

THE BROOKINGS INSTITUTION

FALK AUDITORIUM

FROM ARAB SPRING TO CHEATING STUDENTS IN INDIA:
THE ECONOMIC COSTS OF INTERNET SHUTDOWNS

Washington, D.C.

Thursday, October 6, 2016

PARTICIPANTS:

DARRELL WEST, Moderator
Vice President and Director, Governance Studies
The Brookings Institution

KATH CUMMINS
Director of Communications & Outreach
Global Network Initiative

DEJI OLUKOTUN
Senior Global Advocacy Manager
Access Now

TAYLOR REYNOLDS
Technology Policy Director, Internet Policy Research Initiative
Massachusetts Institute of Technology

* * * * *

P R O C E E D I N G S

MR. WEST: Okay, good morning. We'd like to get going. I'm Darrell West, vice president of Governance Studies and director for the Center for Technology Innovation here at the Brookings Institution, and I'd like to welcome you to our forum on the economic costs of Internet shutdowns.

And we are webcasting this event live, so we'd like to welcome our viewers from around the country, as well as around the world. And we are archiving the video as well, so anyone who would like to view it afterwards can do so at the Brookings.edu website. And we welcome any comments and questions that you have. We've set up a Twitter feed at #InternetShutdown, so if you wish to post comments during the forum, feel free to do so.

So the Internet is a growing source of gross domestic product in many countries. We see a tremendous increase in e-commerce and the use of online services. This creates great opportunities for businesses and it contributes to the long-term economic development of countries around the world.

And yet, at the same time, there are powerful forces that are threatening the vitality of the digital economy. In recent years a number of countries have blocked particular applications. They have shut down specific services, they have turned off mobile services, and they've disrupted the entire Internet. This obviously damages the economy in those home countries and disrupts e-commerce and online service delivery.

Right now Ethiopia has shut down the Internet in response to a public protest against the government. In other countries, for example in India, when there are student entrance exams, sometimes local communities shut down mobile services in those areas to keep students from cheating. So there's a wide variety of rationale that the governments are using, but the sad reality is we're seeing an increase in these types

of shutdowns and this is a worrisome trend for the global marketplace.

So, today we have released a paper that estimates the economic impact of temporary Internet shutdowns. In the paper I identify 81 short-term shutdowns that have taken place in 19 countries over the past year. So, between July 1, 2015, and June 30, 2016, I found that these shutdowns cost their home counties at least \$2.4 billion in GDP activity.

And the paper presents our methodology and talks about the data on which we relied to develop these estimates. We also developed specific estimates for each shutdown and then aggregate it by country, so you can get a sense of which countries are experiencing the greatest economic damage. And we found that economic losses included \$968 million in India, \$465 million in Saudi Arabia, \$320 million in Morocco, \$209 million in Iraq, \$116 million in Brazil, \$72 million in the Republic of the Congo, \$69 million in Pakistan, \$60 million in Bangladesh, \$48 million in Syria, \$35 million in Turkey, and \$20 in Algeria, as well as in other places.

So you can see that the economic damage is significant here and, as the digital economy grows, this economic damage is likely to accelerate and further weaken global economic development. So we want to encourage countries to maintain digital service, so as not to damage their own domestic economies. There also are interests in terms of keeping the Internet open in order to preserve freedom of expression, promote human rights, and promote healthy civic dialogue.

We argue in the paper that many nations are shooting their economies in the foot and damaging the livelihoods of their very own inhabitants. So it's something that they should be concerned about as the digital economy grows. Any of you who would like more details, those of you who are here today can get copies of the report outside the auditorium. Those of you who are watching online, the report is available at

Brookings.edu.

So, in order to discuss Internet shutdowns, we put together a distinguished set of speakers who have a lot of expertise on this topic. So I'd like to welcome Kath Cummins, she's the director of communications and outreach at the Global Network Initiative. Kath is responsible for the initiative's engagement with policymakers and stakeholders. She came to GNI after working as a journalist, magazine editor, and communications advisor in the United States, the United Kingdom, China, and Australia. And prior to joining the initiative, she was the director of public affairs at the D.C.-based National Center for Victims of Crime.

Taylor Reynolds is the digital policy director for the Internet Policy Research Initiative at MIT. In this role he leads the development of technology policy and helps policymakers address digital policy challenges in a variety of different areas. Previously he served as senior economist at the OECD and he led the organization's Information Economy Unit. He also worked on a major study of the economic cost of the Internet shutdown that took place in Egypt several years ago. We reference the study in our paper, as well.

Deji Olukotun is the senior global advocacy manager at Access Now. He manages the global campaigns to fight Internet shutdowns and protect free expression. Prior to this job he worked at the PEN American Center where he founded the group's digital freedom program. And he holds a JD from the Stanford Law School and has a master's degree from the University of Cape Town.

