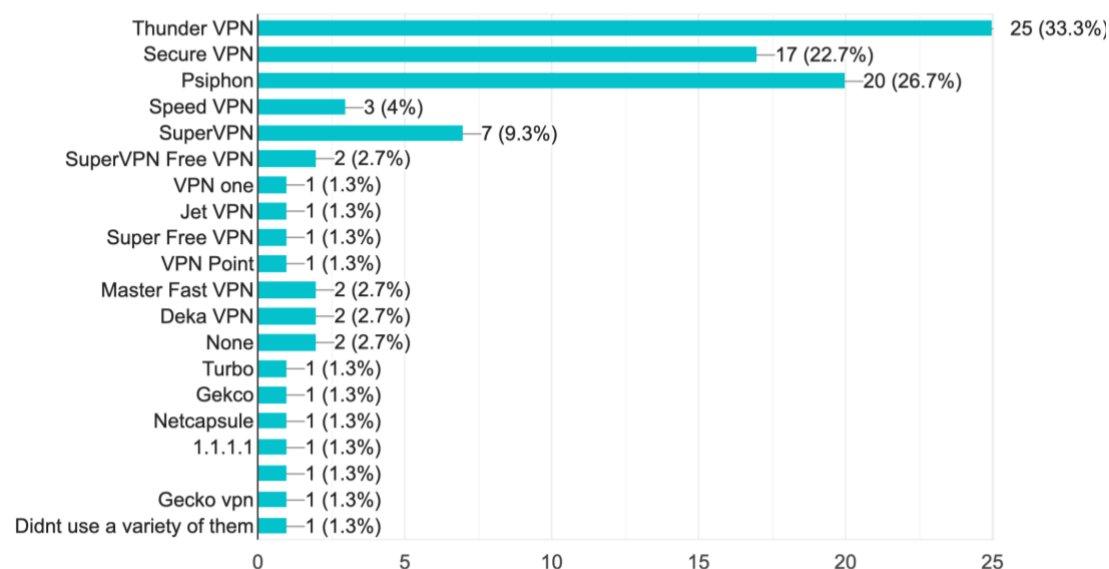
According to the responses, the majority of the participants indicated that they experienced Internet connectivity challenges while using ThunderVPN, followed by Psiphon, SecureVPN, and others, as illustrated by the above graph.

Respondents' Views on VPN Usage After the General Elections

Do you plan to use VPNs even after the social media blockage is lifted?
79 responses

- Yes, I will continue to use VPNs
- No, I will pay OTT tax
- Not sure

25.3%
7.6%
67.1%
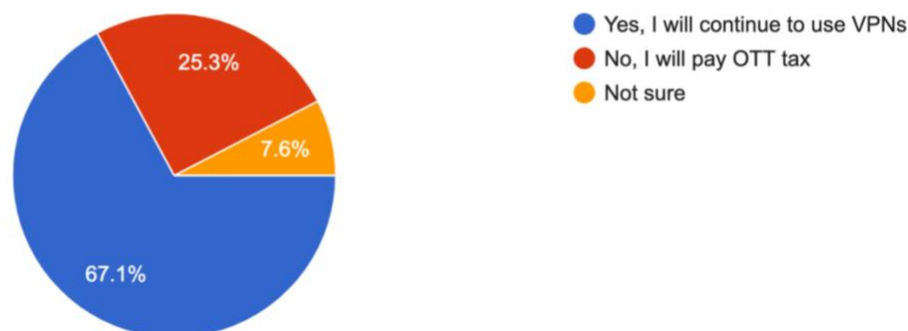
The majority of the respondents disclosed that they will continue to use VPNs even after access to social media platforms is fully restored. However, 20 respondents indicated that they would pay the OTT tax rather than use VPNs. Some respondents (7.6%) were unsure as to whether they would pay the OTT tax or use VPNs after the elections.

OONI Probe Findings
The Open OONI Probe application was used to carry out connectivity tests on different ISPs. By the time this research was carried out, the OONI Probe application only carried out tests on two circumvention tools: Tor and Psiphon. Other OONI measurement tests, such as web connectivity, were used to assess whether the official websites of other VPNs that Ugandans commonly use were blocked.

Several signs pointed to blockages of both Psiphon and Tor between January 9 and 21, 2021. This is supported by the evidence in OONI's report on Uganda's nationwide Internet blackout amid the 2021 general elections.

