The Anatomy of an
INTERNET BLACKOUT:
Measuring the Economic Impact of Internet Shutdowns in India

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Indian Council for Research on International Economic Relations

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Executive Summary

Internet shutdowns are a growing concern in India. At a time when India is leveraging the impacts of a generative technology like the Internet to give boost and expression to Digital India, the rising number of shutdowns epitomizes the difficulties on the pathway to realising India's digital ambitions. The Shutdown Tracker Optimisation Project (STOP) run by the civil society organization Access Now reported in September 2017, that India with 54 shutdowns had topped the list of 30 countries that witnessed shutdowns in the preceding 21 months. In 2017, the number of Internet shutdowns in India more than doubled from 2016, while the total hours of shutdown increased by only 20 percent.

Internet shutdowns are in the same class as network disruptions and represent a tool of Internet censorship. There are broadly two types of Internet shutdowns – complete and partial. While partial shutdowns, such as throttling or blocking are a growing concern with manifold implications, this study focuses only on the economic impact of a complete Internet shutdown. In this report, an Internet shutdown is *an intentional and complete disruption of fixed-line, or, mobile Internet, ordered pursuant to the authority of the state, that renders the Internet inaccessible or unusable for a specific population, within the territory of India.* India has witnessed mobile-only and mobile plus fixed-line Internet shutdowns. Recent experience suggests a trend of targeted mobile-only Internet shutdowns. A state-wise representation of the duration of shutdowns in represented in Figure ES.2 below. The first image captures only mobile Internet shutdowns, while the second one includes instances where both mobile and fixed lines were shutdown. Jammu & Kashmir, Rajasthan, Gujarat, West Bengal and Bihar are clearly the states to have seen the maximum duration of shutdowns over the period 2012 and 2017.

With Internet shutdowns on the rise, many studies and reports have looked at various dimensions of the issue. While there has been extensive work on the legal and human rights implications of Internet shutdowns, studies that focus on the economic impact have been few and far between. The OECD was among the earliest to measure

Figure ES.1: Internet Shutdown Trends in India
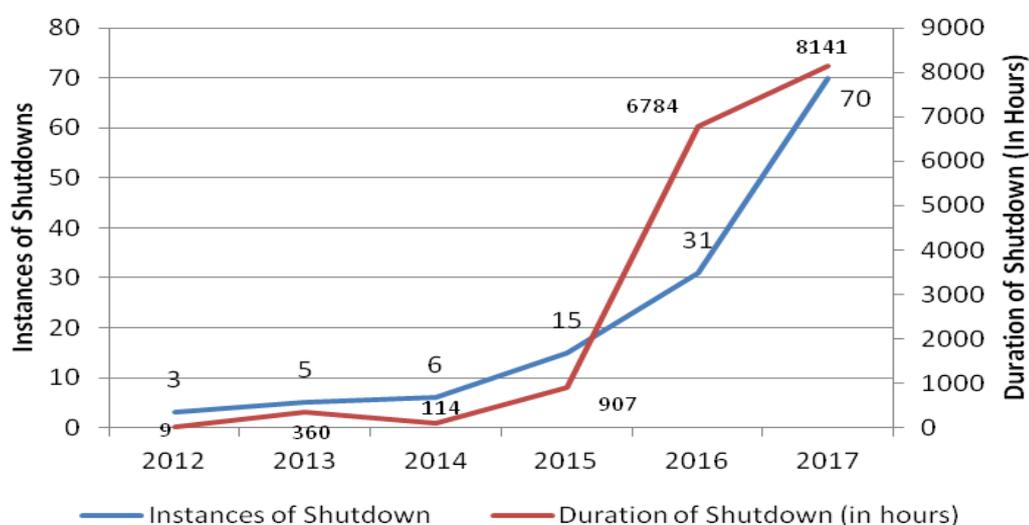
Source: www.Internetshutdowns.in

Figure ES.2: State-Wise Duration (in Hours) of Internet Shutdowns 2012-2017
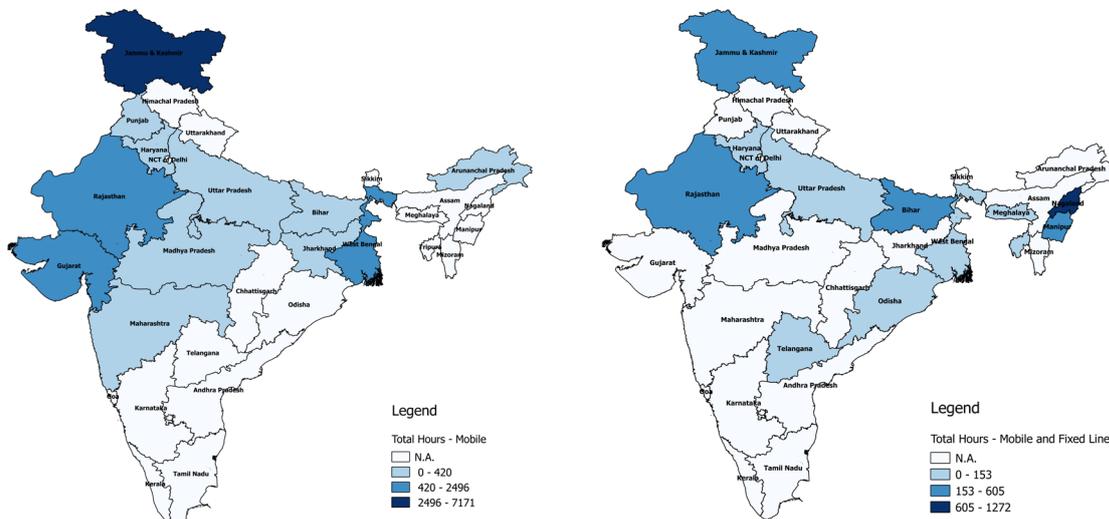
the economic impact of Internet shutdowns in Egypt. More recently, studies by the Brookings Institute and Deloitte also measure the economic impact of Internet shutdowns. We estimate the economic impact of shutdowns using a two-step top down methodology. In step 1 we estimate traffic affected by the shutdown and in step 2 we estimate the economic cost of the traffic affected using estimated elasticities.

We employ standard procedures such as the instrumental variable method to estimate elasticities for mobile Internet and totel Internet use. The measured elasticities are used to compute the economic impact of each shutdown reported in India between 2012 and 2017. Each instance of shutdown is tabulated with details on regions impacted, duration and network disrupted (mobile / mobile and fixed line). We take advantage of India's diversity and the availability of state level data to investigate economic impacts within India – between states for mobile only and mobile plus fixed line shutdowns.

Key Results from Econometric Estimations

- 16315 hours of Internet shutdown in India cost the economy approximately $3.04 billion during the period 2012 to 2017

- 12615 hours of mobile Internet shutdowns in India cost the economy approximately $2.37 billion during the period 2012 to 2017

- 3700 hours of mobile and fixed line Internet shutdowns in India cost the economy approximately $678.4 million during the period 2012 to 2017

The economic impacts are shown in Figure ES.3 below. The entire North Eastern region is clubbed as one in the way telecom licenses have been awarded historically. The grading does not imply that each state in the North East was equally and severely impacted by shutdowns.

While these figures highlight the magnitude of economic costs, it is also imperative to underscore that these amounts could be high since they are computed from macro-economic data reflecting the model assumption that assigns a uniform impact across the affected region. Moreover, there is no way to capture in the macro data, adjustments made to overcome the temporary shutdown. Therefore we have supplemented our quantitative estimates with a qualitative analysis based on interactions with affected stakeholders to fully grasp the impacts across businesses and society.

Figure ES.3: State-Wise Economic Impact of Internet Shutdowns 2012-2017 (Million $)

Legend
Economic Impact ($) - Mobile
- N.A.
- 0 - 181
- 181 - 421
- 421 - 1178

Legend
Economic Impact ($) - Mobile and Fixed Line
- N.A.
- 0 - 42
- 42 - 93
- 93 - 189
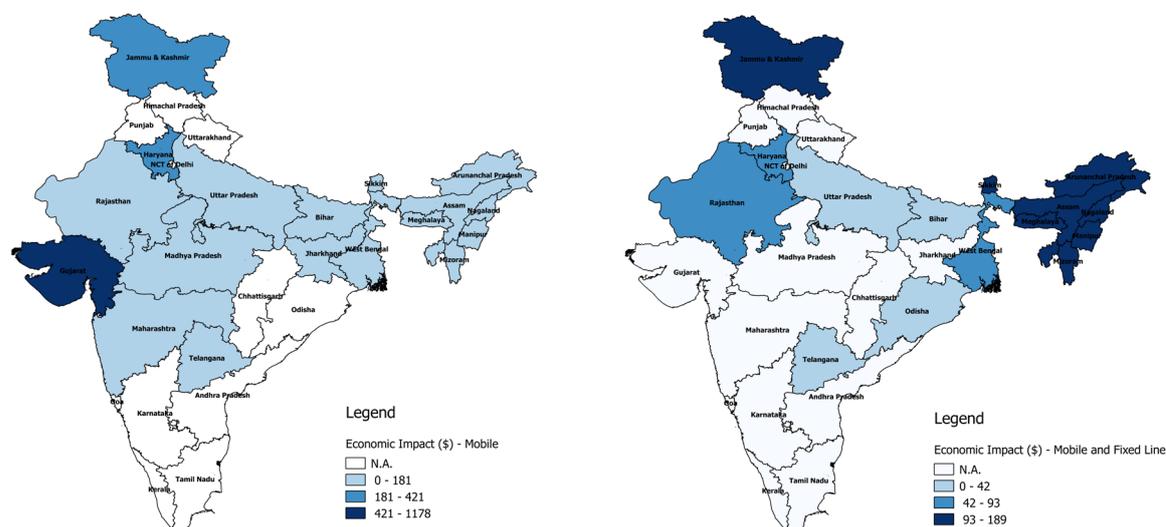
Insights from our field research complement the quantitative impact assessment. We covered 7 out of 18 states in India that have faced Internet shutdowns. Table ES.1 represents the framework for selection of stakeholder interactions. The stakeholders are divided into government, business and society. Government as a stakeholder is categorized as an administrator and a user. It is the authority ordering and enforcing the Internet shutdown, and is also affected when services and functions that utilize the Internet are disrupted due to a shutdown. The business group represents stakeholders with commercial interests that are dependent on the Internet. Given the nature of impacts, the society cohort is classified into press, social institutions and individuals.

Table ES.1: Framework for Selection of Stakeholder Interactions

State	Stakeholders					
	Government		Business	Society		
	Administrator	*User*		*Press/Media*	*Social Institutions*	*Individuals*
Bihar	√	×	√	√	√	×
Gujarat	√	×	√	×	√	√
Haryana	√	×	×	×	×	×
Jharkhand	√	×	√	×	√	×
Kashmir	√	×	√	√	√	√
Rajasthan	√	×	√	√	×	×
West Bengal	√	√	√	√	√	×

Note: √ implies stakeholder consulted in the category, × implies stakeholder not consulted in the category

The qualitative analysis is conducted around three distinct themes – (i) causes and characteristics of Internet shutdowns, (ii) impact of Internet shutdowns, and (iii) alternatives to Internet shutdowns. Interactions with field officers revealed that Internet shutdowns in India have been ordered both in anticipation of, and to prevent further escalation of, law and order situations. In several cases, rumour-mongering or provocative messaging on social media and instant messaging platforms had driven decisions to order Internet shutdowns. Our field research also captured the heterogeneity of impacts across sectors. Since the impact of Internet shutdowns on telecom and Internet service providers is obvious, this study shifts the spotlight on Internet dependent sectors. Based on field level data, we find that businesses such as e-commerce suffer most during shutdowns along with online freelancers who operate out of small towns and are completely dependent on a functioning Internet. The impact on banking services is limited as their operations run on private leased lines and remain uninterrupted by shutdown of the public Internet. At best, small volumes of online banking transactions get disrupted. Other sectors that are Internet dependent, such as tourism, IT services and the news media industry are also adversely affected and the impacts are described in detail in the case study section. Expectedly we also find that the effects of shutdowns are regressive, i.e., they affect smaller businesses relatively more than larger businesses that are able to find alternatives given

resources at hand. Figure ES.4 presents a continuum along which sectors have been placed to represent the relative magnitude of impact from Internet shutdowns.

Our interactions with stakeholders on alternatives to Internet shutdowns have highlighted the importance of capacity building of law enforcement agencies and counter-speech among other necessary efforts. It is beyond the scope of this study to make any blanket assessment of the effectiveness of Internet shutdowns in addressing the concerns of the government. Stakeholders provided contrasting views on the effectiveness of Internet shutdowns and this reinforces the need for a thorough impact assessment of each Internet shutdown ordered. Flowing from our quantitative and qualitative analyses, the following are some recommendations for future thinking on Internet shutdowns:

- Building a Civilian Line of Reporting: While ordering or evaluating an Internet shutdown, having a civilian line of reporting provides the much-needed multidimensional perspective on ground realities.

- Curbing Disproportionate Internet Shutdowns: Blanket shutdowns across the state are often disproportionate measures to the law and order situation at hand. An urgent recognition of this trend will help restrict shutdowns in the future.

- Providing Official Notification or Communication of Internet Shutdowns: Stakeholders can be better prepared, and possibly mitigate some of the adverse

Figure ES.4: Level of Impact Across Sectors of the Economy

- **Manufacturing and Heavy Industries**

- **Banking**
- **Education**
- **Healthcare**

- **Tourism**
- **IT Services**
- **Press & News Media**

- **E-Commerce**
- **Freelancing**

Low Impact   High Impact
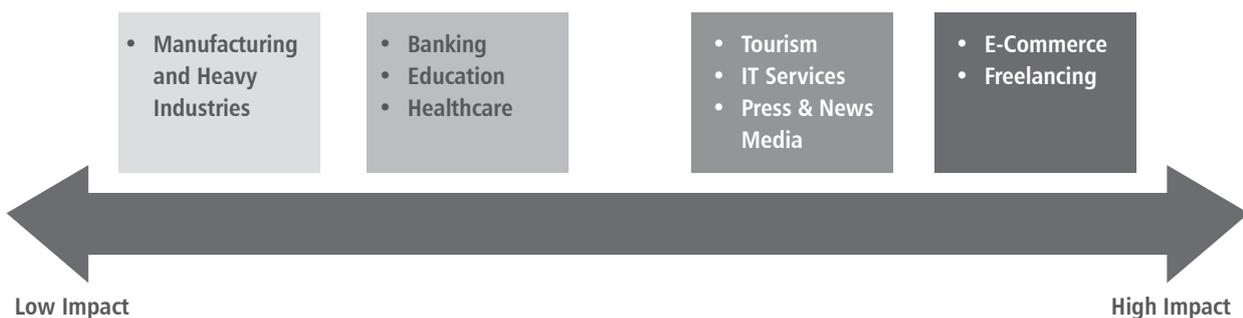
impacts of Internet shutdowns if proper notification or communication of shutdowns is provided by the state.

- Documenting Internet Shutdowns: The lack of reliable data on Internet shutdowns limits an understanding of the nature and scale of the problem. Official documentation with impact analysis of each Internet shutdown would be an invaluable resource for future course of action.

- Building Corporate Accountability: Telecom and Internet service providers can cultivate a culture of transparency and build corporate accountability by developing disclosure policies on Internet shutdowns and allied details.

- Improving Connectivity and Providing Alternatives: Building more resilient Internet infrastructure and improving fixed-line Internet connectivity would go a long way in mitigating the damage of frequent disruptions to mobile Internet.

- Using and Promoting Effective Counter-speech: The state's investment in better public communication and counter-speech during law and order situations can prevent the need for Internet shutdowns in the long run.

- Promoting educative campaigns on curbing hate speech, and inflammatory messages: Educative campaigns can address some of the primary concerns of provocative messaging and rumour-mongering that is often the basis of decisions to shut down the Internet.

- Promoting Independent Fact Checking: Fact-checking on fake news as an additional, independent mechanism will address some concerns related to law and order situations. Citizen driven fact checking initiatives have had some success in controlling the proliferation of fake news and provide an avenue for reasonable dialogue.

- Sharing best practices and capacity building across states: Sharing best practices amongst states and collaborations with service providers and Internet companies in relation to curbing Internet shutdowns will be useful for state administrations to build capacity particularly to nab online miscreants and manage public order crises.