So I'd like to start with Kath. And if you can just tell me about the work being done at the Global Network Initiative, as it relates to Internet shutdowns?

MS. CUMMINS: Well, thank you to Darrell and thank you to the Brookings Institution for creating a space to draw attention to this increasingly important

issue. We see network shutdowns through a human rights lens, but we also recognize that human rights and economic development and prosperity are issues that are intertwined, that build on each other, and that when human rights are harmed, economies are harmed and when economies are harmed, human rights are harmed.

We think that network shutdowns is an issue that is only going to grow in importance and it's something that the Global Network Initiative is going to do escalating work on. But before I talk a bit about that, I should say a little bit about the Global Network Initiative. It's a bit of a mouthful of a name, so let me deconstruct it.

We're a multi-stakeholder initiative, which is different from being an industry association or an advocacy organization. Think of us as a conversation, as a forum, and around our table are some of the most influential and important Internet companies on the planet, as well as human rights organizations, press freedom groups, academics that specialize in digital rights, and socially responsible investors.

Think of it as Thanksgiving dinner, if you like, It's often a very robust and rich discussion. We don't always agree and that is as it should be, but when we speak with one voice it is a very powerful voice. And on network shutdowns we don't only speak with the voice of human rights groups and Internet companies, but we also speak with the voice of telecommunications companies. And that's because GNI has now been joined by seven global telecommunications companies, as observers. They're on track to be members of our organization next year and so it's an even more powerful voice that we speak with when we talk about network shutdowns, when we bring these incredibly large and influential companies together in our multi-stakeholder human rights framework.

So that's who we are. We work on a lot of issues, network shutdowns is just one of them. But this is something that we think right now needs a lot of attention.

Darrell mentioned the shutdown in Ethiopia that's going on right now. We consider this good, we can talk about something that's happening in real time, but actually we could host this event any day of the year and somewhere in the world there will be a country or more countries that are using network shutdowns as a tool against their own populations.

And so we see things as something that, even though it has more recently been pushed off the front pages, it was on the front page when we talked about the shutdowns in Egypt, but it's become the new normal. And that's something that we want people to understand has devastating implications for human rights and for economies around the world, particularly developing economies. So that's who we are and that's why we're focused on network shutdowns.

A couple of things to keep in mind. I mention that the economic harm and the human rights harms are very difficult to disentangle and I think a really important message that we want to get through to governments around the world is that you have to stop seeing shutdowns through a security lens and start seeing shutdowns through an economic development lens. Because if we don't do that, then there will just be an ever-increasing amount of use of this particular tool against populations.

What is really important about the study that Darrell has done with Brookings is that they've taken an approach where they've measured the economic harm, but they've also raised some really critical questions about where this research can go in the future. That \$2.4 billion figure doesn't even take into account the loss of tax revenue, it doesn't take into account of consumer and business confidence. It doesn't measure the businesses that haven't been started, the connections that haven't been made, the communities that haven't been empowered.

So we feel like the research that is beginning to be done on this issue is just the beginning. We're very encouraged by it, and what we would like to see,

obviously, is more of it. So the more, the better. I'm very pleased to hear that Brookings has a long-term commitment to this issue and will be continuing to discuss it.

GNI will be releasing its own report on network shutdowns in the very near future, so keep an eye out for that. And I guess my main message, other than to say that we have stop seeing shutdowns as a security issue and start thinking about them as an economic issue, is that if we are really serious about taking this issue on then we have to think about it in a multi-stakeholder framework. We can raise this issue. We can put it on the world agenda, but the next step has to be how do we engage governments directly to mitigate and prevent these shutdowns?

And that's where an organization like GNI comes in because we can raise these issues, but without the tools and the forums to engage governments, none of this work translates into real practical reform. What the GNI is committed to doing is to creating opportunities for governments to have conversations with companies, academics, human rights and press freedom groups, and other stakeholders to educate them about the real costs of shutdowns. And also to bring into strong focus the harms that are caused to human rights.

So that's what we're about. I guess I'll leave that there. But keep in mind that we can focus on this issue, but we have to take that next step and ask ourselves, how do we make governments change their behavior?

MR. WEST: Okay, Deji, Access Now is one of the big players in the Internet shutdown area, so can you tell us a little bit about the work your organization is doing on this?

MR. OLUKOTUN: Sure, yeah. For those of you who aren't familiar with Access Now, we extend and defend the digital rights of users at risk around the world. We have a 24-hour digital security helpline, which we offer to human rights defenders,

journalists, and people at risk.

So we've been working on this. We've talked about Egypt because I think that was the moment when the world realized that shutting down networks was a real possibility, and we've actually been involved since that moment. But what I wanted to talk about was where we are now, which is very exciting.