Tor & Psiphon testing in Uganda: January 2021

Measure Names
- ■ Anomalies
- ■ Ok
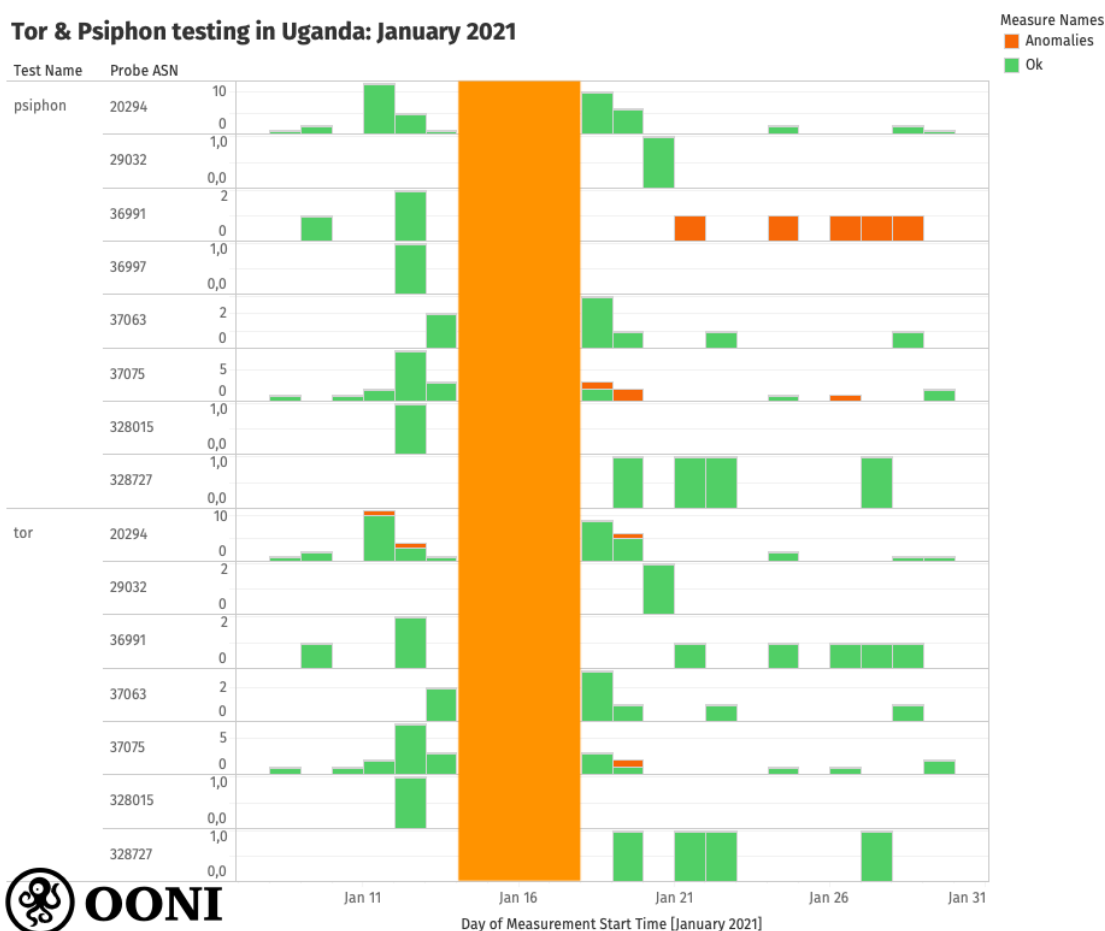
Source: OONI measurements between January 9 and 29 as recorded from Uganda: https://explorer.ooni.org/search?until=2021-01-29&since=2021-01-09&probe_cc=UG

As the graph above demonstrates, few anomalies were recorded on January 11 and 12, 2021 while testing Tor accessibility on MTN Uganda. From January 13 to 17, Uganda experienced a total Internet shutdown, indicated by the orange rectangle on the graph. Furthermore, few anomalies were recorded while testing for the connectivity of Tor and Psiphon between January 18 and 19. More anomalies were recorded while measuring Psiphon connectivity on January 22 via the Orange (Africell Uganda) ISP.

While some measurements presented anomalies, as indicated in orange on the chart, they were too few to conclude blocking and likely occurred due to transient network failures. The above measurements indicate that Tor and Psiphon were reachable from Uganda with no indication of blocking, similar to findings in OONI's report.

In addition to Psiphon and Tor, Ugandans also use other VPNs, such as ThunderVPN, SecureVPN, ProtonVPN, and NordVPN.