1. Introduction and Background

There is nothing either good or bad, but thinking makes it so."
—Hamlet in Hamlet

The Internet has dramatically revolutionized the way we live. From the basic to the most complex, many facets of economic and social activity are now affected by the Internet. The technology that began as a simple network connecting a handful of universities in the 1960s has grown massively to become a fundamental and integral part of our social and economic lives. Much like electricity, the Internet is also considered a general-purpose technology (GPT).[1] Its role in improving productivity and inspiring innovation can be seen in almost every sector of the economy. Its imprint is also visible in the interface between government and citizens. Governments are increasingly investing in e-governance initiatives to provide efficient citizen services that are easily scalable. For the average citizen, the Internet has facilitated easier engagement with the state, indeed enabled citizens to push the state to higher levels of accountability, besides empowering society at large.

With any technological disruption, there are both contemporary and temporal challenges. The Internet is no different. With its ever-expanding reach and pervasiveness, questions posed by the Internet have also multiplied. Besides driving a reorientation of economic activities, Internet based crimes have also become a cause of worry for governments across the world. At a localised level, exploitation of social networking sites has become common bait for criminal activity. Popular platforms such as Facebook, Twitter and Whatsapp are being leveraged for illegal activities. While social media undoubtedly enables rapid and

wider information exchange, it is a double-edged sword that equips perpetrators of illegal activities with the means to carry out new white-collar crimes. With approximately 194 million Facebook users[2] (largest user base in the world), 200 million monthly active WhatsApp users[3] and the second highest monthly active users on Twitter globally, India is vulnerable to the rising menace of social media crimes.

Social media networks have also enabled civil society to coordinate and gather voices of dissent like never before, crucial to the functioning of a democracy. But it has also created disquiet over its alleged role in recent politics. For example, social media has alleged to have disproportionately influenced outcomes of elections in US and the Brexit vote in the UK[4]. Sometimes the integrity of the process of convening on social media is suspected for the right reasons because of the increasing popularity of fake news and the growing influence of 'keyboard warriors'.

The growing dangers of automated fake accounts and chain letter scams intermediated through social media platforms are present and real. Internet companies that serve as the medium are literally on the horns of a legal dilemma with respect to sifting information-to sift or not to sift? A similar predicament confronts governments that on the one hand support development of the Internet and associated infrastructure for digital enablement and on the other clamp down on its functioning using ordered measures such as censorship, blocking and shutdowns. Shutdowns are justified when instances of civil unrest

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1 Clarke, George et al (2015), "The Internet as General Purpose Technology: Firm Level Evidence from around the World" Policy Research Working Paper, World Bank Group. Available at : http://documents.worldbank.org/curated/en/630411468338366817/pdf/WPS7192.pdf

2 Statista https://www.statista.com/statistics/304827/number-of-facebook-users-in-india/

3 Statista https://www.statista.com/statistics/280914/monthly-active-whatsapp-users-in-india/

4 Hall, Tinati and Jennings (2018), "From Brexit to Trump: Social Media's Role in Democracy", Computer (Volume: 51, Issue:1, January 2018)

provoked or perpetuated by rumour-mongering on social media become serious security concerns. While solutions are being crafted and Internet companies are tirelessly working on finding ways to curb it, an immediate and popular approach among governments is to order temporary suspension of Internet services.

Some of the earliest and most prominent cases of Internet shutdowns across the world arose from political compulsions. In 2005, the Kingdom of Nepal shutdown its entire telecommunications network for two days. Fixed line telephony was the first to be restored within a few days, followed by Internet services, while mobile telephony was restored only after a period of 88 days.[5] The Arab Spring - a wave of revolutions across the Middle East and North Africa in 2010-2011 marked the beginning of a trend in protest cultures that only increased over time. The practice of shutting down the Internet spread quickly to other countries and the reasons were no longer restricted to issues of large scale political opposition or violence.[6] The reasons for shutdown now included fair administration of school exams, limit circulation of illegal content, etc. The Shutdown Tracker Optimisation Project (STOP) run by the civil society organisation Access Now reported in September 2017, that at least 30 countries in the last 21 months had seen a shutdown, of which India and Pakistan topped the list with 54 and 10 shutdowns

respectively[7]. The organization runs the *KeepItOn* program to build awareness around Internet shutdowns globally.

The increasing incidents of Internet shutdowns across the world raised much concern, particularly with regard to infringement of human rights. In an acknowledgment to this growing concern the United Nations Human Rights Council (UNHRC) passed a resolution on the promotion, protection and enjoyment of human rights on the Internet. The resolution specifically expresses concern about "measures aiming to or that intentionally prevent or disrupt access to or dissemination of information online, in violation of international human rights law."[8] Among other global initiatives, the 2017 Ranking Digital Rights Corporate Accountability Index evaluated 22 telecommunications, Internet and mobile companies on their public commitments and disclosure policies, with a new indicator that focused specifically on network shutdowns[9].

In India, the escalating number of shutdowns has not gone unnoticed. By 2016, India was topping the global charts on the number of Internet shutdowns. Shutdowns in India are mostly ordered under Section 144 of the Criminal Procedure Code or Section 5 of the Telegraph Act. There has been extensive discussion on the corresponding legality of Internet shutdowns.[10] The use of shutdowns as an instrument to control the law and order situations was challenged in the High Court of Gujarat. The High Court

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[5]   Peng Hwa Ang et al (2012), "Shutting Down Mobile and the Downfall of Nepalese Society, Economy and Politics", Pacific Affairs Vol. 85 No. 3, Ceiling South Asia: The Mobile Phone's Impact on a Region pp. 547-561.

[6]   While some of the prolonged Internet shutdowns are measures taken to tackle political opposition and insurgency, more recently number of countries have shutdown the Internet for much smaller causes such as to prevent cheating in examinations; See http://www.independent.co.uk/life-style/gadgets-and-tech/news/facebook-twitter-banned-blocked-algeria-exams-3g-Internet-a7091171.html and https://www.accessnow.org/need-stop-shutting-Internet-school-exams/.

[7]   https://www.accessnow.org/keepiton-shutdown-tracker/

[8]   UN Human Rights Council, (June 2016) The promotion, protection and enjoyment of human rights on the Internet. Available at http://ap.ohchr.org/documents/dpage_e.aspx?si=A/HRC/32/L.20

[9]   https://rankingdigitalrights.org/index2017/findings/networkshutdowns/

[10] See Nayak, Nakul (6 October, 2017), "The Recently Notified Rules on The Suspension of Telecom Services Legitimise Internet Shutdowns and Facilitate Voice Call Bans", Caravan Magazine. Available at http://www.caravanmagazine.in/vantage/suspension-telecom-services-rules-legitimise-Internet-shutdowns-facilitate-voice-call-bans ; Also see Gupta, Apar and Jit Singh Chima, Raman (October 26, 2016) "The Cost of Internet Shutdowns" Indian Express. Available at http://indianexpress.com/article/opinion/columns/ Internet-access-government-restriction-shutdown-3102734/ ; Also see Bhatia, Gautam, (18 October 2017), "Making the Internet Disappear" The Hindu. Available at http://www.thehindu.com/todays-paper/tp-opinion/making-the-Internet-disappear/article19879182.ece ; Also see Arun, Chinmayi, (24 February 2016), "Demarcating a safe threshold" Indian Express. Available at http://indianexpress.com/article/opinion/ columns/demarcating-a-safe-threshold/

dismissed the petition ruling in favour of the state's powers, as did the Supreme Court of India, not allowing an appeal and agreeing that "it sometimes becomes necessary for law and order".[11] Figure 1 presents the increase in number and duration of Internet shutdowns over the last few years.

With the spotlight on India and rising concern about the exercise of power by authorities to issue orders for Internet shutdowns, the Government of India issued rules on shutdowns under the legacy legislation – The Telegraph Act, 1885. The "Temporary Suspension of Telecom Services (Public Emergency or Public Safety) Rules, 2017" (Internet Shutdown Rules, 2017) prescribed clearly the competent authorities that can order an Internet shutdown and the periodic review for such orders.[12] The new rules attempt to bring order into shutting down of the Internet, although these have been criticized on grounds of not having included responses or suggestions from civil society. Moreover, the new

rules have not had any discernible impact on the number of ordered shutdowns. Over 40 shutdowns were reported in India after the issue of new Rules on 8th August 2017 until early February 2018[13]. This however, does not include other shutdowns which go unreported in public media, a problem we discuss later.

1.1 Defining Internet shutdowns

Neither the United Nations Human Rights Council, nor India's recently issued Internet Shutdown Rules 2017 explicitly define an Internet shutdown. For the goal of measuring its economic impact, the immediate purpose of this study, knowing the scope of what comprises an Internet shutdown is the first step. Several stakeholders and experts have offered a working definition for Internet shutdowns. A generally acceptable crowd sourced definition states "*Internet shutdown is an intentional disruption of Internet or electronic communications, rendering them inaccessible or effectively unusable, for a*

Figure 1.1: Instances and Duration of Internet Shutdowns in India (2012 – 2017)
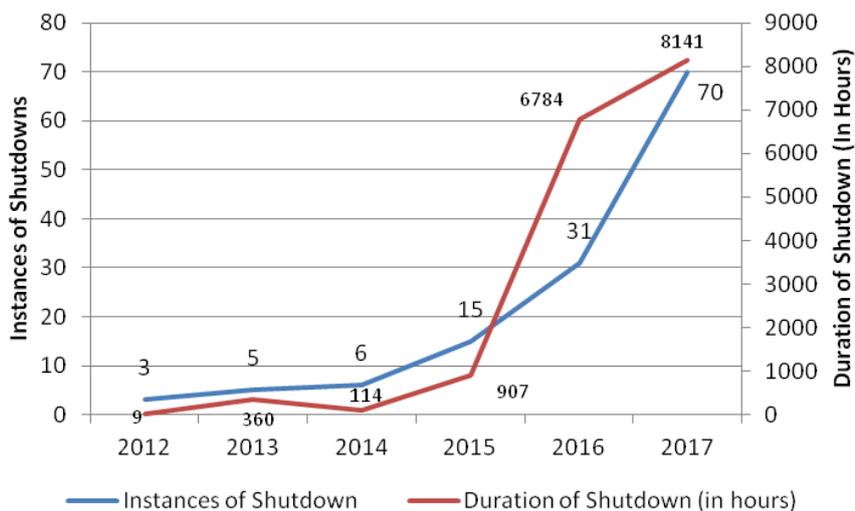
Source: Data from www.Internetshutdowns.in

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[11] Shashidar K.J,(2016) "Supreme Court upholds states' right to ban mobile Internet services" Medianama , 12 February, 2016. Available at https://www.medianama.com/2016/02/223-supreme-court-mobile-Internet-ban/

[12] http://www.caravanmagazine.in/vantage/suspension-telecom-services-rules-legitimise-Internet-shutdowns-facilitate-voice-call-bans

[13] https://Internetshutdowns.in/

specific population or within a location, often to exert control over the flow of information."[14]

Internet shutdowns observed in practice can be either total or partial.[15] A complete or total shutdown is when all Internet services are blocked without specific targeting of applications or websites. It targets either mobile or fixed line Internet access or both and disables users' access to the Internet in that country or region. A partial Internet shutdown involves blocking of specific content and communication platforms. While partial shutdowns are a growing concern with potentially high impact, the focus of this study is limited to total Internet shutdowns, i.e., complete blocking of mobile access or fixed access or both. It does not include analysis of partial shutdowns such as blocking of websites, or social media platforms. Given the local context, Internet shutdowns as studied in this report include the following elements:

- Intentional and complete disruption

- That is not throttling of speeds or blocking of specific websites or applications

- Of fixed line or mobile Internet or both

- Pursuant to an order by an authority of the state

- That renders them inaccessible or unusable for a specific population

- Within the territory of India

As stated above, this study focuses on the economic impact of Internet shutdowns and captures narratives that illustrate the extent of impact on people and their social activity. The legal and human rights dimensions of shutdowns have been studied elsewhere.[16] The rest of the study is organised as follows. The next section presents the econometric model used for estimating the economic costs of Internet shutdowns in India. Section 3 discusses findings from our field survey. Section 4 concludes and offers recommendations.

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[14] AccessNow, a civil society organization has developed the definition resulting from their #Keepiton Campaign. Available at https://www.accessnow.org/keepiton/

[15] ISOC (2017) Internet Shutdowns, Internet Society Policy Briefing, 14 November 2017. Available at https://www.Internetsociety.org/wp-content/uploads/2017/11/ISOC-PolicyBrief-Shutdowns-20171109.pdf

[16] Freedom on the Net (2017) Available at https://freedomhouse.org/report/freedom-net/2017/india

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

Internet Society (2017), "Policy Brief: Internet Shutdowns", 13 November 2017, Available at https://www.internetsociety.org/policybriefs/internet-shutdowns

United Nations (2017), Report of the Special Rapporteur on the protection and promotion of the right to freedom of opinion and expression . Details and Report available at http://www.ohchr.org/EN/Issues/FreedomOpinion/Pages/SR2017ReporttoHRC.aspx

2. Measuring the Economic Impact of Internet Shutdowns

The role of digital technology is rapidly expanding in both developed and developing countries. With a substantial policy push, the Internet is now central to most socio-economic activities in India. India's Internet economy is expected to touch USD 250 billion in 2020 (7.5% of GDP), driven by explosive growth in data consumption. E-commerce and financial services are likely to lead this growth[17]. A recent survey reported that of the total time spent by Indians on their mobile, 45 percent is on entertainment, 34 percent on search, social media and messaging and about 4 percent on shopping[18]. India is already the highest ranked in mobile data consumption, at volumes which are 50 percent more than that in China, indicating the disruptive effect of Reliance Jio that entered the market in September 2016 and resulted in significant adoption through its free data and voice plans. India's mobile obsession is also underscored by the relentless rise in smart phone users and average monthly spends on mobile data despite poor network speeds and unaffordable devices. Interestingly, this growth is led by rural areas, where the recent rate of uptake is higher than that in urban areas[19].

The empirical literature measuring the dividends of Internet has conclusively established high impact on economic growth and job creation. A pioneering study by Roller and Waverman (RW)[20] showed evidence of growth externalities due to telecoms that were not

necessarily linear. Several studies (Sridhar & Sridhar 2004, Qiang et al 2009, Koutrpompis 2009) inspired by RW also estimated growth dividends of telecoms. ICRIER used a modified RW (2001) approach and also adapted the Barro (1991) model in a series of reports from 2009 that captured the growth dividend of telecoms in India, starting with the now ubiquitous mobile[21]. This report estimated that a 10 percent increase in mobile penetration resulted in a 1.2 percent increase in rate of GDP growth. According to recent estimates a 10 percent increase in Internet subscribers results in a 2.4 percent increase in the rate of GDP growth per capita[22] while a 10 percent increase in Internet traffic results in a 3.3 percent increase.[23] The latter focuses on Internet usage as opposed to penetration, moving away from the implicit assumption that traffic growth is proportional to subscriber growth. From available industry statistics we know that the compounded annual growth rate for subscribers in India is 27 percent as compared to 32 percent for traffic[24] over the period 2013 to 2017.

The policy narrative on the Internet is now bittersweet. Rising instances of Internet abuse and its anticipated role in sparking and fueling law and order situations is pushing governments to order shutdowns, the frequency of which has risen disproportionately to its expanding footprint. These shutdowns are naturally criticized by sections of society who favour liberty and whose financial interests are tied to a functioning Internet. But public

17   BCG-TiE (2017), "The USD 250 Billion Digital Volcano: Dormant No More" https://media-publications.bcg.com/BCG-TiE-Digital-Volcano-Apr2017.pdf

18   Internet Trends 2017 – Code Conference, Mary Meeker, Kleiner Perkins http://www.kpcb.com/Internet-trends

19   http://www.governancenow.com/news/regular-story/rural-india-leads-growth-in-mobile-Internet-users

20   Roller and Waverman (2001), "Telecommunications Infrastructure and Economic Development: A Simultaneous Approach" , American Economic Review, 91(4), pp. 909-23

21   ICRIER 2009, "India: Impact of Mobile Phones", Moving the Debate Forward, Policy Paper Series, Number 9, Vodafone Group

22   ICRIER (2016), "Quantifying the Value of an Open Internet for India"

23   ICRIER (2017), "Estimating the Value of Internet Based Applications in India" for Broadband India Forum

24   Estimates by data from TRAI and CISCO's VNI Index

policy has a mandate that transcends narrow interests and at the same time has to be exercised responsibly. How to achieve this delicate balance is however not the focus of this study, recognizing that tradeoffs are manifest in public policy choices. We concentrate instead on the opportunity cost represented by the loss from interrupted economic activity of an Internet shutdown.