We have a campaign called "Keep It On." So, in addition to the hashtag #internetshutdowns, please use the hashtag #keepiton. We have over 100 organizations from around the world, civil society organizations -- some of whom are in the room today and some of them are watching on the live stream, I want to salute you -- from over 50 countries, and many of the members of these organizations are in countries that are directly impacted by Internet shutdowns.

How did we come to this space where we have a coalition? Well, we realized at that time in Egypt, and then soon after as this trend continued, that it's been discussed -- that shutdowns are really early warning signs of atrocities. So governments will shut down the Internet and there are a few players -- I think it's worth mentioning that there's few major actors in this space, that Kath mentioned. One is governments, the companies, the ISPs, and telecommunications companies, and then that impacts Internet applications, and then also end users.

So there's a few actors in this space, all of whom have a role and that's why it's a multi-stakeholder. But what we realized was that governments would shut down the Internet and people would die. And that trend continues today. The Ethiopia example that's happening right now, the Internet was shut down, 50 people or more were killed, as many as 500 estimated by Human Rights Watch since the beginning of this year. And each one of those deaths has some link to an Internet shutdown.

We've also seen that they happen increasingly around elections, which

are the most critical moment in a democracy. We saw this play out in Uganda in February of this year where President Museveni was up for re-election. Shut down mobile networks, shut down mobile banking for four days, and put the opposition leader under house arrest, and ordered the telecommunications companies to shut down the Internet. It was amazing because there was actually a moment when you could see the chain of events because the telecommunications regulator made the order public. The MTN, which was one of those mobile providers, published the order and explained why it happened to them and then people went online to get around the block.

Over a million virtual private network applications were downloaded to allow people to circumvent. It's not always possible to do that, but we saw this whole range, and somewhere in there the government of Uganda regulators said they would punish anyone who downloaded a virtual private network application.

And just related to this paper, which as Kath mentions, has a wonderful baseline and a starting point to understand the economic impacts, but from my understanding mobile banking -- those four days, the mobile banking would not have come in these results, so Uganda would be much higher. And we saw a wide range of estimates, but in terms of the tax revenues we saw as much as \$23 million a day travel over Uganda's mobile banking network. So that just shows how this is really a beginning. The problem is much larger.

But that's sort of painting a dire picture. We've had some amazing victories to start already. The first was at the U.N. Human Rights Council, which passed a resolution in June unequivocally condemning Internet shutdowns. The language was very specific. We had the wonderful statement from the Global Network Initiative and the industry dialogue, and then the GSM Association -- one of the world's largest technology associations -- put out really strict standards that comport with international law. So

we're seeing some mobilization. We have a lot more to do but it's encouraging that companies, governments, and telecommunications companies, and now think tanks, are taking this issue seriously because it really is a multi-stakeholder problem.

I'll stop there.

MR. WEST: Okay. So, Taylor, you're at MIT and leading work on technology policy, and you also helped author the estimates of the \$90 million in economic costs from the Egyptian Internet shutdown.

MR. REYNOLDS: Yeah.

MR. WEST: So tell us about your work in Syria.

MR. REYNOLDS: Thank you very much for having me. I honored to be here. In January 2011, I actually had a plane ticket -- as did a couple of members of our team -- to fly to Egypt and complete a telecom review of their country that had been requested by the Egyptian government. So we were actually in the process of working with the Communications Ministry to look at their telecommunications sector, say what's working and how can we support businesses with more in Egypt?

And then all of a sudden we saw the Arab Spring Internet get shut down and one of my colleagues, Arthur Mikolite, approached me and said, you know what? We have all of this data that the Egyptian government on our first visit has given us about their telecommunications sector. Why don't we start analyzing this and look at what are the costs of shutting down the Internet for five days?

So we did this and we did it relatively quickly. We jumped in and we took a look at the numbers and came up with an estimate of just direct costs. And I need to emphasize these are just the lost telecom revenues from shutting down the Internet to the telecom carriers. And we came up with a number of \$18 million per day, which worked out to be \$90-some-odd million over the course of 5 days, and we published the

number just quickly on our website. And it went all over the place because people were looking for some way to measure what this cost was.

I think everyone on the ground realized that this was a problem, but no one had really gone in and looked at the methodologies behind it. How would you calculate what the economic loss is here?

I want to point out though that that \$90 million number that we came up with for 5 days actually was only the direct costs. And one of the interesting things that we heard at the time was that, in New Zealand you had Vodafone, which is a mobile operator there. And Vodafone in New Zealand actually used call centers in Egypt to handle about one-third of its customer service traffic. So here you have the Internet that gets shut down in Egypt, which seems like a localized problem, and all of a sudden people in New Zealand can't get to customer service on Vodafone's network, on their mobile network.

So there's these linkages all over the world that happened as a result of this takedown. And we weren't able to measure any of those effects. I think we pointed out in our release that we put out that this was a billion-dollar industry in India, the remote call centers was a billion-dollar industry. And if you cut off the Internet for 5 days, you've going to shake confidence in businesses in doing business in your country, which would have a much larger impact than the \$90 million of last telecom revenues.

