Internet Shutdowns
An Internet Society Public Policy Briefing

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Introduction

Restrictions to Internet access are on the rise globally,[1] with frequent news of government-mandated disruptions of Internet access. Driven largely by political and national security concerns, state-ordered Internet shutdowns have become the "new normal" in many countries.

The United Nations considers cutting off users from Internet access, regardless of the justification provided, including on the grounds of violating intellectual property rights law, to be disproportionate and thus a violation of Article 19, Paragraph 3, of the International Covenant on Civil and Political Rights. It also calls upon all States to ensure that Internet access is maintained at all times, including during times of political unrest.[2]

At a time when governments of the world have committed to leveraging the power of the Internet and Information & Communication Technologies (ICTs) to reach the U.N. goals on Sustainable Development in areas such as education, health and economic growth, cutting off entire populations from the Internet is extremely counterproductive.

This policy brief highlights a series of externalities associated with Internet shutdowns and calls on policymakers to "think twice" whenever they consider restricting access as a means to address policy challenges.

Defining "Internet Shutdown"

An **Internet shutdown** is an intentional disruption of Internet-based communications, rendering them inaccessible or effectively unavailable, for a specific population, location, or mode of access, often to exert control over the flow of information.[3] Internet shutdowns can happen at a national level, where users across the entire country are unable to access the Internet, or at a subnational (local) level, where mobile and/or fixed Internet access in a state, city, or other localized area is cut off. For the purposes of this briefing document, application/content blocking should be considered separate and distinct. Please refer to *Internet Society Perspectives on Content Blocking: An Overview* for additional information on such actions.

Where We Are

Internet shutdowns started gaining global attention during the Egypt uprising in 2011, when authorities shut down the Internet for nearly a week to disrupt communications of protestors.[4] Since then, the use of Internet shutdowns as a tool for political purposes has steadily risen: according to Access Now, 196 Internet shutdowns were documented in 2018, growing from 106 in 2017 and 75 in 2016.[5] With 114 shutdowns in 23 countries seen within the first six months of 2019, according to Access Now and the #KeepItOn Coalition, the trend shows no sign of slowing. While the phenomenon is global, current trends indicate that India and Pakistan lead with the most documented shutdowns, followed by the MENA and Sub-Saharan regions.[6] Of these shutdowns, only a fraction are acknowledged by the government or entity that ordered them.

Access Now notes that governments implementing Internet shutdowns historically use similar justifications for ordering shutdowns, but that these rarely match what observers can conclude is the true motivation. In 2018, official rationales included combating "fake news" (properly called disinformation and misinformation), hate speech, and related violence, securing public safety and national security, precautionary measures, and preventing cheating during exams, among others.[7]

Against this backdrop, a growing number of governments, businesses, civil society organizations, technical community bodies, and individuals have been speaking up against Internet shutdowns.[8] The *Keep It On!* Coalition,[9] for instance, includes over 200 organizations from nearly 100 countries.

Key Considerations

Internet shutdowns have far-reaching technical, economic, and human rights impacts. They undermine users' trust in the Internet, setting in motion a whole range of consequences for the local economy, the reliability of critical online government services, and even for the reputation of the country itself. Policymakers need to consider these costs alongside security imperatives.

Technical Impact

When a complete Internet shutdown occurs in a given country, the technical impact can extend beyond the country's borders to the rest of the global Internet. Being part of an interconnected network means having responsibility towards the network as a whole, and shutdowns hold the potential to generate systemic risks.