Instances of communication shutdown and its socio-economic impacts have been studied before. For instance, cutting off the mobile telecommunication network in Nepal[25] in 2005 was found to have a negative impact on the economy and the resultant social alienation led to the eventual downfall of the reigning king. A recent study on Pakistan examined the shutdown in Islamabad and Rawalpindi during March 2015[26] . It covers a wide range of impacts including safety, access to emergency services, disruption to education, impact on small businesses and availability of e-services. This study however does not report the estimate of the economic loss. An earlier study in 2012, reported that Pakistan suffered an estimated loss of USD 49 million to the exchequer from mobile companies for a shutdown during Eid[27].

The first rigorous quantitative estimate of economic disruption was due to OECD in 2011[28]. It reported an estimated loss of USD 90 million for shutdown of Internet and communication services in Egypt for a period of five days. The loss estimates however ignored the indirect impacts on sectors affected by the Internet such as e-commerce, tourism, etc. A more recent report by the Brookings Institution[29] estimates that Internet shutdowns cost countries about USD 2.4 billion between

July 2015 and June 2016. The reported estimate for India was USD 968 million for 70.54 days of Internet shutdown during this period. The study triangulates estimates available from the literature on the contribution of a country's Internet economy to GDP and the multiplier effect it generates to arrive at cost estimates of each shutdown, justly distinguishing between mobile and fixed line disruptions. However, the study acknowledges challenges of precision due to paucity of relevant economic data.

As online ecosystems mature and infiltrate, the impact of such shutdowns is only likely to increase. According to Deloitte[30], for a well-connected country, the per day impact of an Internet shutdown would be $23.6 million per 10 million population. With medium and low levels of Internet penetration GDP impact amounts to $6.6 million and $ 0.6 million per 10 million people respectively. The study is based on varying estimates of broadband usage and broadband speeds in different economies. The Internet speed elasticity helps measure the impact of throttling, a purposeful slowing down of available bandwidth. The estimation is based on data from 96 countries and the elasticities are borrowed from previous studies by Deloitte[31].

Since 2015, network disruptions have also become very common in Sub-Saharan African countries. A report by CIPESA recently developed a framework to measure the costs of network disruptions in Africa to account for the informal economy that GDP based approaches may not accurately measure. While their approach borrows from Brookings and Deloitte it introduces a country risk profile and measures loss of efficiency from the inability to digitize businesses. According to their estimate, Internet

[25] Ang, Tekwani and Wang, 2012, "Shutting Down the Mobile Phone and the Downfall of the Nepalese Society, Economics and Politics", Pacific Affairs, University of British Columbia

[26] "Security Versus Access: The Impact of Mobile Network Shutdowns, Case Study: Telenor Pakistan", Institute of Human Rights and Business, 2015

[27] Aamir Attaa, Propakistani, Mobile Companies Lost PKR 2.6 Billion On Eid Day Due to Cellular Shut Down (23 August 2012)

[28] http://www.oecd.org/countries/egypt/theeconomicimpactofshuttingdownInternetandmobilephone servicesinegypt.htm

[29] Darrell M West, 2016, "Internet Shutdowns cost countries USD 2.4 billion last year", Centre for Technology Innovation at Brookings

[30] Deloitte, 2016, "The Economic Impact of disruptions to Internet Connectivity" A Report for Facebook

[31] Deloitte (2012a), "The Value of connectivity: economic and social benefits of expanding Internet access and Deloitte (2012b), "What is the impact of mobile telephony on economic growth?"

and social media shutdowns during the period 2015 to 2017 cost countries in Sub-Saharan Africa $237 million approximately. Available estimates for Internet shutdowns is summarised in Table 2.1 below

2.1 Econometric Framework and Estimates

As highlighted in the introduction, Internet shutdowns in India have increased exponentially over the last few years. From three reported shutdowns in 2012, the number increased to 70 in 2017. The duration of shutdowns increased from a total of 9 in 2012 to 8141

hours in 2017. Based on carefully assembled data from different sources, we find that the frequency and duration of shutdowns between 2012 and 2017 are concentrated in certain regions (shown in Tables 2.2 and 2.3 below). As is evident, Jammu & Kashmir has seen a disproportionate number of shutdowns followed by Rajasthan, Haryana and Gujarat. Data on hours of shutdown across states shows that there is no simple relationship between number of shutdowns and duration, implying the incidence of very long duration shutdowns as in the case of Nagaland and West Bengal. In general, mobile networks have been shut down for longer than fixed line Internet.

Table 2.1: Estimates for the Economic Impact of Internet Shutdown

Study	Country	Duration in Days	Number of Instances	Economic Impact Estimate
OECD (2011)	Egypt	5	1	Direct costs of a minimum USD 90 million (On a yearly scale 3-4% of GDP)
Brookings (2016)	India, Iraq , Syria (non-ISIS areas) Pakistan, Turkey, Bangladesh, Brazil, North Korea, Republic of Congo, Uganda, Vietnam, Algeria, Bahrain Chad, Ethiopia, Libya , Morocco, Saudi Arabia , Syria (ISIS areas)	753	81	Total: USD 2.43 billion India: USD 968 million for 70.54 days of shutdown
Deloitte (2016)	Based on data for 96 countries	Not Applicable	Not Applicable	• Highly Internet connected country: Per day impact of USD 23.6 million per 10 million population • Medium connectivity country: Per day impact of USD 6.6 million per 10 million population • Low connectivity country: Per day impact of USD $0.6 million per 10 million population
CIPESA (2017)	Cameroon, DR Congo, Ethiopia, Gabon. Gambia, Niger, Republic of Congo, Togo	176	Not Available	USD 218 million (estimate only for total Internet shutdowns)

Source: Compiled by author

Table 2.2: Instances of Internet shutdowns by state

	2012		2013		2014		2015		2016		2017		Total
	Mobile	Mobile and Fixed Line	Mobile	Mobile and Fixed Line	Mobile	Mobile and Fixed Line	Mobile	Mobile and Fixed Line	Mobile	Mobile and Fixed Line	Mobile	Mobile and Fixed Line	
Arunachal Pradesh									1				1
Bihar										3	2		5
Chandigarh											1		1
Gujarat					1		6		2		1		10
Haryana									4		6	2	12
Jammu and Kashmir	2	1	4	1	4	1	3	2	8	2	23	9	60
Jharkhand									1				1
Madhya Pradesh											1		1
Maharashtra									1		1		2
Manipur								1		1			2
Meghalaya								1					1
Nagaland								1				2	3
Odisha												2	2
Punjab											1		1
Rajasthan								1	4	2	7	3	17
Telangana												2	2
Tripura												2	2
Uttar Pradesh										2	2		4
West Bengal											2	1	3
Total	2	1	4	1	5	1	9	6	21	10	47	23	130

Source: Compiled from Internet Shutdown Tracker, SFLC and other media reports

Table 2.3: Duration of Internet shutdowns by state

states/year	2012		2013		2014		2015		2016		2017		Total Duration (in hours)
	Mobile	Mobile and Fixed Line	Mobile	Mobile and Fixed Line	Mobile	Mobile and Fixed Line	Mobile	Mobile and Fixed Line	Mobile	Mobile and Fixed Line	Mobile	Mobile and Fixed Line	
Arunachal Pradesh									48				48
Bihar										312	420		732
Chandigarh											72		72
Gujarat					72		528		28		96		724
Haryana									84		322	153	559
Jammu and Kashmir	4	5	336	24	42		9	106	5352	240	1428	230	7776
Jharkhand									24				24
Madhya Pradesh											96		96
Maharashtra									48				48
Manipur								168		288			456
Meghalaya								24					24
Nagaland								48				1224	1272
Odisha												96	96
Punjab											72		72
Rajasthan								24	120	120	474	216	954
Telangana												144	144
Tripura												110	110
Uttar Pradesh										120	372		492
West Bengal											2496	120	2616
Total Duration	4	5	336	24	114		537	370	5704	1080	5848	2293	16315

Source: Compiled from Internet Shutdown Tracker, SFLC and other media reports

We estimate the economic impact of shutdowns using a familiar methodology[32] that uses the impact elasticities for mobile and total Internet usage to derive the estimated losses. We first estimate these using an instrumental variable regression. The geographical diversity of India means that inter-state variations can be modeled to arrive at growth elasticities. The results show that a 10% increase in India's mobile traffic will deliver on average a 1.6% increase in India's GDP per capita and a 10% increase in India's total Internet traffic will deliver on average a 3.1% increase in India's GDP per capita. Details of the econometric model including data sources are provided in Box 2.1

Box 2.1: Model Specification, Assumptions and Data Sources

$\text{Log GDP\_PC}_{it} = \alpha + \beta\text{Log (K/L)}_{it} + v\text{Log (MobileInternetTraffic)}_{it} + D_i + \mathcal{E}$ (i)

$\text{Log GDP\_PC}_{it} = \alpha + \beta\text{Log (K/L)}_{it} + v\text{Log (TotalInternetTraffic)}_{it} + D_i + \mathcal{E}$ (ii)

Where *i* goes across 19 telecom circles of India and *t* runs from 2012-13 to 2016-17

In equation (i),

Log GDP_PC_{it} is the logarithmic value of nominal state domestic product per capita in rupees lakhs (using the 2011-12 base) for the ith circle in year *t*. Data for this variable has been extracted from the State Series data of the National Accounts (CSO)[2].

Log (K/L)_{it} is the logarithmic value of capital intensity as measured by Net Investments (Net of investments in telecommunication) in rupees lakhs for the ith circle in year t divided by Total Persons Engaged in the ith state in year t. Data on Net Investments has been estimated by subtracting investments in telecom from total gross capital formation in the country and distributed across states using the proportion of factories as distributed across states. Data on Net Investments is extracted from the National Accounts Statistics (CSO) and on number of factories from the Annual Survey of Industries[1]. Labour is measured using data on state-wise higher education enrollment[3].

$\text{Log (MobileInternetTraffic)}_{it}$ is the logarithmic value of mobile Internet traffic in petabytes per month for the ith circle in year t. In the absence of circle level data, mobile Internet traffic for India has been distributed using the proportion of adjusted gross revenue accruing to each circle. CISCO VNI made data on total Internet traffic in India available and data on adjusted gross revenue was extracted from TRAI's Financial Reports.

D_i are 19 telecom circle dummies

α and $\mathcal{E}$ are the Constant and Error terms respectively

Data for 2016-17 has been extrapolated where necessary. The logarithmic value of the number of Base Transceiver Stations (BTSs) is used as an instrument. Data on number of BTSs has been extracted from Lok Sabha starred questions and also extrapolated where necessary. The data for 2013 and 2014 are March figures, however for 2015 and 2016 they are for September and January respectively.

In equation (ii),

All variables remain the same, except $\text{Log (TotalInternetTraffic)}_{it}$ which is the logarithmic value of total Internet traffic in petabytes per month for the *ith* circle in year *t*. Similar to the method in equation(i) national level data has been distributed by state

Note 1: Telecom data for Mumbai and Kolkata have been added to Maharashtra and West Bengal respectively. UP East and UP West have combined to represent a single circle

Note 2: State data has been aggregated to represent circles

Note 3: State data has been aggregated to represent circles

Since we use a log- log model the estimated coefficients will be elasticities

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[32] Darrell M West, 2016, "Internet Shutdowns cost countries USD 2.4 billion last year", Centre for Technology Innovation at Brookings

Results of the model are provided in Appendix I. The elasticities are then applied to the hours lost in a specific region due to a shutdown to arrive at the resultant economic harm. Each shutdown reported in India since 2012 has been tabulated with details on region, duration and network disrupted (mobile / mobile and fixed line). A two-step procedure is used to determine the economic harm caused as a result of the shutdown. In step 1 we estimate traffic impacted by the shutdown and in step 2 we estimate the economic cost of the traffic impacted using measured elasticities . Our top line results are:

- 16,315 hours of Internet shutdown in India cost the economy approximately $3.04 billion during the period 2012 to 2017

- 12,615 hours of mobile Internet shutdown in India cost the economy approximately $2.37 billion during the period 2012 to 2017

- 3,700 hours of mobile and fixed line Internet shutdowns in India cost the economy approximately $678.4 million during the period 2012 to 2017

How much does an hour of internet shutdown cost the economy? Results naturally vary by geography of

shutdown, the intensity of economic activity over the internet and by the total duration of the blackout. One of the few examples of a country wide shutdown in Egypt which is estimated to have cost the economy US$ 750,000 per hour in 2011 (OECD, 2011). Similarly, an hourly estimate for social network shutdown in Brazil was US $ 966,985 (estimated from Brookings, 2016). Other geographically targeted shutdowns are clearly less harmful. For example, hourly estimates for Internet shutdowns in Kenya and Ethiopia are US $ 263,196 and US $ 145,823 respectively (estimated from CIPESA, 2017). Our average estimate of hourly loss for India over the various shutdowns during 2012-2017 is US $ 186,332.

The state-wise list of economic impacts for mobile only and mobile plus fixed line shutdowns are reported in Table 2.4. The total number of shutdowns in Table 2.4 is higher than that in Table 2.2, as some instances of shutdowns in Kashmir and Haryana have been separated to account for differences in location of shutdowns across network types during the same instance of a shutdown. Economic impacts for 19 instances could not be computed due to missing information either on duration or location of shutdown. 17 of these instances were in the state of Jammu & Kashmir.

Table 2.4: State-wise Estimates of Economic Costs on Account of Ordered Internet Shutdowns

Year	State	Network Type	Number of Shutdowns	Total Number of Hours	Economic Impact (USD million)
2017	Chandigarh	Mobile	1	72	4.31
2014	Gujarat	Mobile	1	72	18.64
2015	Gujarat	Mobile	6	528	1129.6
2016	Gujarat	Mobile	2	28	20.6
2017	Gujarat	Mobile	1	96	8.7
2016	Haryana	Mobile	4	84	21.93
2017	Haryana	Mobile	6	322	332.17
2012	Jammu & Kashmir	Mobile	2	4	0.85
2013	Jammu & Kashmir	Mobile	4	336	165.57
2014	Jammu & Kashmir (Note 1)	Mobile	4	42	Could not be estimated
2015	Jammu & Kashmir (Note 2)	Mobile	3	9	1.46

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[33]   See Appendix II for a detailed flow chart of a sample calculation

Year	State	Network Type	Number of Shutdowns	Total Number of Hours	Economic Impact (USD million)
2016	Jammu & Kashmir (Note 3)	Mobile	9	5352	30.2
2017	Jammu & Kashmir (Note 4)	Mobile	24	1428	223.03
2016	Jharkhand	Mobile	1	24	0.78
2017	Madhya Pradesh	Mobile	1	96	33.26
2016	North East	Mobile	1	48	0.27
2017	Punjab	Mobile	1	72	Could not be estimated
2016	Rajasthan	Mobile	4	120	9.68
2017	Rajasthan	Mobile	7	474	80.24
2017	Telangana	Mobile	1	72	7.72
2017	Uttar Pradesh	Mobile	2	372	29.9
2017	West Bengal	Mobile	1	2496	181.34
2017	Bihar	Mobile	4	420	51.91
2016	Maharashtra	Mobile	1	48	13.63
2017	Maharashtra	Mobile	1	Not reported	Could not be estimated
2016	Bihar	Mobile and Fixed Line	3	312	42.04
2017	Haryana	Mobile and Fixed Line	2	153	75.12
2012	Jammu & Kashmir	Mobile and Fixed Line	1	5	2.82
2013	Jammu & Kashmir	Mobile and Fixed Line	1	24	8.55
2014	Jammu & Kashmir	Mobile and Fixed Line	1	Not reported	Could not be estimated
2015	Jammu & Kashmir	Mobile and Fixed Line	2	106	66.32
2016	Jammu & Kashmir	Mobile and Fixed Line	2	240	68.06
2017	Jammu & Kashmir (Note 5)	Mobile and Fixed Line	10	230	43.38
2015	North East	Mobile and Fixed Line	3	240	38.68
2016	North East	Mobile and Fixed Line	1	288	18
2017	North East	Mobile and Fixed Line	4	1334	91.82
2017	Odisha	Mobile and Fixed Line	2	96	8.01
2015	Rajasthan	Mobile and Fixed Line	1	24	3.44
2016	Rajasthan	Mobile and Fixed Line	2	120	18.06
2017	Rajasthan	Mobile and Fixed Line	3	216	71.52
2017	Telangana	Mobile and Fixed Line	1	72	13.85
2016	Uttar Pradesh	Mobile and Fixed Line	2	120	23.1
2017	West Bengal	Mobile and Fixed Line	1	120	85.65
	Overall Total of which:		**134**	**16315**	**3044.21**
	Mobile Total		**92**	**12615**	**2365.79**
	Mobile and Fixed Line Total		**42**	**3700**	**678.42**

Note 1: Number of hours not reported for 3 shutdowns and location not specified for 1 shutdown

Note 2: Reported based on data for 2 shutdowns

Note 3: Reported based on data for 5 shutdowns

Note 4: Reported based on data for 23 shutdowns

Note 5: Reported based on data for7 shutdowns

Some instances of shutdown that stand out in terms of their economic impact are the Internet shutdowns of Gujarat in 2015. In one particular shutdown incident, the entire state of Gujarat that includes the bustling metropolitan area of Ahmedabad was shut down for close to 10 days. This cost the state close to 0.8% of their annual State GDP. However, over the years, Gujarat has seen a reduction in number of shutdowns with only one in 2017. The extended period of shutdowns in Kashmir since 2016 and in West Bengal in 2017, have resulted in significant impacts. Interruptions that occur repetitively or last for longer durations magnify the GDP impacts as they increase uncertainty in the business environment and often influence service providers to rethink business models and investments in network infrastructure. User industries need to adapt their models and look for expensive alternatives while qualitatively there is erosion of investor confidence and enhanced reputational risk. We discuss the qualitative impacts in the following chapter. It is worth underlining that other than Ahmedabad, Jaipur and Surat, none of the other larger cities in India have witnessed a shutdown. Table 2.5 lists the top 10 cities in India in terms of their City GDP, and highlights the ones that have been impacted by ordered shutdowns (Jaipur doesn't figure in the list of top 10 cities by City GDP).