So we went on from that to do a much larger piece that looked at different methodologies for measuring the Internet economy, that the OACD published back in 2013 that looks at ways of measuring from direct effects. You had direct effects, you had dynamic effects -- which was how GDP grows as a result of the Internet -- and then you had kind of indirect effects which covered things that aren't measured in GDP, like consumer surplus. So you have these three different effects.

And as we've seen, as well, we've seen more and more of these shutdowns and it feels like countries and policymakers are not quite understanding what's going on behind this. I think the three messages I'd like to get across are, number one, these takedowns don't work. Just ask North Korea trying to keep out South Korean dramas. It does not work. And when you shut down the Internet in Turkey, they're going to find ways around it. You'll see Google's DNS look-ups posted all over the place. It just does not work. And I think that information and that message needs to get out.

It's also extremely difficult to measure. And one of the things we did is, we brought together at the OACD 50 experts from around the world and said, how would you tackle this problem? And there were many different ways, they found many different solutions. It is not an easy thing to measure because if you cut off access to the Internet, people might be able to use SMS. You've got all sorts of cross-elasticities to deal with and measurement is an issue.

The third thing is, surprisingly, when we were working with Egypt, the Egyptian government is actually very forward-thinking. The Communication Ministry was very forward-thinking and were pushing for reforms. And that side of the government, I don't know what was behind the decision, but I'm sure they were not part of that. That must have come from somewhere else.

And I think we have a role to play in convincing the economic ministers and the executive branch of their governments that this is a bad idea because the communication ministries I think understand, but we need to get the message out that this hurts the economy.

Lastly, I'll just tell you a little about the initiative I'm with now. I'm based at MIT. We're a new group called the Internet Policy Research Initiative, and I think we sit in a really interesting place where we bring in some of the world's best technologists,

and we have some of the world's best policymakers who come together and work on technical issues and policy issues surrounding cybersecurity, privacy, advanced network architecture, and what we call the Internet experience, which is where this fits in.

We have a group led by Dave Clark, who is one of the original architects of the Internet, that looks at how you measure Internet traffic and congestion. And his work is also looking at takedowns. So it's an interesting area and we're happy to be here with you and talk more about this issue.

MR. WEST: Okay, great. So let me throw out a question and get each of your reactions. So we've given several examples of countries that have shut down the Internet or mobile services. But let's step back from particular examples and just think, what are the factors that you are seeing that are driving this trend towards shutdowns?

Kath, we'll start with you.

MS. CUMMINS: Well, I was going to say maybe --

MR. REYNOLDS: Sure.

MR. WEST: Sure, go ahead.

MR. REYNOLDS: Definitely. I touched on a lot of them. Elections is probably the number one, especially in Africa, at the moment. It's not an African problem and I think that's important to note. We recorded over 20 different countries, many in the Middle East and North Africa region, India, Pakistan, Bahrain has an ongoing shutdown that's happening right now.

Another one would be public unrest. So people are expressing themselves. They have these amazing new tools, they're not that new, but they're learning to organize. And that's empowering. And this is kind of a knee-jerk response to Shut It Down. So protests -- often there are shutdowns around protests.

And, yeah, I would say that those are the main contributing factors at the

moment. And I think what's interesting is, I liked it -- with each of these it sounds like sometimes it seems like they're inevitable and they're just going to keep continuing, but actually if you look at the case of Ghana, a police chief said that he was considering banning social media, or blocking social media during this election that's coming up now in December -- at the time it was in November. And civil society pushed back and now the president himself has declared that, and committed to keeping social media on. So it is possible to win.

We're also seeing another trend, the blocking is getting more sophisticated, more targeted. And I mentioned Bahrain, and that one was so complicated that researchers at Citizen Lab and at an organization called Bahrain Watch had to really understand what was happening because in our definition of shutdowns, a throttling or an unusable Internet is still a shutdown. And that's what was happening.

It's still happening every night in Bahrain in this particular neighborhood to users who go to that neighborhood on certain mobile networks. So it's getting more sophisticated.

But those are a couple of the trends that we've observed. And we have a post coming up, I think this week, which identifies some other ones that we've seen.

MR. WEST: Kath or Taylor?

MS. CUMMINS: I think that probably covers a lot. A couple of things I would add, you know, this is not an issue that's confined to what we would traditionally consider authoritarian governments, you know. These are emerging democracies, these are highly democratic countries like India, for example, and huge democracies like Brazil.

So on the one hand the headlines will capture elections, protests and others if they capture them, but there's also a sort of ongoing, low-level issue that doesn't get a lot of attention. One example that stands out for us is in a country like India,

regional governments are extremely powerful. They have a lot of power over connectivity and if an entire region is shut down, you know, it's a massive population and we're not necessarily going to get outrage on the world stage about it, but it's a serious problem.