Intentional physical damage to infrastructure, such as cutting fiber optic cables, is probably the most extreme method of implementing an Internet shutdown. For a number of countries, physical damage to telecommunications cables is particularly problematic because they are transit states.[10] For example, Egypt is in a unique geographic position to be physically crossed by multiple high-capacity cables running from East Asia, along the Indian Ocean, through the Red Sea, and across the Mediterranean to Western Europe, as shown in the figure below. Several of the lines come ashore at the Suez Canal and run overland through Cairo before entering the Mediterranean at Abu Talat or Alexandria. Because of this, severing fiber optic cables to cut off Egypt's access to the global Internet would be a dangerous proposition, as it could take down a significant portion of the telecommunications connections between Asia and Western Europe as well.
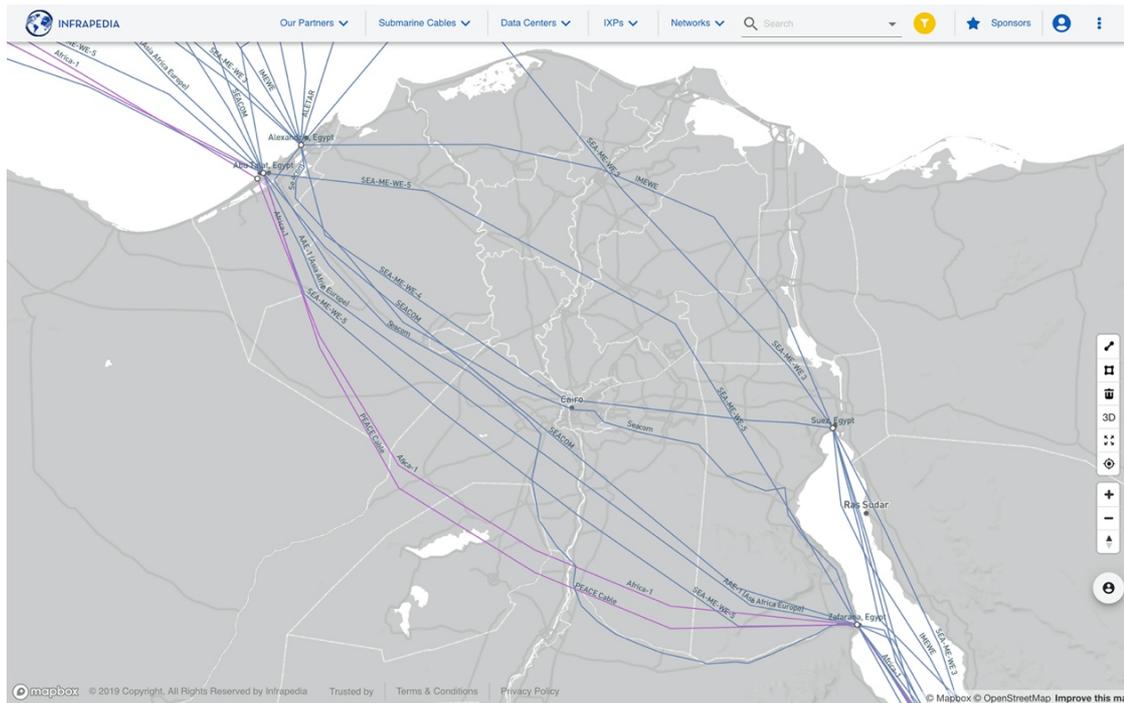
Figure 1: Infrapedia map showing multiple telecommunications cables crossing Egypt
(Source:
https://live.infrapedia.com/?neLng=33.322310229798035&neLat=31.90956204468185&swLng=28.552025158584456&swLat=29.3444010
07676126&zoom=7.672405840012672&bearing=0&pitch=0&centerLng=30.919934005350143&centerLat=30.613237544488925)

Web-based services or applications developed and hosted in a given country often become popular with
expats and/or émigrés, and are often used by these extended communities to maintain communication,
transfer money, or purchase goods. Other hosted services and applications may be used across an
international organization's global supply chain. While an Internet shutdown in the hosting country is
focused on disrupting access in that country, it ultimately blocks access to these services and applications
from the rest of the global Internet, cutting off critical inter-personal communication, financial
transactions, and enterprise workflows.