Empirically we observe that cities with well-developed and deep rooted digital architectures have not witnessed shutdowns despite law and order situations. The disproportionate impact of a shutdown in cities with high levels of digital activity is perhaps one reason, besides the fact that such cities may have other means to address the law and order problem. Using the Deloitte definitions for level of Internet connectivity, and assuming that Ahmedabad and Jaipur fall in the cohort of cities with high levels of Internet connectivity, the per day

Table 2.5: Top 10 cities by GDP and Impact of Internet shutdowns

City	City GDP (in USD Billion)	Number of shutdowns	Hours of shutdown	Impact of shutdowns (in USD million)	Estimate (as % of City GDP)
Mumbai	310	0	0	0	0
Delhi	293.6	0	0	0	0
Kolkata	150.1	0	0	0	0
Bengaluru	110	0	0	0	0
Chennai	78.6	0	0	0	0
Hyderabad	75.2	0	0	0	0
Pune	69	0	0	0	0
Ahmedabad	68	3	264	152.58	0.2%
Surat	59.8	3	240	85.53	0.1%
Vishakhapatnam	43.5	0	0	0	0

Source: City GDP based on data from Brookings, Hours of shutdown from SLFC

Note: Shutdowns in Ahmedabad and Surat shown in the table occurred over a period of 2 years. Ahmedabad saw two shutdowns in 2015 and one in 2016 Surat saw two shutdowns in 2015 and one in 2016. The costs as a percentage of City GDP in the last column are a weighted average over the two years.

impact on City GDP is likely to be USD 18.8 million and USD 8.7 million respectively[34]. If the cities are assumed to fall within the medium connectivity cohort the corresponding loss estimates will be USD 5.3 million and USD 2.4 million per day[35]. Our estimates fall in between these two values - the proportionate per day loss is USD 14.5 million and USD 6 million for Ahmedabad and Jaipur respectively.

Nationally, a direct comparison with the Brookings study is not possible due to differences in coverage – both geographical and period. Their estimate for 70.54 days of shutdown cost India USD 968 million during 2015-16, while our numbers find that 679.8 days of shutdown cost India USD 3.04 billion during the period 2012 to 2017.

The economic impact of shutdowns is idiosyncratic not only to location, but also to familiarity with previous occurrences. Stakeholders affected by repeated shutdowns are likely to resort to alternatives – an after-effect that the econometric evidence cannot immediately capture. Happily, the case studies conducted during the field survey provide such evidence indicating that the statistical loss estimate presented above is best viewed as an upper bound and as an order of magnitude. The availability of such quantitative evidence, while not intended to drive decision making with respect to shutdowns, is relevant data in the hands of administrators ordering shutdowns. Estimates for impacts on business revenues and profitability due to shutdowns are shared in Chapter 3.

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[34] About 8 and 3.7 million people are estimated to be living in the Ahmedabad Metropolitan area and Jaipur respectively..http://worldpopulationreview.com/world-cities/ahmedabad-population/ and http://population.city/india/jaipur/
We use Deloitte estimates for impact on high and medium connectivity cities to arrive at proportionate impacts on GDP per day. For example, if Ahmedabad were to be have high level Internet connectivity, the estimated impact would be 80% of USD 23.6 million = USD 18.8 million per day. (80% is a population adjustment for the 8 million population of Ahmedabad since Deloitte estimates that for a highly connected country, 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)

[35] Deloitte impact estimates for countries with medium levels of Internet connectivity is USD 6.6 million per day per 10 million population

3. Insights from Field Research

Recent events, both within and outside India, establish that while Internet is a vast source of information it is also increasingly a source of disinformation. The boundary between what is legal and what is not, is blurring in the digital age making it ever so hard for law enforcement agencies to execute their mandate. The inability to prosecute perpetrators and the rising number of cyber abuse instances has interrupted digital progress. These broader challenges have driven states to respond with blanket bans on Internet use and/or network shutdowns to control immediate law and order situations. India has seen a large number of shutdowns over the last few years and mostly concentrated in certain states. However, from being long-lasting, these shutdowns are now implemented for a finite duration and hyper-localised, often ordered only around a single mobile tower[36]. Shutdowns, by the admission of administrators, are often an outcome of weaknesses in the law enforcement network around an occurrence, but in some cases, have also been employed as a pre-emptive measure to nip potential security concerns in the bud. A case in point was the 72-hour shutdown in parts of Haryana and Punjab ahead of the court verdict on the accused Dera Sacha Sauda head, Gurmeet Ram Rahim Singh. The shutdown in Darjeeling notched up over a landmark 100 days amid fears of agitation from the separatist group, - Gorkha Janmukti Morcha. Intermittent shutdowns in Rajasthan, Bihar, Odisha and Jharkhand were all grounded in concerns over "public emergency' or "public safety". In December 2017, Internet services were temporarily disrupted in the Adilabad district of Telangana as a precautionary measure, in the wake of clashes between Adivasis and Lambadas, and to curb the rumours being spread on social networking sites.

By limiting channels of communication between citizens and businesses, any Internet shutdown surely comes at a cost. The previous chapter estimated economic costs of shutdowns using macroeconomic data and an econometric model with standard approximations

and assumptions. Such quantitative methods and the corresponding estimates offer a measurable reference but cannot capture the complete impact of shutdowns, especially that which does not find expression in a pecuniary measure. In order to better understand the implications of Internet shutdowns, interaction with stakeholders formed an important part of the study since the experiences of businesses and individuals during a shutdown help provide intelligence and form to the quantitative loss estimated above. Ubiquity of the Internet has made it indispensable for personal communication and an efficacy enhancing tool for businesses. Several chat applications such as WhatsApp have become communication lifelines for Indians cutting across demographics. The Internet is also a primary driver of entrepreneurship among the youth, who run online shops, deliver services and innovate over the Internet. There is also visible uptake of digital payment options including mobile wallets. In the aftermath of demonetisation, even kirana shops and temples in urban areas started accepting payments (donation) via mobile wallets. The Internet has undoubtedly become crucial to our daily lives, and the impact of its sudden withdrawal is what we are attempting to capture.

In this chapter, we present narratives from stakeholder interactions across some States that faced Internet shutdowns in India. There is immense value in engaging with affected citizens and to understand the character of their responses. In places like Jammu and Kashmir and Darjeeling, lifestyles and livelihoods were altered due to prolonged shutdowns. The general unrest combined with absence of communication channels led to accounts of adaptation and resilience that we capture through stories of ordinary citizens and businesses to complete the graphic of the shutdown. The case studies have been carefully selected from across affected states and through them; we depict not only economic losses on account of shutdowns, but some social aspects as well. We also present opinions of administrators on reasons that

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[36]   Based on inputs from stakeholders

warranted the shutdown and whether there could be alternatives. The opinions naturally vary by stakeholders and by region. The set of respondents embody the varying voices within the sample of stakeholders. Table 3.1 below provides a framework for our stakeholder interactions. We covered 7 of the 18 states (excluding Chandigarh) that experienced the shutdown.

The stakeholder groups are broadly divided into government, business and society.

Government stakeholders include administrators and users of Internet. Administrators are those that order and implement a shutdown, while users are government departments running for example e-government services. While the revealed preference of administrators is in favour of a shutdown, our interactions indicate otherwise. Some administrators highlighted the compelling circumstances that necessitated the decision. In the Government user category, we have responses only from West Bengal, interaction with other states proving elusive.

The second category includes businesses across a variety of sectors. The focus of the conversation with businesses was obviously on the reported economic losses, but several distinctive anecdotes on coping adorn the narrative. While respondents were frequently prone to conflating the stifling repercussions of a measure such as a curfew, with an Internet shutdown, some offered insights of their dependence on the Internet and the losses that accrue in its absence.

Table 3.1: Framework for Selection of Stakeholder Interactions

State	Stakeholders					
	Government		Business	Society		
	Administrator	User		Press/Media	Social Institutions	Individuals
Bihar	√	×	√	√	√	×
Gujarat	√	×	√	×	√	√
Haryana	√	×	×	×	×	×
Jharkhand	√	×	√	×	√	×
Kashmir	√	×	√	√	√	√
Rajasthan	√	×	√	√	×	×
West Bengal	√	√	√	√	√	×
Uttar Pradesh	×	×	×	×	×	×
Madhya Pradesh	×	×	×	×	×	×
Telangana	×	×	×	×	×	×
Punjab	×	×	×	×	×	×
Odisha	×	×	×	×	×	×
Maharashtra	×	×	×	×	×	×
North East including Nagaland, Manipur, Arunachal Pradesh, Meghalaya and Tripura	×	×	×	×	×	×

Note: √ implies stakeholder consulted in the category, × implies stakeholder not consulted in the category

The third category, society, is divided into three sub-categories, namely press/media, social institutions and individuals. The distinction is made primarily because perceptions and experiences of stakeholders differ by sub-category. While social institutions such as schools, colleges and educational institutions are relatively homogenous in their views, the opinions of the media vary significantly by state and their professional role. Stories of individuals were captured only for Gujarat and Jammu & Kashmir. These provide profound insights of the dependence the Internet has spawned and also the manner in which it is manifested. In order to evaluate the economic losses objectively, a conscious attempt has been made to separate the political and social from the commercial as well as the opinion of individuals from the pure enterprise related impacts.

Several important issues were raised during the stakeholder consultations that spread over a period of three months from end 2017 to early 2018. During the course of discussions, stakeholders also offered what they felt were solutions to minimise the impact of shutdowns. We report our findings through three broad themes given below:

I. **Causes and Characteristics of Internet Shutdowns** - This section identifies the different circumstances under which Internet shutdowns are implemented. It presents the varying points of view among stakeholders on the necessity of shutdowns and whether they achieve their stated objective. We also look at the duration and frequency of shutdowns to understand the potential impact they are likely to have on businesses and individuals.

II. **Impact of Internet Shutdowns** - This section is central to the study. Since impacts are heterogeneous, we distinguish between networks (fixed versus mobile), between sectors of the economy, and whether shutdowns are lengthy or brief. We are careful not to conflate impacts of the Internet blackout with general law and order situations.

III. **Alternatives to Internet Shutdowns** - In this section we explore how shutdowns are increasingly being used as an instrument for tackling law and order

situations, the concerns surrounding it and what alternatives can be developed to address these concerns.

For ease of readability, we arrange the discussion of survey findings by themes. This allows us to bring together all ideas related to an issue under one heading and enables a better understanding. However, details of each case study are presented in Appendix IV. The case studies have been divided into two broad categories - government and non-government. Each government case study includes a discussion on - (i) causes for shutdown including instances of rumour mongering, mass mobilisation, communal violence, etc., (ii) process of implementation, highlighting the decision-making process, ordering the shutdown, choice of network, communication with public, etc., and (iii) challenges faced and policy recommendations.

For the Non-Government case studies, the discussion is divided into (i) background of stakeholders - distinguishing between businesses, individuals, and media etc., (ii) Internet usage and dependence underscoring their need for Internet and categorizing them into partially dependent or completely dependent, (iii) impact of the shutdown through qualitative discussions and some quantitative estimates, and (iv) challenges and recommendations.

In the following subsections we develop the thematic discussion from the field survey

3.1 Causes and Characteristics of Internet Shutdowns

3.1.1 Causes of Shutdowns

India reported the highest number of Internet shutdowns in 2017. Our field interactions find that several shutdowns were driven by rumour-mongering on social media that eventually led to public unrest, and sometimes to violent protests etc. The larger objective cited by most administrators is the need to protect national security and lives of ordinary civilians in such circumstances. Administrators admitted the difficulty to keep order when provocative videos and photos were shared on social

media. The justification of preemptive shutdowns was in anticipation of a law and order situation that could quickly go out of hand.

One can debate the necessity of shutdowns particularly the preemptive kind. Although there is no robust documented evidence of the relationship between shutdowns and loss of life and property, administrators shared anecdotally how shutdowns helped control spread of violence and civilian clashes. In the case of Jharkhand particularly, a comparison of two neighbouring areas facing similar issues found that one where a shutdown was imposed was able to restore normalcy within 24 hours versus 72 hours in the other location, including loss of life and property. However, this outcome is not true for other shutdowns. For example, in Jammu and Kashmir, some shutdowns were reported to have a counterproductive effect. People found alternate ways to access the Internet, navigating through systemic loopholes and circumventing the law. In Gujarat as well, the Patidar agitation continued to pick momentum, despite the mobile Internet shutdown as it also did in the preemptive shutdown in Haryana. There are several instances of Internet shutdowns not having been able to prevent mass mobilisation and civil unrest. It is both difficult and beyond the scope of this study to make a blanket assessment on the effectiveness of Internet shutdowns in addressing the concerns of the government. While some argue that it didn't prevent the disturbance to public order, others argue that it may have mitigated the potential for further damage. This warrants an impact analysis for each shutdown to ensure stated objectives of the order are met.

3.1.2 General Characteristics of Shutdowns

In most cases the choice of shutdown is between shutting down access to mobile or both mobile and fixed line networks[37]. Another aspect of ordering shutdowns is the reliance on field staff for reporting law and order situations. It was observed by administrators that

in some situations better reconnaissance of ground realities would improve decision making i.e. reduce the possibility of type II errors. Moreover, the geographical coverage of a shutdown is region specific. For example, in Kashmir, administrators reported that where mobility was restricted by craggy terrain, even shutdowns surrounding a tower were effective in meeting the objectives whereas in smoother topographies, shutdowns need to be widespread to prevent escalation of violence to neighbouring areas.

In several cases the decision to extend or call off a shutdown was taken based on changing ground situations and was not necessarily specified at the time of ordering the shutdown. Such reassessments become necessary, especially in instances of long lasting shutdowns. Shutdown orders were officially communicated to telecom operators a day after the fact. Public notifications were few and far between, even in cases where they lasted for long durations. Interactions with businesses and individuals reveal that in the absence of public communication, such instances were treated as network failure and resources were disproportionately wasted in trying to identify reasons for the unavailability of Internet services. These impacts have been captured in the next subsection. Stakeholders reported a period of 2-6 hours of uncertainty, which could be easily avoided if communications were organised either through telcos or other broadcasting media.

The frequency of shutdowns in a region naturally depends on the overall socio-political climate. This is evident from the numerous shutdowns in Jammu and Kashmir compared to the rest of the country. However, not all politically volatile situations need a shutdown. One administrator admitted that ordering a shutdown is often an easy measure, not only to control a law and order situation but for the optics. From being the last resort, it has gradually become a quick option even in situations where Internet use would have little impact on the outcome.