There's also instances where governments, or the judiciary, are punishing companies for noncompliance with government requests. You know, we've seen the shutdown of social media networks in Brazil, for example, like WhatsApp. And so I think this idea that there's this growing array of tools and sophistication is an important one to keep in mind.

And in the report that will be coming out, with one of the things that we've highlighted is that as countries go more and more online and their populations become more connected, there seems to be a kind of sweet spot -- I hesitate to use that because it's a terrible sweet spot -- for governments where there's a reasonable level of connectivity and that seems to be where the shutdowns are most valuable to governments. And then after that, as the population gets more and more online it becomes harder and harder for governments to wield that tool without serious consequences. So I guess that's what I would add, yeah.

MR. WEST: Taylor?

MR. REYNOLDS: What I would add to that is we had a discussion with some of our leading network engineers not too long ago asking about these Internet shutdowns and one of the things that they came back with was it's very difficult even now to pinpoint the cause when the Internet doesn't work. It's very difficult for them to figure out.

And it can happen for political reasons, it can happen for network reasons, and it can happen for other reasons. And I think it's important for us to figure out a way -- I think that's one of the tasks ahead -- to separate these out. Because if we

can isolate the issues that are politically related, I think it's much easier to make a case for the negative effects. If it's just standard network shutdowns that happen periodically or breakdowns -- because of electricity, for example -- that's another issue. So I think we have a big role to play there.

We do see more of these taking place, it seems like, in the popular press, and I thought in the report that Dale did a great job of listing a very detailed list of shutdowns that have been seen around the world. And I think we need to just have a better understanding of where they're happening and why.

MR. OLUKOTUN: Yeah, I'm just going to jump in. The definition that we have on our website, AccessNow.org -- Keep it On is at the top -- we only include intentional disruptions. So we exclude the network anomalies that happen, so that's why we -- the verification piece of it is so important, whether from someone who is experiencing it firsthand, an end user, or from a telecommunications company, or finding the government order, for example, which happened in Iraq earlier this week.

Sorry, I left out school exams. So school exams is another really major one. And again, it's the advent of technology meeting rote examination and multiple choice tests. So you have these new tools, Facebook and various ways of communicating, different platforms, and these are important exams, like school entrance exams. Sometimes in Iraq they tend to be for sixth graders, so important. But in Ethiopia where a similar thing happened, it was for university entrance exams and the stakes are high, so sometimes even teachers will sell the exam results to their own students who will then pass it around on whatever social media tool they use.

So the response has been, rather than -- it's hit this system of exam administration and they weren't quite ready for it. So when I talk to teachers in the U.S. about this problem, they say, oh, well, I changed the answers, or I don't have all multiple

choice. So there are ways around it and a good proctor can stop this problem. But when you have thousands of people and they're not ready for it, the knee-jerk response has been to shut off the Internet.

So this week -- I think it was October 1st through 5th -- Iraq was shutting down the Internet for three hours, for the entire country except for Kurdistan. So they're not just blocking certain social media, but shutting down the Internet. And that's another major problem that's been happening.

MR. WEST: Let me ask one last question and then we'll open the floor to questions from the audience. So, clearly, we're seeing a lot of problems in this area. There seems to be an accelerating trend. The economic damage as e-commerce grows is going to continue to accelerate, what are the best ways of discouraging countries from doing these things?

MS. CUMMINS: We need to educate and we need to engage. The education comes from the work that's being done to document the harms, to raise awareness around the world, but the engagement is going to be the critical "how" in this. And the way to do that is to use the leverage of governments, of companies, of civil society working together. This is, as we've said, it's a global problem. It will only have a multi-stakeholder solution. There is no other solution.

Governments on their own are not going to solve this problem. Companies on their own are not going to be able to solve this problem. So one of the things we're encouraged is that if a group like GNI can bring telecommunications Internet companies together, as well as human rights organizations, as well as other parts of civil society, that can be a powerful mechanism for engaging governments.

And the second thing I would say is that when we engage governments, we don't just have to engage the government that is using the tool. Governments are

connected, as well. Governments out of Europe, for example, the United States, are powerful donor countries to many of these countries. The World Bank and other international institutions have a big role to play in this and I think it's incumbent on all of us to find ways to engage those institutions.

And I think one of the things that's come out of the Global Network Initiative's work on this is that it's not enough to react during a crisis. There's actually very little you can do once a government has made a decision to shut the networks down and give an order. There's not a lot that the company on the ground can do if they're being faced with threats to their local staff.

So the window for engagement is actually before the storm, before the crisis. And so if we can find mechanisms and forums for governments to be educated and be engaged on this ahead of the crisis, then we're going to come a long way to mitigating or preventing these shutdowns.

MR. WEST: Deji?