Wide-scale Internet shutdowns can also have a detrimental impact on the domain name system (DNS). In
some situations, shutdowns are implemented asymmetrically, where traffic from the global Internet is
prevented from reaching the country suffering the shutdown, but where traffic from the country is still
able to reach the global Internet. In that case, a surge in DNS requests occurs as systems in the impacted
country repeatedly try in vain to resolve hostnames – responses are sent by the DNS servers, but they are
never received by the originating systems, so these systems keep resending the requests.[11] Depending on
the resilience of the authoritative DNS infrastructure, this increased load could slow server response time
or cause the servers to become unavailable. In addition, some users have configured backup DNS resolvers
outside of their local service providers. If these local resolvers fail to complete the requested lookups,
clients will failover to these backup resolvers. This can potentially result in information "leaking" to out-of-
country resolvers and service providers, as well as creating additional unexpected load on this resolver
infrastructure.

Internet routing policy is based on relationships between Autonomous Systems (ASes), and the
relationships can be customer-provider and peer-peer. In both cases, interconnections can cross national
boundaries and a network could suffer reduced availability and increased latency as collateral damage if
the upstream provider's or peer's network is impacted by an Internet shutdown, even though the two are
in different countries.

Finally, if Internet shutdowns are used as a blunt-force means of blocking access locally to a specific
service or application, access to other unrelated services may also be impacted as collateral damage. For

example, shutting down Internet access to block access to social media services will also limit local access to Internet-based ride sharing and taxi hailing applications, likely creating a major disruption for transportation services.

Economic Impact

Internet shutdowns affect economies in multiple ways, upsetting productivity and generating monetary losses in time-sensitive transactions.

Several studies[12] have determined that there is a real impact of shutdowns on countries' Gross Domestic Product (GDP). For example, research by the Brookings Institution[13] shows that Internet shutdowns cost countries about USD 2.4 billion between July 1, 2015 and June 30, 2016, with maximum losses incurred by India (USD 968 million). According to a report by CIPESA, Sub-Saharan Africa lost up to USD 237 million to Internet shutdowns since 2015.[14] In countries where mobile broadband is increasing, a 2017 Ericsson report found that as mobile broadband penetration increases by 10%, it causes a 0.6-2.8% increase in GDP, meaning that even shutdowns of mobile infrastructure will have an economic impact.[15]

A 2016 Deloitte study[16] notes:

> *The impacts of a temporary shutdown of the Internet grow larger as a country develops and as a more mature online ecosystem emerges. It is estimated that for a highly Internet connected country [Internet penetration >79%], the per day impact of a temporary shutdown of the Internet and all of its services would be on average $23.6 million per 10 million population. With lower levels of Internet access, the average estimated GDP impacts amount to $6.6 million and to $0.6 million per 10 million population for medium [Internet penetration 49-79%] and low [Internet penetration <49%] Internet connectivity economies, respectively.*

Although these studies have not been updated in the last several years, figures associated with more recent shutdowns are readily available:

- A December 2018 Internet shutdown in the Democratic Republic of Congo was estimated to have an economic cost of USD 3 million per day.[17]

- A January 2019 Internet shutdown in Zimbabwe reportedly cost the country USD 5.7 million each of the six days it was unavailable.[18]

- It was estimated that a month-long Internet shutdown in June 2019 in Sudan cost the country over USD 1 billion, or nearly one percent of the country's GDP.[19]

Beyond macro-economic impacts, shutdowns also affect businesses and SMEs in very tangible ways. As an example, in early 2017 a 94-days shutdown affected the Anglophone part of Cameroon – a region also known as "Silicon Mountain". Countless stories were reported on local entrepreneurs who lost contracts and couldn't conduct important transactions, leading to loss of money, business closures and firing of employees.[20] India experiences frequent shutdowns at a state level, and states with significant dependence on tourism, including Kashmir, Darjeeling, and Rajasthan saw tourism-related businesses suffer major losses due to Internet shutdowns. The shutdowns limited business-customer communication, and prevented customers from accessing booking platforms, leading to reputational damage for hotels. Additionally, the lack of Internet connectivity resulting from shutdowns impacts the ability of small businesses to do outreach, and hampers tourist ability to discover local services and businesses through apps and online platforms.[21]