3.2 Impact of Internet Shutdowns

3.2.1 Impact by Sector

In each of the seven surveyed states impacts of shutdowns are varied. Telecom companies have suffered because of underutilised capacity; an estimate from a telecom operator in Kashmir[38] suggests that while average data consumption per user is about 1 GB per day, periods of intermittent shutdown bring down the average usage by 30-40 percent. Since the impact on telecom companies is obvious, we focus on explaining the impact of shutdowns on other Internet dependent sectors of the economy. Figure 3.1 provides a pictorial impact of Internet shutdowns by sector. In the continuum from low to high, the Internet dependent sectors such as E-commerce suffer more than say education and health care in the event of a blackout.

Tourism

Tourism is one sector that showed high impact. States with significant dependence on tourism such as Kashmir, Darjeeling and Rajasthan saw tourism related businesses suffer major losses. In Kashmir, the instability and the consequential problems have affected the tourism sector in general. Internet shutdowns have aggravated the challenges by limiting communications between businesses and their customers. The range of impact within the same state can be understood when considering horticulture, another major sector
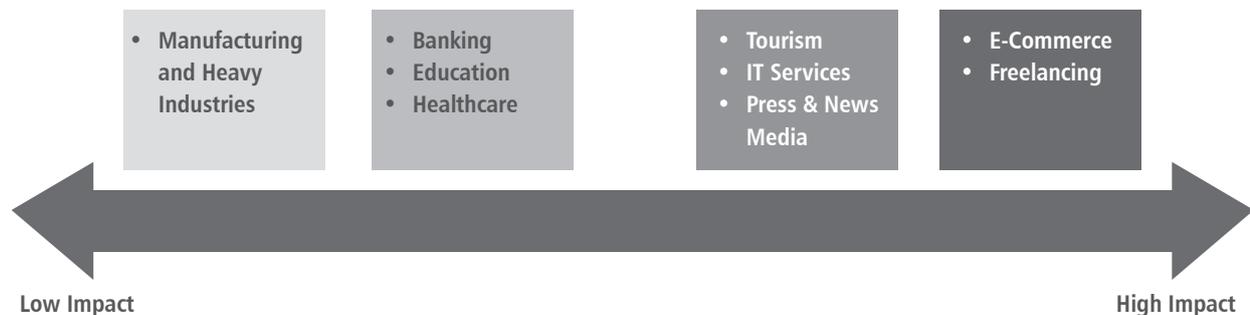
in Kashmir's economy. While, horticulture and tourism together may be considered to form the backbone of the state's economy, unlike tourism, horticulture was barely affected by Internet shutdowns as the operations in that sector are almost entirely offline. Many tourism related businesses in Kashmir rely on the Internet for promotion of their services, and attempt to boost their business during tourist seasons. Reduced Internet connectivity and intermittent shutdowns have made Internet-dependent business models extremely unreliable. This has greatly affected not only basic operations but also growth and expansion plans of companies. Similarly, the tourism sector in Darjeeling was severely affected. Hotels and tourism services in Darjeeling lost out on account of the strike during the agitation, which was amplified by the Internet shutdown. Customers who had booked in advance could not connect with the hotels even to modify or cancel their bookings. Where the online platforms allowed for cancellations, the hotel could not

"

Our reputation was severely damaged as we could not refund the money for booking cancellations. Customers posted nasty reviews online as they considered the hotel to be fraudulent.

HOTEL OWNER, DARJEELING, WEST BENGAL

Figure 3.1: Level of Impact Across Sectors of the Economy

- Manufacturing and Heavy Industries
- Banking
- Education
- Healthcare
- Tourism
- IT Services
- Press & News Media
- E-Commerce
- Freelancing

Low Impact   High Impact

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[38] Based on stakeholder interactions

reimburse advance payments due to the lack of Internet connectivity. This not only affected their immediate business but came with huge reputational costs as dissatisfied customers wrote scathing reviews on these businesses on public forums.

With prolonged shutdowns some businesses moved to managing their businesses via telephone. However, a major portion of booking activity continued to be online. In Darjeeling, one stakeholder noted that offline bookings are a thing of the past, and all bookings at his hotel over the past few years have been completely online. While the public order situation and political climate affected the tourism sector irrespective of Internet shutdowns, businesses received a heavier blow when the lack of Internet affected reputation and customer relations. This impact was felt even long after Internet connections were restored.

Even for small businesses that offer services such as packages for sightseeing, car rentals, etc, an Internet shutdown affects their outreach, perhaps disproportionately. Lack of Internet connectivity affects the ability of tourists to discover services and businesses in a region through apps such as Google Maps, TripAdvisor etc. This is an impact that escapes most narratives, but was highlighted by a reputed trader of spices and dry fruits in Srinagar, whose annual revenue depends on sales to tourists.

Additionally, it also worth noting that tourism gets impacted even when the Internet shutdown is in the neighbouring area. A tourism company that operated desert safaris and paying guest services in Rajasthan's Bikaner district was affected and lost out on business due to shutdowns in the neighbouring districts of Nagaur and Churu.

Information Technology Companies

Dependence on the Internet for IT companies is obvious and therefore a drastic impact on their business was expected. The lack of official notification or certainty about when connectivity is restored amplifies the challenge that IT companies face in the event of an Internet shutdown. For an IT and data analytics company in Rajasthan, it took nearly half a day to realize that it was not a technical network failure at their end but an

Internet shutdown ordered by the state. Their project deliverables were thrown off track with their international clients having difficulty in understanding the reason for the 'blackout', clearly being unused to it themselves. . Additional costs were incurred as employees who use dongles and mobile connections to work from home, had to commute to office premises. The impact was more severe for IT companies in Kashmir that experience prolonged shutdowns. Most IT companies in Srinagar were forced to relocate to Jammu and some even shifted base overseas. Several companies had to invest in dedicated leased lines. Local small-scale Internet service providers seem to have grown their business during these phases.

In contrast to these experiences, an app development company in Ahmedabad (Gujarat) reported no losses during the shutdown as only mobile Internet was disrupted, but broadband was functional. The only part of their work that is dependent particularly on mobile Internet is the testing of location-based apps. The disadvantage was that those without broadband connections at home had to work from their office premises during the shutdown.

E-commerce

The cornerstone of the e-commerce industry is reliable Internet at both ends - demand and supply. Our field research covered various types of small scale e-commerce businesses. First, those businesses which are primarily reliant on the Internet i.e. most of their business is generated online. Second, those companies those are partially online and/or are selling on marketplace e-commerce platforms. Both categories suffered due to blackouts. A trader of spices and dry fruits in Kashmir stated that orders via Amazon where he was listed as a seller, were delayed, impacting his ability to adhere to timely delivery. This adversely affected his ratings on the platform, and also risked violating the terms and conditions to sell on the platform. To protect his online businesses from collapsing, he decided to travel to parts of the state with Internet connectivity and manage with the help of additional human resources. The trader also delayed the launch of his independent online portal due to frequent shutdowns in 2016.

> "
>
> I had to roll back my plans to expand online and my business suffered significantly because of the shutdown
>
> TRADER, SRINAGAR,
> KASHMIR

For businesses that are primarily Internet based, the impact is naturally more severe as a significant part of their revenue stream is generated online. An e-commerce apparel company in Jaipur was significantly affected not only in terms of receiving its orders and sales but also in collaborating with vendors and logistics partners who helped with design and delivery of orders. WhatsApp is often used as a medium for communication between designers, vendors and customers, especially when it comes to approving samples. Similarly, an online fashion jewellery retailer lost nearly 50% of its business during the shutdown, including an impact on its digital marketing efforts.

Press and News Media

The impact of Internet shutdowns on journalists and the news media is enormous -affecting both the medium of consumption and dissemination. In our field research it emerged that freelance journalists were more affected by the shutdowns than regular staffed journalists. A freelance journalist based in Srinagar struggled to deliver his articles during the period of Internet shutdowns. He had to send his articles through multiple text messages and sometimes ended up dictating text over the phone.

> "
>
> I would spend hours sending SMSes or dictate them over the phone to file my story
>
> JOURNALIST, SRINAGAR,
> JAMMU AND KASHMIR

> "
>
> We were cut-off from the rest of the world. News was neither going out nor coming in. We were left in the dark. If there is one benefit from the internet shutdown, it was that we realised the value of the internet and became aware of its utility to the people
>
> JOURNALIST, DARJEELING,
> WEST BENGAL

Freelance journalists were particularly affected since receiving payments became a problem due to disruptions in net banking facilities. In the case of journalists employed by newspapers or news agencies, the Internet shutdown disrupted their work, rather than income but more importantly affected efficiency. In the case of Bihar, journalists in Kishanganj travelled to the neighbouring state of West Bengal, where Internet connectivity was available to file their stories. For some the Internet has become a source for news, and a platform to publish opinions. Shutting down the Internet restricted access to information and the ability of some to express themselves.

Professionals and Freelancers

Freelancers, entrepreneurs and independent professionals like doctors and lawyers were particularly affected by the shutdowns. Entrepreneurial activities have not gained momentum in Kashmir owing to the frequent shutdowns. Young Kashmiris educated outside the state returned with ideas for new startups and opened cafes – the appeal of which lay primarily in the provision of free and unlimited Wi-Fi to their customers. However, prolonged shutdowns forced some to close shop due to lack of business. Most businesses have a substantial part of their operations dependent on the Internet, especially for startups. A lawyer in Ahmedabad reported that his clients were unable to pay him. As SMS services were also blocked, OTPs could not be received on mobiles and online transactions could not be fulfilled. According to him, many of his other colleagues also faced similar problems. Some worked from office premises for want of fixed-line broadband connections at home.

Education

Internet shutdowns impacted educational institutions

as well. Students from states like Kashmir and Gujarat reported inability to register for exams and access study material on the Internet. Particularly in Kashmir, even when students had broadband connections at home, speeds were abysmally low either due to throttling or generally poor quality of Internet connectivity. A school in Kashmir reported that they were unable to upload study material online because of poor connectivity. Online material is often a substitute when classes are suspended due to curfews. The shutdown also prevented schools from coordinating with other franchise branches in the country for updates. The biggest cost for some schools was printing hard copies of question papers since they could not be accessed online. For a school in Jharkhand, which had recently migrated to an online fee payment system, the Internet shutdown resulted in chaos as parents were unable to pay fees online. However, they highlighted that the poor network quality in general hindered the smooth functioning of these systems and exacerbated the trust deficit between parents and the school administration.

Healthcare

The healthcare sector in India is getting increasingly digitized. Hospital records and various medical schemes are maintained online. The operation of these schemes and updating details were affected during shutdowns. Doctors often rely on the Internet to consult colleagues on certain issues, and patients also share records with doctors online, particularly while seeking a second opinion. For sensitive areas like Kashmir, due to the political turmoil, mental health problems like Post Traumatic Stress Disorder (PTSD) are widespread, especially, among the youth. While there are online counseling platforms, many cannot function due to frequent shutdowns.

Digital Payments

The adoption of cashless transactions using debit and credit cards at a Point of Sale (POS) machine predates modern payment methods. The recent policy thrust towards digital wallets especially post demonetization in November 2016 had to contend with poor broadband connectivity even when available, and a cultural affinity for cash transactions. Our stakeholder

interactions, however points to the increase in usage of POS machines, particularly in regions dependent on tourism. POS machines rely on Internet connectivity to process transactions. Following demonetization, there was a significant fillip towards cashless transactions, and many businesses saw customers adopting these. Where the shutdown was restricted to mobile Internet, businesses moved to fixed line. Some businesses noted that 60-70% of payments made by customers are via POS machines, and not being able to serve them affected their businesses severely.

Apart from these sectors, small businesses, local shops, schools, hospitals and numerous other sectors felt significant impacts. The banking sector was one not significantly affected by Internet shutdowns since they are secured by private leased line connections for their functioning. Features such as net banking and mobile banking apps are affected but is still a fraction of their banking business. This is also true for manufacturing firms. Quantitative estimates from some businesses impacted by the shutdown are available in Appendix III.

3.2.2 Effects of Location and Spread of Shutdown

The location and spread of shutdowns are a crucial determinant of impacts. Internet shutdowns have been common place in states like Kashmir but have grown rapidly in number and spread to other states in the country. Some states have chosen to move towards more targeted shutdowns such as Kashmir. Others such as Gujarat have seen a reduction in Internet shutdowns over time, while Jharkhand has not had an Internet shutdown after a single instance of a 24-hour shutdown in 2016. To minimise impacts, shutdowns are increasingly localised, although blanket shutdowns are not completely abandoned. The West Bengal shutdown was prolonged and widespread. It did not comprise just the city of Darjeeling, but also adjoining areas of Siliguri and Kurseong, thus affecting a large area. There has been evidence on impacts of a shutdown spilling over to businesses in adjoining areas.

Difference in geography and terrain also impact the effectiveness of an Internet shutdown. Administrators

noted that protest mobilization in places like Darjeeling was hard in the absence of the Internet, but not as much in Haryana because other modes of communication were available.

Additionally, areas with poor quality of connectivity barely felt any additional impact due to an Internet shutdown. This was true in places like Jharkhand, because poor quality Internet services rendered a shutdown indistinguishable from absence of service network. On the other hand, shutdowns around urban areas with larger number of Internet dependent businesses felt significant impacts.

3.2.3 Impact of Mobile versus Fixed Line or Both

Although reasons behind Internet shutdowns are varied, it was observed that mobile networks were shut down more frequently than fixed line. (For details on which networks were shut down by state please refer to Table 2 in Chapter 2.) Administrators indicated that mobile networks were more impacted primarily because they are more widely accessible, and therefore potential for damage is higher. Only in very serious cases of agitation did administrators also shut down the fixed-line network. Impacts naturally vary depending on which network is shutdown. Estimates by CISCO VNI suggest, that while mobile traffic in India is rising faster than fixed traffic, it currently comprises only 22.9% of the total Internet traffic in India[39].

Unique to Gujarat was a forced shift towards fixed line connections, when mobile Internet was frequently shut down in 2015. Telecom companies marketed fixed line connections and fresh investments were announced by them to roll out broadband services in different cities of Gujarat. Data from TRAI shows that in Gujarat, fixed-line broadband penetration increased from 6.89 million in March 2015 to 18.46 million in March 2017. Consequently, impact in Gujarat was muted. Students and young researchers in Gujarat even expressed support for such measures and believed that it helped

in controlling the adverse law and order situations. Moreover, those who had broadband connections at home were able to overcome the constraints of a mobile blackout, given that the curfew in any case restricted movement. The field findings contrast with the high impacts measured in the macro-economic model. We have already acknowledged that the estimates are likely to provide upper bound estimates of economic loss.

3.2.4 Impact of One-off versus Long Lasting Shutdowns

In States like Jharkhand, which saw a single shutdown of 24 hours in 2016, most stakeholders barely remembered the event and conflated it with general issues of poor connectivity. In cases of short term Internet shutdowns, the impact is short lived, but its intensity could be higher. In long duration shutdowns, people eventually adapt to living without the Internet or find alternatives. In the case of Darjeeling, people thronged a location which received network from a neighbouring area. Every day, several people came to the spot with their devices to connect to the Internet. States like Kashmir that have seen most shutdowns have reengineered businesses to reduce dependence on the Internet. However, our interactions with individuals in Kashmir, find that prolonged shutdowns affected people's access to social media and other communication networks resulting in social confinement and frustration which often led to issues related to mental health. Internet is the primary source of information, entertainment and communication in Kashmir.

3.2.5 Impact on Government Functions

Government services and public infrastructure such as railways were just as affected by Internet shutdowns, as other stakeholders. Several examples from Darjeeling show how traffic had drastically reduced for railway tickets which were largely made online. According to transport officials in Darjeeling, there was a decline in movement of passengers and a corresponding decline in revenues as well. In addition, postal services and

39   https://www.cisco.com/c/m/en_us/solutions/service-provider/vni-forecast-highlights.html#

transactions related to post office savings schemes were also disrupted.

The suspension of Internet services in Telangana also affected its otherwise strong e-governance services[40]. This was especially true for students who had applied for caste certificates, and other online applications by citizens for payment of bills and fines. Common Service Centres could not function and civilians, who used CSCs for banking services, were also unable to use these services. In some cases, modifications on Aadhaar card applications could not be processed. These are all examples of government activities being disrupted because of Internet shutdowns.