MR. OLUKOTUN: Yeah, I completely agree with that, that it is a multi-stakeholder problem. It's the very nature of one and that makes it very exciting because that's also where the solutions are. And there's really a lot of reasons to collaborate.

One of the things we're looking at is, because our helpline, it's a 24-hour digital security helpline, we do have to respond. And the members of our coalition do have to respond as they're happening, so we do need to have some circumvention advice. How do you get around the block, if it's possible? How do you document? Reaching out to journalists, who have such a huge role in this because not only are they recording the kinds of human rights violations that are happening around them, but they're often the first ones to actually document the disruption in context, so they don't just on a technical level, but actually understand why it's happening and where it's

happening and they can verify. So that's super important.

But I do think the norm shifting of the U.N., and going for these top, top governments and multi-stakeholder bodies, multilateral bodies, getting them to make statements and take the stand. But I do think the economic impact is so huge and understanding that, so many of these countries in the developing world, particularly, say we're open for business, come invest in us, and then shut down the network.

So being able to point that out and point to some numbers is going to be really powerful and I hope we can continue doing more research like this.

MR. WEST: Taylor?

MR. REYNOLDS: Great. I've just got a couple. Interestingly, in many countries you have a very centralized connectivity out to the world for the Internet. And one of the things that we would recommend, or that I would recommend, is that you have a more decentralized structure.

So if you've got a country where there's one Internet exchange point where all of the operators exchange traffic, it's very easy to walk in and just pull the plug. And all of a sudden you lose connectivity throughout the whole country.

We have been arguing from a network planning standpoint that you should have multiple exchange points, which would decentralize your network and make it more difficult for parts to go down all at once. And I think that could help from a political standpoint, as well.

The second, no one had mentioned this yet, but I think it's important to insure that governments have a pretty good social media footprint themselves. And that policymakers are actually using these technologies because if this is a tool that they also use to communicate, then they're going to be less likely to take it down when they need to respond to things in the press and the media. So I think getting them more online and

understanding what's going on is a good thing.

And third, I think it's important for us to have some centralized databases that look at when things are shut down. And what that allows is academic researchers at places like MIT to go in and try and figure out what's going on and come up with numbers. But to have some sort of centralized database would be extremely helpful.

MR. WEST: Okay, let's open the floor to any questions or comments from the audience. We have microphones, so just raise your hand and we will get to you. Right here is a gentleman with his hand up.

MR. NOJEIM: Hi, Darrell, Greg Nojeim from Center from Democracy and Technology. Could you just walk us through one example of how you calculated these numbers? I'm looking on page 9 of the report. The Brazilian judge ordered the shutdown of WhatsApp and the number on May 2nd. And then following another shutdown in December 2015, the May shutdown was for a day and it cost the Brazilian economy \$39 million. How did you get to that number?

MR. WEST: Great question. On pages 5 and 7 of the report I have detailed formulas outlining the data that we used to derive those estimates and how we did it. So just to give you an example, what we would do is, in the case of a national mobile shutdown -- like if the mobile network was being shut down across an entire country -- we would take the national GDP for that country, we would measure the duration, the percent of the year. So, one day, one week, one month.

We would look at the extent of the digital economy, which we measured as a percentage of that nation's economy that comprised the digital component. There are estimates that are available for each of those things. the extent of the mobile penetration, which we measured as a percentage of the country having mobile subscriptions, and then we incorporated a multiplier effect. So, basically, we were able to

get data for each of those aspects and then computed the economic cost.

I do want to point out that we used a very conservative approach here, in the sense that, as Kath pointed out, we didn't look at the tax costs to the loss of economic activity, we don't look at indirect effects. There are a variety of other negative economic consequences that we don't seek to estimate. In addition, we all know that the digital economy is growing year by year. In some cases, the most recent data that we had in particular countries was two or three years old, and so the \$2.4 billion figure that we give for the world as a whole is likely to be a low estimate of the actual damage. But that's how we derived our numbers.

Other questions? Don't be shy. Oh, over here is a question.

SPEAKER: I was wondering if you also kept in mind the cost of Internet slowdowns because there are probably ways in which the shutdown of the Internet is like an extreme measure, but you can slow it down, especially maybe closer to moments in time that are very important, politically speaking.

MR. WEST: Yes, absolutely. There certainly would be economic costs of slowdowns throttling down, more targeted or selective ways in which traffic is slowed.

We were not able to develop estimates of that, so again that's an economic cost that we did not compute in ours. So that's the reason I'm saying it's a very conservative approach that we used and our estimate is likely to be a low measure of the actual damage.

MR. REYNOLDS: Can I jump in and share an experience that we had working with these type of methodologies at the OACD when I was there? These are really difficult numbers to calculate because in some instances you're underestimating, and in other instances you're overestimating, and you're kind of hoping that everything works out in the middle. It's a very difficult thing to do because, on one hand, if I can't

send an email to someone, I may be able to send a text, so that's not necessarily lost, it's just substituted for something else. So that would be overestimating the impact.