Notwithstanding the impact on the entire economy, businesses that are heavily dependent on electronic transactions are particularly exposed to very serious consequences. For example, e-payments are becoming increasingly common not only in the developed world but in many developing countries.[22] In countries such as India, where the government has launched an ambitious plan towards demonetization

and digital payments, frequent Internet shutdowns across various states are directly at odds with digital economy outlooks.[23]

While shutdowns raise financial and reputational risks for ICT companies and their investors,[24] the secondary economic impacts resulting from a climate of uncertainty can potentially discourage foreign investors and spillover on a wide range of sectors, including education, healthcare, press & news media, and e-commerce.[25] The NetBlocks Cost of Shutdown Tool (COST) uses indicators from the World Bank, ITU, and U.S. Census to estimate the economic impact of an Internet shutdown.

Human Rights Impact

People routinely depend on the Internet to stay in touch with family and friends, create local communities of interest, report public information, hold institutions accountable, and access and share knowledge. To that end, it can be argued that Internet access cannot be distinguished from the exercise of freedom of expression and opinion and the right to peaceful assembly. These rights - recognized in the Universal Declaration of Human Rights and reflected in the Constitutions of many of the countries where those shutdowns occur - entrust governments with the responsibility to respect them and protect their citizen's enjoyment of them. As stated by the UN Human Rights Council in 2012 and reaffirmed since, people should enjoy the same protections of these rights whether in online or offline contexts.[26]

As such, Internet shutdowns, in particular those that disable all means of communications, should be considered as potential Human Rights violations. While rights such as free speech are not absolute and can be restricted on exceptional grounds - such as national security and public order - they also need to follow the three-part test laid out in Article 19(3) of the ICCPR, including meeting proportionality and necessity criteria.[27]

In recent years, the Human Rights' community has stepped up its efforts to address the impact of Internet shutdowns to these rights. The UN Special Rapporteur on freedom of expression has voiced concerns at the disproportionate impact of Internet shutdowns on people's right to expression.[28] A Human Rights Council (HRC) resolution, adopted by consensus in 2016, stated that it "condemns unequivocally measures to intentionally prevent or disrupt access to or dissemination of information online in violation of international human rights law".[29] A number of Internet Society partners are also dedicating significant resources to tracking Internet shutdowns occurring around the world, publishing detailed research on the impact of such shutdowns on human rights, including *Freedom on the Net 2018: The Rise of Digital Authoritarianism* (Freedom House),[30] *Disconnected: A Human Rights-Based Approach to Network Disruptions* (Global Network Initiative),[31] and *The State of Internet Shutdowns Around The World: The 2018 #KeepItOn Report* (Access Now).[32]

Challenges

The increase of politically motivated Internet shutdowns is one of the critical concerns reflected in the aforementioned Access Now report, as well as in the Internet Society's *Global Internet Report 2017*,[33] where the growing role of government has been identified as a key driver of change of the network's future. Challenges related to the use of Internet shutdowns by governments include:

National Security and Public Order

Governments have legitimate concerns and duties to safeguard public order and national security for their citizens. Yet, any measure that restricts free expression or association in order to advance such objectives must remain exceptional, be grounded in law, and be strictly necessary and proportional to achieve a legitimate aim. During shutdowns, many citizens feel that their fundamental rights are being violated, nurturing discontent and a feeling of insecurity that can generate negative consequences for the stability of the country.

Cross-Border Enforcement

Governments are faced with the challenge of applying their national legislation in an online environment marked by cross-border content platforms. In the context of a globally connected and open Internet, removing content considered problematic in a specific jurisdiction is not as simple as asking a local provider to remove that content. Unless they are able to get effective collaboration from such platforms, this cross-border complexity may lead some governments to instead opt for the more heavy-handed approach of shutting down the ability to access to these platforms entirely.