In Kashmir a common complaint of businesses after implementation of GST was their inability to file taxes online due to frequent Internet shutdowns in the state. This not only signals a problem for businesses, but an impact on the government revenues as tax payments get delayed. This was common to businesses in Darjeeling as well.

In adverse law and order situations, shutting down the Internet has also prevented administrators from securing instantaneous and updated information about troublemakers. . In such instances they have often relied on a civilian line of reporting as was highlighted by government officials from both Haryana and Gujarat. An administrator from Gujarat suggested that during the shutdown, they relied on informal sources of information from Anganwadi workers and others employed under government schemes, who conveyed important information from the sites of protest through plain ordinary telephone services (POTS) and / or other channels of communication. In Haryana, a government official insisted that gathering inputs from civilian intelligence would improve decision-making during such crises. Law enforcement officers across states admitted that Internet shutdowns affect them as well. However, it might be less limiting than that for businesses and other individuals as BSNL operations are treated as an exception in several cases of shutdown, which most

officers subscribe to.

3.2.6 Magnitude of Impact conflated by general law and order situations

While varied narratives exist on the impact of Internet shutdowns, it remains difficult to isolate the effects of the shutdown from the effects of measures such as a curfew that is imposed because of an existing law and order situation. While this was a problem in most states we surveyed, it held particularly true for Kashmir and for Darjeeling, owing to their long standing instability. In our experience, often, shutdowns were accompanied by curfews that limited physical movement of people. Therefore, in such cases, it becomes impossible for people to find alternatives to manage their business. Many reported the inability to work from home.

In the case of Kashmir, long standing political and security issues have already handicapped several institutions and businesses. For example, one of the primary reasons behind schools and colleges remaining closed for prolonged periods of time is the political turmoil. After Burhan Wani's death in 2016, schools were shut for almost six to seven months and a major factor was the violence and stone pelting on the streets that made it challenging for both teachers and students to reach school. While an Internet shutdown certainly exacerbates problems as students are unable to access study material and assignments online, it would be an exaggeration to lay the blame for disruptions in education in Kashmir at the altar of an Internet blackout.

3.3 Alternatives to Internet Shutdowns

With the increasing number of Internet shutdowns every year, it is evident that it has become a popular instrument of the state. We have already discussed how some officers increasingly view it as a first option. It is the considered view of some officers that there is no alternative to an Internet shutdown in extreme law and order situations, although quick and efficient deployment

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40   http://www.thehindu.com/todays-paper/tp-national/tp-telangana/no-Internet-no-transactions/article21996080.ece

of police forces could obviate the need for a shutdown in others, including those that are ordered as a preemptive measure. Timely action is thus decisive and involves planning and developing a containment strategy by law enforcement. The adequate deployment of police personnel is sometimes a challenge given the limited strength in a specific area. Accompanying this with counter-speech and other educative campaigns to curtail the effect of provocative rumours, could be explored as alternatives.

In cases where the shutdown is to prevent escalation of a crisis, the challenge is to first, identify the source and thereafter restrict or eliminate the circulation of inflammatory messages. The alternatives to shutting down the Internet in this context would be to invest in better cyber forensics capabilities, and educative campaigns that target the spread of disinformation.

Social media platforms and instant messaging applications are most often targeted as responsible for the spread of provocative and malicious messages that result in law and order situations. However, many stakeholders have noted that such situations arose even in the absence of social media and instant messaging,

while acknowledging that it did accelerate the spread of messages. Some stakeholders have also noted that these platforms must not be seen only as part of the problem but also part of the solution. We received mixed responses to whether law enforcement agencies can effectively use counter-speech. Particularly in cases of civil unrest where the agitation is against the state, law enforcement is seen as an agent of the state and counter-speech in such situations may not prove to be effective. However, some believe that more effective public communication during law and order disturbances have not been adequately explored. Working with Internet companies to use these platforms and messaging services to communicate better with the public could help law enforcement agencies arrive at better solutions to handle such crises.

Several issues highlighted and discussed in this chapter point towards the immense challenge facing us today. Just as shutdowns and their impacts vary in characteristics and magnitude so will solutions to limit their incidence and spread. In the concluding remarks we offer some policy direction on how the problem could be addressed. These suggestions flow from our analyses in Chapters 2 and 3.

4. Conclusions and Recommendations

The study establishes that Internet shutdowns are a policy concern. The central objective of the study is to arrive at estimates of economic loss due to Internet blackouts in India during 2012-2017. This we do using standard econometric methods. And follow it up with an extensive field survey to complement the econometric results to capture where possible the nuances of the impact on different stakeholders.

The results from our macroeconomic estimates reveal that 16315 hours of Internet shutdowns over the period of 2012 to 2017 cost the Indian economy nearly $3.04 billion. This figure must be seen as an upper bound of the negative economic impact. A case in point is Gujarat where the estimated loss of the shutdowns as presented by the econometric model appears higher since users of mobile Internet very quickly shifted to fixed line connections. The field survey also revealed heterogeneity in impact and sentiments by location. For example, Jammu and Kashmir can be singled out as unique with respect to its law and order situation and the overall impact it has on the state's economy.

Moreover, data on Internet shutdowns in India clearly shows a trend towards shutdowns in smaller cities and towns that are relatively less dependent on the Internet as compared to other urban agglomerations. Except for Ahmedabad, Surat and Jaipur, most districts and towns that saw an Internet shutdown during 2012-17 were not within the top ranked cities by GDP. A caveat however is in order. The empirical evidence on growth dividends finds higher growth coefficients for Internet and broadband in developing versus developed countries[41]. Extending the same result to India, the economic loss to regions which witness frequent shutdowns, mostly small towns and rural districts, could mean relatively higher proportion of loss, if digital use were to proliferate in these regions as envisaged under the Digital India program.

The field survey also captures varying level of impacts on different sectors of the economy. Using responses from a field survey, we find that businesses such as e-commerce are significantly affected during shutdowns as it renders the business dysfunctional. Online freelancers who operate out of small towns are also severely impacted by a shutdown. Banking is shielded as their operations run on private leased lines not interrupted by the shutdown of the public Internet. At best, small volumes of online banking transactions get affected. Other sectors that depend on the Internet are tourism, IT services and the news media industry. We find that the impacts of shutdowns are regressive, i.e., they impact smaller businesses relatively more than larger businesses that quickly find alternatives given their resources at hand.

The objective of the study is not to pronounce on the efficacy of a state decision on an Internet blackout, rather to estimate the economic costs associated with the event. An extension of the result is that given the trajectory of digitization of businesses and services, the magnitudes of such impacts will necessarily increase in the future. Policy makers would be well advised to consider these costs in the final decision on a shutdown. Some recommendations for future thinking on Internet shutdowns are discussed below:

1. Building a Civilian Line of Reporting: The Internet Shutdown Rules introduced by the Department of Telecommunications in August 2017 attempted to allay concerns of arbitrary calls for Internet shutdowns by any officer of the state. However, our conversation with government administrative stakeholders revealed that often in a law and order situation, they relied solely on the inputs of an officer on the ground and this did not always present a complete and/or accurate picture. Administrators in such circumstances often use informal communication channels to seek help with

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41 Qiang et al, 2009, "Economic Impacts of Broadband", http://siteresources.worldbank.org/EXTIC4D/Resources/IC4D_Broadband_35_50.pdf

information on ground realities. It was recommended that building a civilian line of reporting within the administration in addition to inputs from police/ law enforcement personnel, would provide the much-needed multidimensional perspective before a decision to shut down is taken.

2. Curbing Disproportionate Internet Shutdowns: As evidenced in our research, blanket and prolonged shutdowns are a disproportionate response- -instead restricting the Internet shutdown to specific geographies is technically feasible. This has been seen in states like Kashmir, where shutdowns have been executed purely in the specific range of a communications tower in an affected area.

3. Providing Official Notification or Communication of Internet Shutdowns: An official notification about the shutdown is rarely provided. Stakeholders are thus caught unaware. They end up spending time and resources in trying to resolve the issue assuming it is a technical failure at their end, or contact the service provider. This is especially true of states that generally have poor connectivity. The uncertainty surrounding an Internet shutdown deeply affects businesses and peoples' lives. Timely notification or announcement of an Internet shutdown would alleviate at least some of the hardships faced by stakeholders. It thus becomes the responsibility of the state administration to ensure transparency regarding its actions to the public, taking cognizance of the ramifications of such a measure.

4. Documenting Internet Shutdowns: Currently apart from crowd sourced data maintained by civil society organizations and media reports, there is no public record or documentation of Internet shutdowns across the country. While the new rules prescribe internal communications and review, there is no mechanism for maintaining a public record of Internet shutdowns that is aimed at improving accountability of the state apparatus that is ordering it. One of the primary challenges of this study was in sourcing accurate data on Internet shutdowns. The practice of documenting shutdowns may also be accompanied by a cost-benefit analysis, i.e. its ability

to achieve the stated objective and the collateral damage to the economy, simply as a data producing exercise.

5. Building Corporate Accountability: While the government may have limitations in collecting and sharing data, it is important to note that there is currently no mechanism that holds service providers accountable for the same. Under licensing conditions, service providers are required to comply with government requests for shutdowns. However, basis our interactions we find the predominance of informal channels over authorized official orders. Given the sensitive nature of the subject, service providers have rarely raised this issue in public. One approach would be for telecommunications companies and Internet service providers to develop disclosure policies on the number of orders received, orders complied with, procedures, etc. This would work positively for both companies and their customers while improving investor confidence. An example is the Ranking Digital Rights (RDR) Corporate Accountability Index. The non-profit research initiative developed within the Open Technology Institute of New America Foundation evaluates the commitment of ICT companies to freedom of expression and privacy. However, they have reported little success from operators in India.

6. Improving Connectivity and Providing Alternatives: The impact of Internet shutdowns is felt more significantly by smaller businesses as they rarely have resources to invest in alternatives. Infrastructure availability must be aligned to the needs of a region, such that shutdowns do not handicap businesses. Where mobile networks are shutdown frequently, investments in fixed line connectivity could be considered. Other physical infrastructure may be improved to compensate for loss of communication through the Internet. Moreover, as always, most of these regions would benefit from overall improved network connectivity.

7. Using and Promoting Effective Counter-speech: Counter-speech is considered as a response strategy that has not been adequately explored in place of

an Internet shutdown. Since rumour-mongering is considered one of the primary reasons for a shutdown, effectively addressing the root of the problem with counter-speech narratives is important. Counter-speech aids in quelling panic in a frenzied public order situation. The success of counter-speech has been reported by administrators in states like Gujarat and Jharkhand.

8. Promoting educative campaigns on curbing hate speech, and inflammatory messages: Considering that a significant number of Internet shutdowns have been ordered to control the spread of inflammatory messages, hate speech and rumours, it is imperative that governments invest in educative campaigns promoting a behavioural change that restricts the creation and circulation of such material. Developing dedicated channels for the same could be potentially beneficial in simmering down the impact of rumour-mongering and spreading of fake news. Collaborating with Internet companies could be one of the options for the Government to address the rapid rise of cyber abuse.

9. Promoting Independent Fact Checking: While the state may invest in counter-speech and educative campaigns to curb hate speech, the importance of having independent fact checking and curbing the menace of fake news must be mentioned. There have been several instances where provocative messages with photos and videos were circulated to mobilize groups and upset the law and order of an area. Citizen driven fact checking initiatives have had some success in controlling the proliferation of fake news. While the challenges of fake news are much broader, a significant component of it remains a shared concern within the realm of material that creates law and order crises.

10. Sharing best practices and capacity building across states: While some states have turned to others in understanding the modalities of an Internet shutdown, others have mostly worked in isolation. Many states, when faced with an adverse law and order situation turn to Internet shutdowns as a first response. Sharing best practices in controlling law and order situations with due cost-benefit analysis of measures would create a more predictable environment. This would help stakeholders prepare better. It is important to highlight that close cooperation between states on developing solutions, may very well be futile without the contribution of service providers and Internet companies that can work together to build creative solutions that address the root of the problem. There should be increased focus on improving cyber forensics capacity of law enforcement agencies to discourage abuse of the Internet. In this case, infrastructure for identification, arrest and legal proceedings might act as deterrents.

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Other sources

- Access Now
- Cisco VNI data
- Media Nama
- OECD
- SFLC Internet Shutdown Tracker
- Statista

Appendix I:

Regression Results for Mobile Internet Traffic and Total Internet Traffic

	Mobile Internet	Total Internet
Log(Capital/ Labour)	.2 (3.04)	.15 (3.24)
Log(Mobile Internet Traffic)	0.16 (30.95)	
Log(Total Internet Traffic)		0.31 (26.47)
Constant	10.8 (54.17)	10.1 (66.88)
The double log specification implies that the coefficients are elasticities (Numbers in parentheses are t-statistics, denoting significance of over 95% for each variable)		
Fixed effects	Yes	Yes
R-squared (within)	0.94	0.95
R-squared (between)	0.23	0.1
R-squared (overall)	0.28	.16
Number of observation	95	95
VIF (Test for multicollinearity)	0.93	8.95
Heteroskedasticity	No (Reported Standard errors are bootstrapped)	No (Reported Standard errors are bootstrapped)

Appendix II:

A Sample Computation of How the Loss has been Calculated in the Study

The first step is to estimate the traffic impacted by a given shutdown. For instance, there were 216 hours of mobile Internet shutdown in Ahmedabad in 2015. To derive traffic impacted we use the product of the following (i) Ahmedabad's population as a proportion of Gujarat using Census data (ii) duration of the shutdown in proportion to the year (365*24) (iii) total mobile Internet traffic for Gujarat in 2015. Since shutdowns are mostly ordered at the district level, and comparable district wise data is available from census 2011, we use that data to calculate the population proportions affected by the shutdown. The reported duration of shutdowns are available in hours and converted to proportions in the calculation represented in equation I:

Traffic impacted$_t$ = Traffic for the circle$_t$ * Population Proportion * shutdown proportion (annualized)… (I)

The traffic impacted is converted to a percentage amount and subsequently multiplied by circle GDP of the previous period and by the estimated mobile/total Internet elasticity to arrive at the economic cost of the shutdown. Continuing with the example for Ahmedabad, the economic cost of the shutdown is measured by percentage loss in Internet traffic multiplied by State GDP of Gujarat in the previous period and mobile Internet elasticity. The calculation is represented below in (II)

Economic Impact of a shutdown$_t$ = GDP$_{t-1}$ * % Loss in Traffic * Network elasticity (mobile/ total Internet)… (II)

The three key assumptions in this method are

(i)   At the margin, the impact elasticities of total Internet and mobile Internet are uniform whether measuring economic benefits or economic losses

(ii)   Internet usage is distributed evenly by population i.e. higher population implies higher usage

(iii)   Internet traffic is distributed evenly by population across the State

Appendix III:

Quantitative Estimates of Economic Losses

State	Category of Stakeholder	Type of Stakeholder	Total Estimated Economic Loss
Rajasthan	Non-Government (Business)	Ladies apparel e-commerce company	Rs. 3,00,000
	Non-Government (Business)	Fashion jewellery retailer	Loss was estimated to 3% of monthly revenues
	Non-Government (Business)	Tourism Service Company	Rs. 15,000 over 2 days
West Bengal	Non-Government (Business)	Restaurant	Rs 27000 per day
	Non-Government (Business)	Tours and Travels Agency	80% of their business was affected
	Non-Government (Business)	Tea Estates	Darjeeling has 87 tea estates and another 10-12 allied estates that were affected and the estimated losses were Rs. 300 crore at the beginning of the shutdown taking into account the next 3 months of the shutdown and notional profit
	Government (User)	Transport Official	Loss in the number of railway passengers - 3600 passengers could not travel during the one month and 20,800 passengers could not travel during the 3 months of the shutdown
	Non-Government (Business)	Medical Shop	Lost 10-15 customers who used WhatsApp as a medium for placing orders for medicines
	Non-Government (Individual)	Journalist	Approximately Rs. 500 per day and Rs. 20,000 during the course of the shutdown
Jammu & Kashmir	Non-Government (Business)	Travel Company	There was potentially a loss of 500 tourists and Rs. 3 crore worth of business
	Non-Government (Business)	Telecom Service Provider	Average data consumption falls by 30-40%
	Non-Government (Business)	Small and Medium Enterprise	Loss - Rs. 30,000 per day from September 2016 to October 2016. They would make Rs. 5-10 lakh per month. They expected to earn Rs. 10 lakh through online sales but could realise only Rs. 7 lakh
	Non-Government (Business)	IT Company	Loss of revenues was 50%
	Non-Government (Business)	BPO	Rs. 30-40 crores
	Non-Government (Business)	Cellular Operators	Rs. 150 crores
	Non-Government (Business)	Industry Associate/Business person	Average daily sales value is Rs. 30,000-60,000. Card transactions are 60-70%. Card transactions were affected
	Non-Government (Business)	Telecom Companies	Daily loss of Rs. 2 crore
	Non-Government (Business)	School	Cost incurred for printing question papers as they could not be accessed online was Rs. 62,500. Due to excessive printing, a photocopy machine worth Rs. 1,50,000 became dysfunctional
Gujarat	Non-Government (Social Institutions/Business)	Bank Employees' Association	Rs. 1000 crore
	Non-Government (Individual)	Lawyer	Could not receive payment for 2-4 cases worth Rs. 75,000 on average
Jharkhand	Non-Government (Business)	Steel Plant	Costs incurred were time costs as tenders got delayed and additional time had to be spent for completing the tendering process

Source: Compiled from field research

Appendix IV: Stakeholder Consultations

The broad classification in the framework as government, business and society has been organized under government and non-government stakeholders. Non-government stakeholders include business and society stakeholder groups. While consultations with stakeholders involved free-flowing conversation, for the purposes of streamlining, each individual stakeholder's input has been divided into background, Internet dependence, impact of shutdown, and challenges and/or recommendations if stakeholder has provided any. For government stakeholders who administer or enforce the shutdown, the discussion is divided into cause, process and challenges and/or recommendations if the officer has provided any.