But on the other hand, there are these effects that are not captured by your model. So you're trying to find a balance somewhere in the middle and I think that when reports like this come out with numbers, they're there to give kind of a big idea, not to be precise because they can't be very precise. But they give a general idea that this is a problem of a certain magnitude. And I think one of the things that we're really excited about is working together to try and figure out how do we come up with some more precise measurements using new data that's available with big data from some of the partners that we can come out with?

I think there's some really exciting things we can do, but we have to look at it in the big picture.

MR. OLUKOTUN: Yeah, in our definition, we record if the Internet is effectively unusable. So we consider that a disruption and we kind of have this joke where we say, the only thing worse than no Internet is a slow Internet. And we've all experienced that. (Laughter)

MR. WEST: That's right, we experience that in the United States, too, from time to time.

Other questions? Right here on the aisle?

SPEAKER: So I'm interested in understanding more about what these numbers will mean in terms of negotiating with the governments that are causing the shutdowns. And I know there was a point made about the spectrum of regional and national efforts to shut down the government. Some countries are a little bit worse than others and in countries where you see these human rights violations, clearly what matters more to them is staying in charge of their country than it does that a few people are going

to get killed for voicing their opposition.

So for countries like that, for kleptocracies, and governments where corrupt leaders are managing the decisions, even though there might be factions that disagree, for those countries, how would an economic loss truly influence their decision to keep the Internet running?

MR. OLUKOTUN: In our analysis, we focused on the economic cost because we felt this was a way to play to the self-interest of the people shutting down the Internet. Like if it's an authoritarian government and they're human rights violations, they don't care, you know? They're willing to bear that cost, as you point out, in order to stay in power. But even authoritarian governments, and certainly democratic governments fall in the same category, they're pushing economic development. They're telling the world, we're open for business, come invest in us.

But then if, on the other hand, they're turning around and shutting down the government and hurting economic development and harming businesses, then they're shooting themselves in the foot. So we tried to make the argument in ways that would actually resonate with them.

In a lot of these countries, the digital economy as a percent of overall GDP is still relatively low. We're talking about 4 or 5 or 6 percent, depending on the country, but we know that number is growing year by year. So in a few years those countries are going to be in a situation where 10 or maybe even 15 percent of their GDP is going to come from online services and the digital economy. When they shut it down, that's really going to hurt their economies. So we just wanted to get them to start to focus on the ways they are harming their own people and their own businesses.

MR. REYNOLDS: Can I add one thing on this? So the number that we chose to use, we talked about how large of GDP, at first, when we talked. You know, this

is equivalent to a certain amount of GDP. I think one thing to keep in mind whenever we talk about GDP is that there's a portion of GDP that will have no impact on the Internet or could never be impacted by the Internet. So we typically focus on what we call "business sector value added," which represents about 60 percent of GDP. And that's the amount of goods and services that are built by companies over the course of a year.

The remaining 40 percent of GDP that you're talking about is typically things like imputed rent. So when you -- I know this is quite technical, but here in the United States we have a lot of home ownership and so what we have to do is, when you're talking about calculating the value of goods and services in the U.S., you have to impute the rent that you would be paying on the home that you own. And so that amount that you would have been paying in rent, had you been renting, goes into GDP and it makes up this roughly 40 percent of GDP.

So it means that numbers of 2 to 3 percent of GDP are actually 2 to 3 percent of the 62 percent that's actually in play in any given year. So it just means that it's actually more significant.

So I think it's a tricky number. We like to think of things in terms of GDP, but actually these numbers can be quite larger.

MR. OLUKOTUN: I would just like to make a point about I don't want to give authoritarian governments a free pass to do whatever they want. And as a human rights activist, I believe that you can make an impact. This is an economic discussion, so you could talk about raising the political cost of their actions.

I also -- Kath's point about the economic and the human rights being inseparable, it's important because this is a technical problem that's happening right now, and I mentioned that the targeting is getting more specific. So, just looking further down the road, there's a problem if you're only dependent on the economic aspect if a technical

solution can solve that problem.

So if you're a government, you want to shut it down and you'd be like, actually, I just want to target six people in this protest. They target those people, it doesn't cost your company much, other than having a direct conversation with us. We don't like that. So we want to be anticipating that.

And human rights are indivisible, they complement each other, so the two need to go together. It needs to be a kind of heady mix. And if you just focus on whether people can get away with it, then I think we're not going to win this battle of shifting norms, and making it something that not okay.

MS. CUMMINS: I would add to that question, what do you do about countries that are completely focused on regime survival and they're not going to be focused even on the economic accounts? Well, of course, that's just incredibly hard. But the reality is, and we've talked about this already, communications systems are global. There are companies, for example, part of the Global Network Initiative, that operate in countries where there are incredibly difficult human rights situations. And they're on the ground every day dealing with those challenges.