Increasing Censorship

Although Internet shutdowns wielded as a blunt tool continue to attract global attention, increasingly sophisticated content filtering techniques will likely become more ubiquitous in the future. Intelligent algorithms powered by machine learning are already fueling real-time censorship tools in some parts of the world[34] and such a scenario would make censorship less visible and more difficult to detect and react to because it is being done invisibly upstream of the user. Such tools, and associated restrictive policies, are already being exported by China to dozens of countries worldwide.[35]

Undermining Commitments to Sustainable Development Goals

Because of the role of the Internet in advancing public policy goals including education, health, and economic development, in 2015, 194 countries of the U.N. General Assembly recognized ICTs as a horizontal catalyst to reach the new 2030 Development Agenda. The U.N. Sustainable Development Goals (SDGs) demonstrate the world's commitment to social and economic growth. In particular, governments commit to "significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020".[36] While progress is being made[37] towards this near-term goal, Internet shutdowns are in clear conflict with this commitment.

Effectiveness

There is currently no evidence of the effectiveness of shutdowns to solve the issues they are meant to address, in particular when they are meant to restore public order. In fact, research[38] has found that information blackouts resulting from Internet shutdowns can actually result in increased violence, with violent tactics that are less reliant on effective communication and coordination being substituted for non-violent protests that rely on the Internet for organization. There are also multiple accounts of collateral damages provoked by these measures, including impacts to civil, political, economic, social, and cultural rights.[39]

In addition, Internet shutdowns tend to attract international attention and create pressure on countries that undertake them. This relates to the so-called "Streisand effect", where the attempt to silence voices or hide information leads to the unintended consequence of bringing more attention to them.

Guiding Principles

Freedom of Expression

Freedom of expression should be the norm, and any limitation to this right the exception. The central role of the Internet in users' social and economic lives recently led the United Nations to enact a resolution supporting "the promotion, protection, and enjoyment of human rights on the Internet".[40] The resolution condemns state efforts to intentionally prevent or disrupt access to information online.

Due Process of Law, Proportionality, and Necessity

Grounded in the principles of international human rights law, proportionality and necessity assessments should guide the actions of any policymaker entertaining the use of Internet shutdowns as a policy tool.

Necessity means that any restriction of Internet access must be limited to measures which are strictly and demonstrably necessary to achieve a legitimate aim. It should be demonstrated that no other measure would achieve similar effects with more efficiency and less collateral damages.

Necessity also implies an assessment of the proportionality of the measures. Any restriction of Internet access must also be proportional. A proportionality assessment should ensure that the restriction is "the least intrusive instrument amongst those which might achieve the desired result".[41] The limitation must target a specific objective and not unduly intrude upon other rights of targeted persons.

Cost-Benefit Assessment

There are many costs to be considered as a result of Internet shutdowns, including economic, technical, and social, and governments need to consider these short and long-term effects. In most cases, even short-duration shutdowns may have long-term implications extending long after connectivity returns. The loss of trust and confidence in the Internet as a reliable platform of opportunities can result in hard to quantify negative impacts, in particular on younger generations that see connectivity as a path to their future. Furthermore, shutdowns also highlight that the government believes that taking such action is acceptable, suggesting that the country's economy is not ready to join the global digital economy, requiring businesses to think carefully about whether they should invest and/or locate facilities in the country.

Recommendations

Internet shutdowns are, unequivocally, harmful to the global Internet and to local communities. Governments should be aware that Internet shutdowns affect many sectors of society, and it is imperative to engage in an open exchange with them with an aim of seeking alternative ways of addressing legitimate issues, rather than turning to shutdowns as a policy tool.

- **Build resilient infrastructure**: The Internet technical community, industry groups, and local government have a key role to play in expanding resilient connectivity solutions.[42] More distributed and more numerous Internet exchange points, along with increased diversity of Internet connectivity at international borders, will make it more difficult and cumbersome for governments to effectively implement a single "kill switch".

- **Rule out all non-shutdown options**: Governments should identify best practices in addressing issues at their source, prioritizing alternative measures to Internet shutdowns. Sharing experiences within and across regions could bring solutions that do not rely on restrictions to access.

- **Measure the cost first**: Governments need to do a cost-benefit analysis of the impact of the cost of Internet shutdowns before taking such action. Network disruptions hinder productivity, adversely impact business confidence, and can be detrimental to both short- and long-term financial investments.