1. Rajasthan

1.1 Non-Government

1.1.1 IT Company

Background: The company is an IT services and data analytics firm based out of Jaipur and has been delivering to clients primarily in the US for the past 10 years. These clients belong often to the automobile sector and marketing research organisations. The company focuses on analysis of raw data using plug and play solutions. The company mostly employs software engineers and recently a few statisticians. It works on a 24 X 7 model – employees are given the flexibility to work from home, especially in the case of women employees.

Internet dependence: Skype and Google Hangout are used for interactions with clients. Email and Slack are the other official channels of communication within the organisation. The company uses a leased line connection from Tata, and a back-up connection from Reliance. Most leased line connections in Jaipur promise a down time of a maximum of 30 mins (99 percent no down time) - this is standard across all service providers. Senior management is provided with dongles to work from home. The business model is heavily reliant on the Internet for smooth functioning.

Impact of shutdown: The company did not receive any official communication regarding the shutdown. It took the employees almost half a day to figure out that network issues were on account of a shutdown and not because of a service provider/ infrastructure related problem. The employees working from home had to work from office instead. The delivery of one project was thrown off track. This was for a client based in London – and the managers found it difficult to explain the circumstances to clients who are not affected by similar shutdowns in their country. The company already received complaints from their clients on the quality of connectivity and inefficiencies; delays on account of Internet shutdowns further affected the firm's reputation.

The company said that if the practice of shutdowns becomes more common, the company would have to rethink its work from home model, upgrade its office infrastructure and incur higher employee costs to limit the impact of shutdowns on business processes and delivery.

Challenges and/or recommendations: Quality of regular mobile and broadband connections in the city is poor. If the quality of these connections is improved, the company can encourage the work from home model. While they are not opposed to shutdowns in case of public emergencies and other law and order situations, the government must work towards minimising its impact by better targeting (restricting the shutdown to affected areas) and otherwise better communication, at least to corporate that are likely to get affected by a shutdown.

1.1.2 E-commerce Company

Background: The e-commerce company is one of the oldest e-commerce companies in Jaipur that sells ladies apparel, mostly in-house production, on its web portal, with limited add-ons/ accessories manufactured in the state. The company had empanelled with 28-30 other e-commerce platforms before it started its standalone portal in 2012. This included e-commerce companies like Craftsville, Snap Deal and Amazon.The best business years for the company were between 2012 and 2015.

The share of online to offline retail was 70:30; the company would ship out close to 100 packets a day, even abroad to countries such as the United States and Singapore.

For the last two years the offline channel is working better than then online portal – this is more to do with a lack of focus from management rather than market conditions. However, the company is committed to resurrecting its online platform and develops an omni-channel presence in the industry. The online retail market is getting over-crowded, which means more investment is needed in online businesses. The online format receives more orders from Tier 2 and Tier 3 cities, as compared to Tier 1 cities. The company thinks that fast fashion brands in India can no longer survive without a digital channel.

Internet dependence: Except for core production the company relies on the Internet for most business functions - designing, collaborating with vendors, sales, logistics, etc. WhatsApp is very useful for business – most clients approve samples over WhatsApp; broadcast groups on WhatsApp are used even for their offline store to advertise designs, offers etc. The company works on a leased-line Internet connection.

Impact of shutdown: Business was affected as co-ordination with people on the field came to an absolute standstill. This included their vendors, printers, dyers, etc. who are not a part of their office network. It significantly slowed down businesses as all co-ordination now shifted to voice calls. There was no e-commerce for three days. The logistics partner was not able to process any order. The management estimated the business loss to about Rs. 3 lakh, including both online and offline channels.

Challenges and/or recommendations: News of the shutdown was broadcast on TV channels a couple of hours after the shutdown, without any clear communication on its duration. The owner of the company stated that shutdowns might be necessary in some situations, but it seems unnecessary in others.

1.1.3 Fashion Jewellery Retailer

Background: The company started off as an online fashion jewellery platform in Bangalore. Recently it moved its headquarters to Jaipur since most of their suppliers belonged to Rajasthan and because the city is logistically more efficient. The company is now operating through an omni-channel model, with 250 retail stores across the country. Fifty percent of the sales come through the online platform. The annual revenue of the company ranges between Rs. 50 to Rs. 150 crore.

Internet dependence: Internet has become a necessity. "Shutting down the Internet is like shutting down water supply". The company's operations are on the Amazon cloud, the entire ERP system runs on a cloud service that connects various business locations of the country. The company has multiple leased line connections to allow smooth functioning of the Internet. However, employees on the field use mobile phones and dongles to login to cloud services. WhatsApp now works as an official communication channel for people within the organisation.

Impact of shutdown: The online business was significantly affected during the shutdown. It took employees about 1.5 hours to figure out that the network disruption was on account of a shutdown and not a glitch at the service provider's end. Orders were processed with significant delays. Since order data is fed into the cloud, the company used resources from offices outside Jaipur to help complete order processing as a work around during the shutdown. People on-the-go could not log in to the cloud. The digital marketing efforts of the company were seriously affected. Marketing requires employees to work on social media sites such as Facebook and Google Adwords through the day, which was interrupted by the shutdown. The owner estimated the total loss to business including impact on online orders at 3 percent of their monthly revenue.

Challenges and/or recommendations: The government should work towards selective shutdown to minimise the impact on businesses.

1.1.4 Tourism Service Company

Background: The company has been organising Safaris and providing paying guest service in Bikaner. They receive on an average approximately 20-30 clients per day.

Internet dependence: The company primarily uses emails to receive bookings and communicate with foreign tourists.

Impact of shutdown: Although the Internet shutdown did not take place in Bikaner, the shutdown in Nagaur district (Ajmer division) and Churu district (Bikaner Division) affected their business. The company lost Rs. 15,000 in the two days of shutdown as they couldn't receive bookings and were not able to communicate with the tourists who were attempting to book or had already made bookings.

1.1.5 News Agency

Background: The person is a journalist working with a television news agency. He said that a recent shutdown in Rajsamand near Udaipur was ordered to stop rumours from spreading to adjoining areas that might be communally sensitive and result in clashes and unrest.

Internet dependence: The agency work is extremely dependent on the Internet. However, with leased-line connections, work was not significantly hampered during the shutdown. He added that BSNL's Internet services were available.

Impact of shutdown: He mentioned that his efficiency was affected as the work had to be now delivered sitting in office using a dedicated connection that was not impacted by the shutdown. The Internet connection at home and his mobile Internet was inaccessible, and therefore he could not work from home. While some business managed to get a BSNL broadband connection for work, others suffered losses.

Challenges and/or recommendations: According to him, the spread of rumours could be controlled as Facebook and WhatsApp were not accessible during shutdowns.

1.2 Government

1.2.1 Administrative official

Cause: Internet shutdowns are ordered in case of extreme law and order situations.

Process: The department relies on feedback from officers on the ground. The review committee meets as per the

new guidelines on temporary shutdowns issued by the Department of Telecommunications (DoT) to assess its impact. Divisional Commissioners are best placed for this exercise with maximum amount of detail on the event.

Challenges and/or recommendations: At the moment there is no fresh thinking on how to minimize the impact of Internet shutdowns in the state. The administration is hoping for a technology breakthrough that allows targeted shutting down – either for specific areas or specific apps that can be implemented well. There is also no co-operation or co-ordination with other states on best practices.

2. West Bengal

2.1 Non-Government

2.1.1 Hotel-A

Background: The hotel in Darjeeling was established in the year 1897, and has 11 rooms and 11 staff members. The room tariffs are generally around 5000 INR per night inclusive of breakfast. The annual turnover of the hotel is approximately Rs. 40-50 lakh.

Internet dependence: The business of the hotel is largely dependent on tourists and about 90 to 95 percent of the bookings are made online.

Impact of shutdown: There was no prior notification or official communication regarding shutdowns. Advance bookings and payments made before the shutdown could not be cancelled or returned. The reputation of the hotel was affected as customers posted nasty reviews on travel websites such as Trip Advisor. These customers considered the hotel to be swindling customers and declared it a fraud establishment, since no responses were received from the hotel nor were refunds processed.

Challenges and/or recommendations: For returning advances, the owner of the hotel had to travel to the neighbouring city of Siliguri. The hotel employees were mostly unpaid during the 105 days of shutdowns. Employees were paid by cash after withdrawing from the bank branch in Siliguri. ATMs were mostly shut during the curfew and would quickly run out of cash once open.

Even though the situation in Darjeeling has returned back to being normal, the hotel is still struggling to regain its earlier sales peak in the tourist season. In an effort to recover their customer base, they are offering steep discounts to attract tourists by slashing room tariffs by almost 50 percent to Rs. 2000 -2500 per night.

2.1.2 Restaurant A

Background: The restaurant is amongst the most reputed in Darjeeling, having completed 100 years since it was established during the British rule in India. The annual turnover is nearly Rs. 1-1.5 crore a year and it employs 26 staff members, with an average salary of Rs.8000-9000 per month.

Internet dependence: About 25 percent of the restaurant business is dependent on tourists and 75 percent is dependent on locals. 10 percent of their transactions are through debit/ credit cards.

Impact of shutdown: The shutdown had impacted the routine transactions and operations of the restaurant. Even during a curfew there are transactions and operations that must be completed to maintain an establishment, these include paying the staff, maintaining equipment and communications with vendors and suppliers, and payment of taxes.

Challenges and/or recommendations: For making payments to their employees during the shutdown period, the owner had to travel to Siliguri and withdraw cash from the bank. A late-fee was imposed as VAT payments couldn't be paid online and were delayed. Also the Provident Fund contribution for employees was not regularly paid as a result of the Internet shutdown. It was paid only after 4 months after the Internet connection was restored and the shutdown was called off.

2.1.3 Restaurant-B

Background: The restaurant is a prominent landmark in Darjeeling and exists since the British colonial days. There is free wifi available in the restaurant and it also has a dedicated section for Internet access. There are six PCs, all providing broadband Internet connectivity. The rates are also quite reasonable and at par with other Internet cafes in Darjeeling.

Internet dependence: The restaurant uses point of sale (PoS) machines for 10-15 percent of their payment transactions. Payments to vendors, suppliers and staffs are done online. Their annual turnover last year was 10 crore and they pay 14-15 lakhs to a total of 120 employees. The online marketing of the restaurant is through Facebook and Instagram and they spend nearly USD 2000 annually on online marketing.

Impact of shutdown: The online marketing of the restaurant was affected as the Internet was shut for nearly 105 days. While they don't currently have online store, it is planned, but was postponed due to the prolonged shutdown.

Challenges and/or recommendations: To get Internet access, people would gather at place named "Jio Dada" in Darjeeling where they could access Internet from the stray connectivity of a network in the neighbouring state of Sikkim. Payments to vendors and suppliers were delayed and they had to travel to Siliguri for conducting any online transactions.

2.1.4 Restaurant-C

Background: The restaurant is an establishment that is both a boutique outlet, and serves tea from their own tea estate, which is among the most reputed and prominent tea estates in the world. This outlet on an average generates Rs. 40,000 per day in revenue, while most of their online business is operated through the headquarters in Kolkata. On days of regular operation during the peak season, the outlet receives approximately 300 people every day. The average spend per person is approximately Rs. 300

Internet dependence: The restaurant uses a PoS machines for payment transactions. Approximately 30 percent payments are made through PoS machines. The establishment manages to coordinate supply and other operations via WhatsApp and email, particularly to send updated data, receipts and bills.

Impact of shutdown: The curfew affected daily business operations of the restaurant. The Internet shutdown exacerbated the situation. During the shutdown the restaurant shifted its operations to Siliguri.

2.1.5 Tourism Service Company

Background: The company is a tours and travels agency based in the town of Kurseong in Darjeeling district.

Internet dependence: About 70 to 80 percent of the bookings for accommodation and transportation are done online. They rely on the Internet for communications (primarily e-mails) and online transactions.

Impact of shutdown: The shutdown had impacted 80 percent of their business. The online booking for cabs almost came to a standstill, since transport services were already interrupted by the curfew. There was a massive decline in bookings for hotel rooms during the period.

Challenges and/or recommendations: During the shutdown phase, they shifted to Siliguri and started their operations from there. Despite the situation having returned to normal in Darjeeling, business is yet to revert to its previous peak.

2.1.6 Tea Estate

Background: This tea estate is amongst the oldest in Darjeeling. The tea gardens located close to Darjeeling are also accompanied by a processing unit and a museum with a boutique tea shop. The shutdown overlapped with off-season at the tea-estate and the processing unit was closed. The shop services were also closed down due to the strike called by the Gorkha Janmukti Morcha party. The operations were shut for over three months, i.e., the entire period of the Internet shutdown.

Internet dependence: The unit works uses the Enterprise Resource Planning (ERP) software that requires to be connected to the Internet to update the headquarters for release of payments and other transactions. The estate uses both fixed-line broadband and a mobile Airtel dongle.

Impact of shutdown: Payments were delayed because of shutdowns. Staff payments were not processed. Salaries to higher management were also delayed due to lack of communication. Bulk payments were made when Internet and operations resumed later. Generally, payments were made in cash to workers and in-person transactions at bank branches where required. Regular updates to the head office in Kolkata suffered delays. Documents were couriered from Sikkim or Siliguri. Electricity payments, PF

payments, tax payments and a slew of other payments could not be made, fines accrued on all the delayed payments.

Darjeeling has 87 tea estates and another 10-12 allied estates that were affected due to the shutdown. Some newspapers estimate the loss at 300 crore taking into account the affected operations over 3 months as well as the notional profit.

Challenges and/or recommendations: In his personal capacity, the stakeholder stated that there was a complete lack of access to information about the situation and news from around the neighbourhood or anywhere in the world. The inability to communicate with others via the usual Internet based applications was also a significant problem.

2.1.7 Transport Official 1

Background: The stakeholder is an official at one of the main stations on the Darjeeling Himalayan Railway. This heritage railway line is recognized as a UNESCO World Heritage Site.

Internet dependence: The station uses the Internet mainly for online bookings, sharing data, communications and correspondence through emails.

Impact of shutdown: The shutdown had adversely affected the online bookings, even though it was off-season for tourists. During peak season the transit services are availed by close to 400 passengers every day and it almost cut to off during off-season. During the curfew and Internet shutdown period, the state provided stranded visitors/ tourists, alternate arrangements to leave.

Personally, the official noted that online shopping was affected. There has been a recent uptake of e-commerce in Darjeeling on Homeshop18. Students were also affected as they couldn't register for their exam and make payments online.

2.1.8 Transport Official 2

Background: The stakeholder is an official at one of the main stations on the Darjeeling Himalayan Railway. This heritage railway line is recognized as a UNESCO World Heritage Site.

Internet dependence: All the railways bookings are done online and officials rely on the Internet for communications and correspondence.