Figure: Shows the most commonly used VPNs by Ugandans during the 2021 general elections (9th - 29st January)
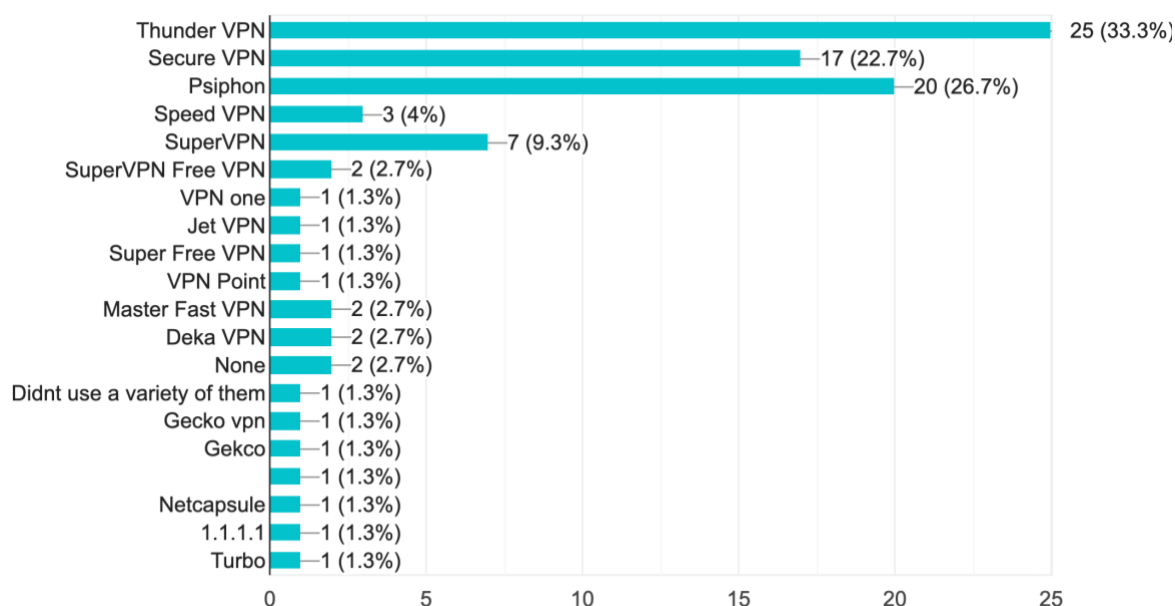

Since OONI does not carry out tests on other circumvention tools apart from Tor, Psiphon, and RiseVPN (included recently), we were unable to perform extensive tests on other VPNs. Nevertheless, we used the OONI explorer to assess whether any connectivity tests were performed on these VPNs' official websites using the OONI Probe app and to check whether any anomalies were recorded. Although we used this technique, blocking VPNs' official websites does not necessarily mean that their apps were also blocked and vice versa.


Source:https://explorer.ooni.org/search?until=2021-01-29&since=2021-01-09&probe_cc=UG&test_name=web_connectivity&domain=protonvpn.com&only=anomalies

As illustrated by the above image, ten anomalies were detected when accessing ProtonVPN's official website on MTN between January 9 and 29.

We were unable to collect substantial data about the blockage of other VPNs owing to the limited OONI website connectivity tests carried out during the research period (January 9–29).
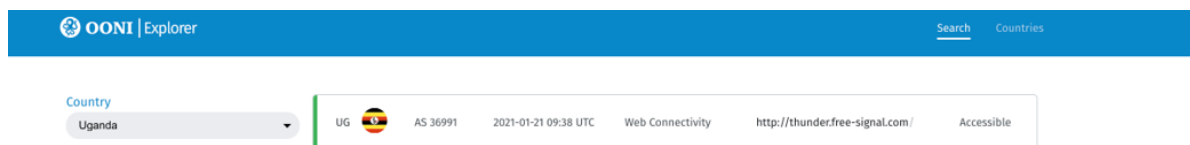
Only one OONI measurement was recorded with respect to the web connectivity of ThunderVPN's official website between January 9 and 29, 2021.
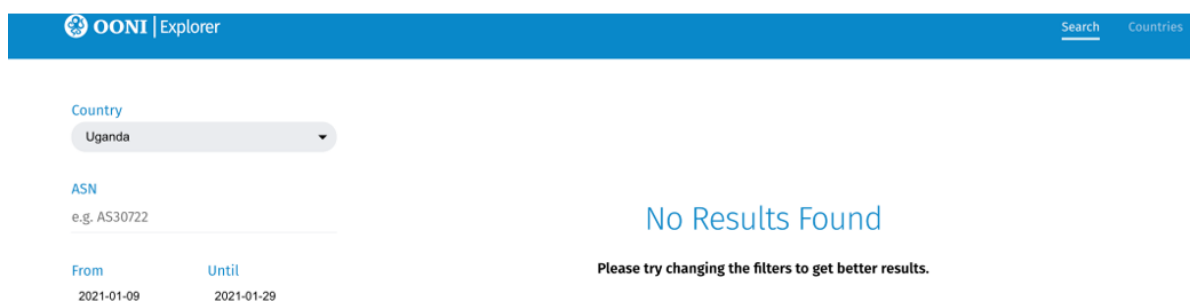
The image above illustrates that the OONI explorer could not return any data when it required to return web connectivity measurements carried out in Uganda between January 9 and 29, 2021.