- **Diversify voices**: Venture capitalists and investors should incorporate Internet shutdowns as part of their risk assessment. The importance of small and medium enterprises, including those outside the ICT sector, to the local economy's future must also be recognized more widely, in light of how Internet shutdowns can completely undermine their ability to operate.

- **Perform watchdog functions**: Civil society organizations, along with other stakeholders, should continue to track the impact of Internet shutdowns and play a key role calling for government accountability and transparency around Internet shutdowns. Alongside these peers, the technical community should continue to expand their Internet monitoring and measurement efforts and make associated tools publicly available. An increased ability to analyze actively and passively collected data from both inside and outside networks can help bring greater visibility to Internet shutdowns, including their scope, duration, and impact.

Additional Resources

Internet Society

Human Rights Resource Center. https://www.internetsociety.org/humanrights

Reports

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2   https://www2.ohchr.org/english/bodies/hrcouncil/docs/17session/A.HRC.17.27_en.pdf

3   Adapted from Internet Shutdowns definition at www.accessnow.org/keepiton/

4   http://www.telegraph.co.uk/news/worldnews/africaandindianocean/egypt/8288163/How-Egypt-shut-
    down-the-internet.html

5   https://www.accessnow.org/the-state-of-internet-shutdowns-in-2018/

6   The State of Internet Shutdowns around the World: The 2018 #KeepItOn Report
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7   Idem

8   See a list of statements in the References

9   https://www.accessnow.org/cms/assets/uploads/2018/06/KeepItOn-Digital-Pamphlet.pdf

10 https://journals.uic.edu/ojs/index.php/fm/article/view/5228/4204

11 https://twitter.com/DougMadory/status/1138063546942668806

12 It should be noted that current research on the size of the digital economy or the impact of lack of
    Internet access on economic activities are all prone to risks of over-estimation (e.g. use of alternative
    communication means when Internet access is unavailable) and under-estimation (e.g. complex
    supply-chain effects as a result of lack of access, tax losses, loss of investor confidence). As such,
    numbers provided need to be understood as providing an order of magnitude, with these limits in
    mind.

13 As an illustration, the Brookings methodology identifies the size of the country's GDP (using 2014
    World Bank data), the duration of the disruption (in number of days), and the percentage of the
    population affected by the disruption. More information on the methodology and other results can be
    found here: https://www.brookings.edu/wp-content/uploads/2016/10/intenet-shutdowns-v-3.pdf

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22 For example, M-Pesa has become a widely used service in Africa, leapfrogging challenges from the
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26 UN Human Rights Council Resolution A/HRC/20/L.13 (2012): http://tinyurl.com/y7aonaw5

27 International Covenant on Civil and Political Rights (ICCPR), article 19(3). More on limitations to freedom of expression: https://www.article19.org/pages/en/limitations.html

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29 UN Human Rights Council Resolution A/HRC/32/L.20, July 2016

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31 https://globalnetworkinitiative.org/wp-content/uploads/2018/06/Disconnected-Report-Network-Disruptions.pdf

32 https://www.accessnow.org/cms/assets/uploads/2019/06/KIO-Report-final.pdf

33 https://future.internetsociety.org/wp-content/uploads/2017/09/2017-Internet-Society-Global-Internet-Report-Paths-to-Our-Digital-Future.pdf

34 https://citizenlab.ca/2016/11/wechat-china-censorship-one-app-two-systems/

35 https://www.reuters.com/article/us-global-internet-surveillance/china-exports-its-restrictive-internet-policies-to-dozens-of-countries-report-idUSKCN1N63KE

36 https://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-9-industry-innovation-and-infrastructure.html#targets

37 https://ourworldindata.org/internet

38 https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3330413

39 https://globalnetworkinitiative.org/wp-content/uploads/2018/06/Disconnected-Report-Network-Disruptions.pdf

40 UN Human Rights Council Resolution A/HRC/32/L.20, July 2016

41 See Human Rights Committee, (1999) on freedom of movement, para. 14.

42 See ISOC's work on Community Networks: https://www.internetsociety.org/issues/community-networks/