What we have to think about is how we wrap around them a set of stakeholders, other governments, that can create a space for a real conversation to happen. And it's incredibly difficult, there's no question. It's like sticking your foot in a door that's already been slammed sometimes. But that doesn't mean that we can't start. Countries have come out of being isolated and they've become less authoritarian, and I think we have to think about the global Internet as an important tool for reducing that isolation. But there's no question that that's the hard basket.

But there's also a set of countries in the middle that we've been talking about, emerging democracies, fragile democracies, countries like India and Brazil, that

have massive populations with incredibly different demographic profiles within those countries. If we can do some good work in those countries, I think you'll find that that will start to have an impact on their neighbors and on countries that are more closed off than them.

But I appreciate your question. That's the hardest issue that we have to deal with.

But these countries, they all have telecommunications networks, they all have hardware on the ground, and increasingly their populations are using WhatsApp, they're using Elo, they're using all these tools. So it's also an enormous opportunity, I think, long term.

MR. WEST: If I could just add one footnote to what Kath said. The thing that surprised me the most in doing the study was when I started, I was thinking that this was going to be a problem of authoritarian regimes. And I learned that that's not the case. It's really the emerging democracies. Kath mentioned India and Brazil as offenders. Turkey we used to think of as a democracy, but they're engaging in the same behavior.

This behavior which we associated with authoritarian regimes is now spreading to other kinds of systems. So that's something everybody should worry about, not just from an economic standpoint, but as was pointed out, the human rights angle, the civic dialogue, many of the things that we value.

Any other questions? There's a gentleman back there with his hand up.

SPEAKER: Thank you. As a layperson I was kind of wondering how easy it is to shut down the Internet. And further from that, are governments around the world now structuring the architecture of the Internet to make it much easier to turn off the switch, as it were?

MR. WEST: Good question.

MR. REYNOLDS: There's many different ways to shut down the Internet. You can typically -- and I'm not an expert in this -- but typically, I think there's an order that goes out from the government to the telecom operators that say, you don't resolve domain names anymore for a certain batch or you just disconnect. It's typically, I think, done via the DNS.

MR. OLUKOTUN: Yeah.

MR. REYNOLDS: I'm not sure, but there are ways around it. Like I said, I think it is quite difficult to knock everything off. And even in Egypt, as you saw, people were able to find ways out, around the Internet blockage. So this is one of the messages I think we need to get out: These things don't work and they make the public mad and they're stronger and they coalesce around the people who are being blocked.

MR. OLUKOTUN: I agree with Taylor's point about -- so when you type in "Facebook.com" or whatever, "NewYorkTimes.com," the ISP just won't deliver the address to you, so they just remove that. I'm not a technologist, though, so don't quote me on that. But that's one way.

There's an interesting article that just came out in *Quartz* that was based on information from a few years ago, but basically they're saying it's not quite what you would expect. A place like China has three main gateways, so something like 75 percent of the traffic goes through one particular gateway in China, so it's easy for them to control and censor that information. And if they wanted to shut down a good portion of the Net they could.

But in other countries, Russia being an example, actually it's very widely distributed, so you consider this to be an authoritarian regime. And the article, at least, suggests that it's because of cybercrime and there's incentive from the major operators at

a technical level to spread out their servers all over the country so that they wouldn't be subject to this.

But what we've seen and what our partners -- especially places like Dyn Research -- have noticed is that, I mentioned the Iraq example, so all of Iraq will be shut down except for Kurdistan. In other places the entire country will be shut down except for a satellite uplink that only certain ISPs know about. And then, in other places, everything will be shut down except for one particular teleco that, it just so happens, all the government minister have access to.

So the forms take -- they're very different forms. People still want access, especially people -- the leaders who are ordering these blocks. But there is a great article in *Wired* a couple of weeks ago, which I can share with you if you follow up, by April Glaser, where she walks through and actually talks to our chief technologist about the different forms that some of this blocking can have.

MR. WEST: Okay, we are out of time, but I want to thank Kath, Taylor, and Deji for sharing their views. And we appreciate your interest. Thank you very much.
(Applause)

* * * * *

CERTIFICATE OF NOTARY PUBLIC

I, Carleton J. Anderson, III do hereby certify that the forgoing electronic file when originally transmitted was reduced to text at my direction; that said transcript is a true record of the proceedings therein referenced; that I am neither counsel for, related to, nor employed by any of the parties to the action in which these proceedings were taken; and, furthermore, that I am neither a relative or employee of any attorney or counsel employed by the parties hereto, nor financially or otherwise interested in the outcome of this action.

Carleton J. Anderson, III

(Signature and Seal on File)

Notary Public in and for the Commonwealth of Virginia

Commission No. 351998

Expires: November 30, 2016