Similarly, the OONI explorer could not return any data pertaining to web connectivity tests carried out on the websites of other VPNs, such as SuperVPN and JetVPN. This illustrates the inadequacy of OONI web connectivity tests carried out to test the blockage of these VPNs' official websites.

Recommendations

1. The Government of Uganda

    a. The government of Uganda should desist from acts of Internet censorship and shutdown by ensuring that social media, instant messaging platforms, and the Internet in general remain open, accessible, and secure across Uganda at all times.

    b. The Ugandan government should reconsider the OTT tax to promote free and secure Internet access for all Ugandans. The tax has broadened the digital divide and badly hit marginalized groups such as women, people with disabilities (PWDs), and refugees in Uganda. Furthermore, the OTT tax forces Ugandans who do not have the money to pay the tax to use insecure circumvention tools, including free VPNs.

2. International Organizations and Donors

    a. International organizations and donors should fund more research projects that focus on Internet shutdowns. In the long run, more resources, tools, and guides will be produced that will better equip citizens to prevent, prepare for, and respond to Internet shutdowns.

    b. Priority should also be given to projects that strive to translate Internet shutdown circumvention manuals into local languages to foster inclusion. Many Ugandans struggle to understand manuals that are written in foreign languages.

3. Internet Measurement Organizations

    a. Greater sensitization with respect to how to use Internet measurement tools such as the OONI Probe is needed to increase the number of Internet measurements carried out by volunteers in their respective countries.

    b. More volunteers are needed to carry out numerous Internet measurements to generate substantial data for analysis.

4. VPN Providers

    a. Develop lite versions of the VPN applications. One of the reasons that Ugandans use free insecure VPNs is because they are lite and do not consume much battery life.

    b. Reduce the cost of premium versions of the VPN applications. Some users shun secure VPNs because they limit the bandwidth of the free versions, and the premium versions are very expensive.

    c. Desist from all forms of data exploitation. As much as users trust VPNs to transfer their data anonymously, some VPN providers exploit these data for financial gains, for example, by compiling detailed profiles of users based on their browsing history for target marketing.

5. Civil Society Organizations

a. More sensitization regarding digital security is particularly needed. This will equip citizens with the necessary digital security skills to identify secure circumvention tools such as VPNs.

Conclusion

This study's findings indicate that a larger percentage of the respondents experienced difficulties in using VPNs during the electoral period. However, some of the data from the Open OONI demonstrate that no cases of VPN blockage were recorded in Uganda according to the measurements submitted. It is important to note that OONI did not have network measurements for the respondents' most commonly used VPNs. Therefore, we cannot rule out the possibility of VPN blockage during Uganda's 2021 general election.

What will happen if the Ugandan government blocks the usage of VPNs in the future? This will further exclude already marginalized and vulnerable people from accessing social media because they will be unable to afford the OTT tax. This will likely lead to a drop in the number of Internet users, thereby stifling Ugandans' digital rights, including freedom of expression and access to information online.

Although the Internet was partially restored on January 18, 2021, many Ugandans were hesitant to completely uninstall VPNs from their devices because of the uncertainty associated with accessing the Internet in Uganda.
Our findings indicate that most Ugandans use free VPNs downloaded from the Google Play Store and Apple's App Store. Unfortunately, free VPNs carry risks associated with data exploitation and legal consequences.

About Kalema Christopher

Chris is currently working as the lead technologist at Unwanted Witness Uganda—a civil society organization that advocates for free, secure, and open Internet in Uganda. His key interests are cybersecurity, digital rights, fact-checking, and Internet governance. Christopher is a graduate from Makerere University Kampala with an honors bachelor's degree in Information Technology. Christopher attended the 2020 OPTIMA Network Measurement Training organized by Internews. He participated in the 2019 Igloo Mentorship Program on Digital and Information Security by Qurium Media Foundation. In the past three years, Chris has attended and facilitated various digital security and literacy workshops for human rights defenders, journalists, and marginalized groups in Uganda.