Impact of shutdown: Approximately 200 passengers travel every day. The shutdown resulted in a 40 percent decline in movement of passengers.

2.1.9 Bank

Background: The bank is located in the town of Kurseong in Darjeeling district.

Internet Dependence: Approx 25 percent customers use Internet banking in Darjeeling.

Impact of shutdown: During the shutdown, leased line connections were functioning. However, most bank branches remain closed due to the curfew .The managers of several bank branches were deputed to neighbouring operational branches such as those in Siliguri. Personally, the representative highlighted that students were most affected as they couldn't make payments for college registrations and other admission applications that required online activity.

2.1.10 Hospital

Background: The hospital is a one of the primary medical care facilities in the region that also caters to people from the adjacent rural and remote areas.

Internet Dependence: Most of the hospital data including patient admissions, Outpatient Department (OPD) attendance, emergency attendance, number of patients, number of police cases, number of surgeries, number of deliveries etc. are shared and updated online with their head office. Orders from the government are received and responded to over the Internet. The hospital also has school health programs, vaccination programs, details of which are also updated online and supplies for the same are also coordinated online.

Impact of shutdown: The shutdown delayed the updating of data. Staff salaries were delayed by a month. As the patients couldn't apply online, doctors had to provide services only at OPD and emergency departments.

2.1.11 Medical Shops

Background: The stakeholders are a cluster of medical shops located in Darjeeling. Medical shops were among the only few establishments operating during the curfew, although only for a limited period of 4-5 hours in a day.

Internet Dependence: The medical shops used Internet to receive orders on WhatsApp for delivery of medicine.

Impact of shutdown: Before shutdowns, one of the medical shops had 10-15 customers who used WhatsApp to place orders. However during the shutdown, WhatsApp ordering was not available, inconveniencing several customers.

Challenges and/or recommendations: The impacts of the shutdown have had long lasting effects. For example, even after the shutdowns are over, people have not resumed ordering for medicines on WhatsApp or other online platforms.

2.1.12 Journalist

Background: The person is a journalist working with a newspaper agency. He stated that the Internet was shut the day after violence broke out between the police and protesters in Darjeeling to restrict coordination and crowd mobilization through Whatsapp. According to him intelligence networks of the state understood that mobiles were being used to rally people. The decision was made in Calcutta to shut down the Internet, and the district administration implemented it. The connection was resumed for a brief period but with poor speeds.

Internet Dependence: The agency work is entirely dependent on the Internet, particularly with regard to correspondence with information sources and colleagues, in addition to writing and submission of stories.

Impact of shutdown: According to him, journalists like him faced a loss of approximately Rs 500 per day. They earned approximately Rs 2000 per story and due to the Internet shutdown they couldn't work and lost nearly Rs.20,000 in a month. E-library resources for students and doctors were not accessible. Diesel run mobile towers ran out and call connectivity was hampered. Nepali and Sikkim SIMs were working briefly. Senior citizens had no entertainment without the Internet;

unlike the young folks they couldn't go anywhere. A lot of e-courses and skill development programs conducted online were also disrupted.

Challenges and/or recommendations: During the shutdown phase, the journalists travelled to Siliguri with "press" stickers on their vehicles to work. Occasionally some of them would connect via the spot of connectivity (Jio dada). Darjeeling was cut off from the rest of the country, and the world with no news on events available to people. He stated that, "The benefit of the shutdown was only one - we realized the value of the Internet and became aware of its utility to the people".

2.2 Government

2.2.1 Administrative Official

Cause: Provocative posts were being shared across social media including threats, morphed photographs, etc. Rumours stating that the police had murdered 22 people, and a 19-year-old student was missing were being circulated. These were going viral and playing with the sentiments of the people. Additionally, threats and slurs against government officials on social media were rampant. The Internet shutdown was effective in curbing further mobilization and rallying of protesters. It slowed down their coordination. This helped handling the mob during the shutdown called by the protestors. While over the 104 days of Internet shutdown, the accompanying strike/shutdown by the protesters continued but the violence had reduced.

Process: The Internet shutdown was ordered after violence had erupted between the protesters and the police force. She noted that the shutdowns were ordered in batches of few days - 3 days, 7 days etc. It was extended each time. The situation was difficult to control due to the limited resources and the limited capacity of armed/ police forces deployed in the remote areas of the district.

Challenges and/or recommendations: The officer highlighted that while there was a ban on transport, food and the daily lives of people were also affected. Ending the shutdown was not a priority given the damage caused by protesters The Internet shutdown was a

necessary step to prevent further mobilization of people from other parts of the district.

2.2.2 Post office

Background: The establishment is the main post office for the district.

Internet Dependence: All services at the post office are online; ranging from savings to insurance in addition to regular postal services. The post office receives close to 10-20 savings transactions per day. Each delivery is updated on the mobile network and online verifications of all deliveries are conducted at the end of the day.

Impact of shutdown: Some customers could not make their payments due to the prolonged shutdown. The grace period also lapsed for some, while others had to pay a fine. The postal services were also disrupted.

Challenges and/or recommendations: The updating process in remote areas is weak even without an Internet shutdown because the smaller post offices do not have proper Internet connections and rely on manual entries which are later updated online at the main GPO. Besides minimizing shutdown, there is a desperate need to improve the quality of network infrastructure in the district.

3. Haryana

3.1 Government

3.1.1 Administrative Official

Cause: Internet shutdowns become necessary to control law and order situations sometimes. Haryana has seen shutdowns ordered in anticipation of a public order crisis and also to prevent the escalation of an on-going law and order crisis.

Process: The orders are usually issued by the DGP and home secretary under Section 144 of CrPC. Under CRPC, the Additional District Magistrate also has concurrent powers. The officer stated that it is difficult to shutdown specific sites, hence a blanket shutdown is ordered. TERM cells take half an hour to shut down the Internet.

Under the new guidelines issued by DoT for Internet

shutdowns, both the IT Act and CrPC will exist and authorities can still use Section 144 of CrPC to order a shutdown. Under the new rules issued by DOT, only the home secretary can issue shutdown orders.

Challenges and/or recommendations: On localized shutdowns, he stated that the ease of implementing localized shutdowns depends on the geography and topography of that place. In Panchkula, the Internet shutdown was pre-emptive. However, people still traveled from afar – some walked from Punjab to Panchkula – and they could not be stopped. A lawyer in Panchkula also filed a PIL with regard to the protests on the streets. He said that the main issue was intercepting Whatsapp calls which are not traceable.

He emphasized on the role of constant monitoring and coordination for gathering better and more accurate information on the law and order situation. According to him, there should be a civilian line of reporting and that the civilian intelligence route should be opened and their views and inputs should be taken. This could lead to better and informed decisions.

4. Kashmir

4.1 Non-Government

4.1.1 Travel Agency

Background: The company is a travel agency operating in Srinagar. In addition to being a travel operator, the stakeholder also noted his other business ventures which include textile designing and craft, stores of which operate from cities like Delhi, Jaipur etc. According to him, diversification is necessary for survival since the tourism industry is deteriorating. The respondent's motive was to revive deluxe foreign tourism in Kashmir. A business that had just starting taking-off, quickly began to decline and almost completely died down after Burhan Wani's death and the consequent unrest in the valley in 2016. Foreigners and Indians visiting Kashmir didn't want to risk their lives, no matter how attractive the tour offers were.

Internet Dependence: The stakeholder's tourism business completely depended on the Internet. Since demand for

hotels and tourism is currently very low, it is possible to co-ordinate bookings over phone for now. He cited an example of a visiting Hyderabad based photographer, who sent several emails that could not be accessed due to the prolonged shutdown. When he finally visited with his family all communications happened over phone calls.

Impact of shutdowns: The unpredictable nature of the valley's political climate is the primary factor affecting tourism. There has been an impact on all hotel categories. He expected atleast 500 premium tourists in 2017, with a minimum business of 3 crores in revenue. If the business were to take off, tourism would have increased ten fold. The revenues had fallen close to zero because of the communal tension. Internet would have positively impacted growth, had businesses been running full capacity. There is a huge difference in the economic scenario pre and post June 2016. Online payments have been affected, but there are alternatives, all manageable since the demand is low.

People are switching jobs to other sectors. Only crafts are surviving as the cottage industry gets its salary from the government and are also not dependent on Internet services. Kashmir, in its present state is not conducive for investments. New ventures and start-ups like cafes also build in Internet availability at their outlet as a part of the business model. Some cafes offer free and unlimited wi-fi to customers - shutdowns affected their businesses. Such new ventures that came in 2016 have crashed. The success of these ventures could have potentially changed Kashmir's economic scenario. But most new businesses are based on the Internet. However, provocative pictures and videos posted on Facebook and WhatsApp do initiate crowd mobilization and rallies that result in communal unrest. Internet shutdowns in his opinion do check the overall law and order situation in the state.

Challenges and/or recommendations: The Internet could have boosted the economy by about 5 times. Google Maps doesn't work so much in Kashmir. There are no live traffic updates. Zomato is slowly building up in Kashmir. Travel e-commerce sites like Make My Trip would have also worked very well in Kashmir. There are some e-commerce start-ups such as Kashmir Crafts in Delhi and Kashmir Box in Bombay. However, none of

these are based in Kashmir. While sourcing is localized, the main operations are not based out of Srinagar to avoid disruptions in Internet services. Due to the unrest, educated Kashmiri youth with startup ideas (either Internet dependent or otherwise), do not want to set up businesses in Kashmir. People are moving out for a better future. There was a Swiggy like app called FoodCart in Kashmir that operated last year. However, app development and usage has declined as the generation of Kashmiris likely to have used these apps has left the state.

4.1.2 Telecom Service Provider

Background: One of the key telecom service providers in the region and country, with a growing customer base.

Process: Shutdowns are ordered mostly during militant encounters, in the expectation of rumor-mongering, clashes and mob rioting that may follow. At the time of our field visit, Internet was down in Avantipura and Tral (Pulwama). According to the operator, BSNL services are not shut down on most occasions (this was contradicted by some others in subsequent meetings. Some said that during an Internet shutdown, all networks would be down, including BSNL). BSNL lines are kept open because many public sector enterprises and government officials use BSNL connections. Recently, targeted shutdowns have been ordered almost every day in some part of the state or another. However, blanket shutdowns have decreased and shutdowns are ordered district wise or at the town/village level, sometimes localised at the tower-level. It is mostly the mobile networks that are shutdown while the fixed-line broadband is spared. Complete shutdowns of both fixed-line and mobile Internet happen on days like 15th August, 26th January and 8th July (recent case, Burhan Wani's death anniversary). These are planned shutdowns. However, in 90 percent of the cases, there are orders for an Internet shutdown on short notice and expect immediate compliance. Some cases are planned, however, 30 minutes are provided to the telcos to execute the shutdown. The new DoT guidelines provide more clarity on the rules of executing a shutdown. Usually the telcos get an SMS or an e-mail from a designated number of the state authority ordering the shutdown and formal orders follow later. The speed and targeted granularity of

an Internet shutdown depends entirely on how evolved the technology of the service providers is.

Orders for shutting down 2G/3G/4G, social networking sites etc. come from the home ministry. Resuming orders are also conveyed via SMS/e-mail communication and this is sent by the Inspector General (Police) as is the case when ordering the shutdown. The publically available records of Internet shutdowns are available with media companies such as Greater Kashmir.

Impact of shutdowns: Personally, the representative stated that the Internet shutdowns are effective and do help in preventing loss of civilian life. Internet usage in Kashmir is different from most other states. In the absence of other sources of leisure, Internet is more valuable to its users when compared to other states. A large percentage of the population uses mobile Internet. Mobile Internet usage has increased sharply after Jio. Lease line/broadband traffic is negligible as compared to mobile Internet. People in Kashmir sometimes consume 1 GB of data in a day. The average data consumption falls by 30-40% in case of shutdowns, thus impacting revenues of telcos and the consumer's ability to use the quantum of data purchased. For the consumer there is considerable wastage as they buy plans based on their requirements, but aren't able to use all of it if a shutdown is ordered. Subscriber behavior in Kashmir is different. In absence of other sources of entertainment or social engagement, data consumption is much higher than in other metropolitan cities. Hence, there is also scope for higher revenue, but due to shutdowns, these revenues are not being realised fully.

In 2016, the government tried censorship and website blocking - 22 sites (mostly social networking,) were ordered to be shut. People started using VPN connections; especially China based VPNs since these were mostly free. This eventually led to the conclusion that network shutdowns were the only option. Speed throttling is also prevalent now, when the administration wants to discourage use of picture and video uploads on social media, instead of a complete shutdown.

Internet shutdowns do not impact big businesses as they all operate on leased line connections which remain

uninterrupted during a shutdown. The financial impact of Internet shutdowns is felt by smaller businesses/ traders. Most businesses in Srinagar have now learnt to operate without the Internet and it works because the overall economic activity and demand for goods is poor. The frequent disruptions discourage investments across the board for all businesses and not only for telcos.

4.1.3 Small/Medium Enterprise (SME)

Background: This SME specializes in local produce like walnuts, almonds, saffron etc. This respondent firm also runs an online store (since February 2017), business on which comes to a complete standstill during shutdowns. The company has featured on international travel magazines like Conde Naste Traveller and TV shows like Fox Traveller.

Internet dependence: The enterprise has online stores that deliver all across India and also rely on the Internet for payments via PoS machines

Impact of shutdown: The products sold online are temperature sensitive and perishable, thus if sales and delivery of products don't happen on time, it affects the quality of products. Their revenue loss has been in lakhs of rupees. To cater to online orders from other parts of the country becomes difficult during shutdowns as the information about orders doesn't reach them at all. Therefore, their last resort has been to employ people to manage orders from other parts of India.

Owing to the long-standing civil unrest, especially since 2016, the tourism industry in Kashmir has nearly been destroyed and footfall in the store has drastically reduced. POS machines don't work without Internet connectivity. Most people, especially tourists carry plastic money and Internet shutdowns affect the store's ability to accept card payments, thus affecting their sales. Due to the frequent shutdowns, they had to shift to wired machines Operations of the online store were due to begin in September 2016, but got delayed due to the turmoil. Wired machines could not be used during September 2016 to October 2016 and the loss was about Rs. 30,000 per day.

They also sell their products on Amazon and have a

rating of 4.8 on the platform. Amazon is very particular about timely delivery of products and provides no leeway for problems faced due to unrest and shutdowns. Therefore, earlier to manage Amazon orders, the shop owner had to travel to places where Internet services were accessible. In 2016, most of the time, mobile Internet was shut down; however, broadband services were available. They have long-term and loyal customers all over India. September - March is the bumper season for sales. They would make about Rs. 5 - 10 lakh per month in the store. From online sales, they expected to earn about Rs. 10 lakh per month but could make only about Rs. 7 lakh per month. However, online sales could not cover the losses incurred due to lower footfall in the store.

Challenges and/or recommendations: Due to sudden shutdowns, card settlements would stop abruptly. The machines work on dial-up or GPRS, the latter being much faster and smoother. The number of customers that visit their store is also affected by the unavailability of Google Maps in Kashmir. Cabs take tourists elsewhere for commission. They have faced a 90 percent loss in business since July 2016.

4.1.4 Import/Export Traders

Background: Srinagar's industrial complexes and traders, even ones owned by non-resident Kashmiris, with back offices in Srinagar, have been affected by frequent shutdowns.

Internet dependence: The dependence on Internet services varies for businesses operating in the region, particularly with reference to its use for communications, marketing, and online sales.

Impact of shutdown: Internet shutdowns also impact export-import businesses. All big exporters are forced to have an office in Delhi due to the frequent shutdowns in Kashmir. This entails huge costs. Major items of export in Kashmir are handicrafts which are part of the village and handicraft industries. The artisans may not use the Internet, but traders do and transactions are dependent on connectivity. There was a demand earlier to declare J&K to be a free economic zone and link it to China-Pakistan Economic Corridor.

Challenges and/or recommendation: Investors don't want to risk their money in Kashmir because of the conflict and the frequent unrest, especially the Internet shutdowns which in today's day and age is a driver of business. Conflict insurance would cover them from potential losses due to unrest in the Valley. According to him, such insurance is provided by the World Bank for projects in conflict areas. The stakeholder proposed that the government may provide conflict insurance in order to encourage investments in Kashmir.

4.1.5 IT Company

Background: The company was set up in Srinagar in the year 2003. It developed research reports on the telecom sector for nearly 19 years and in the last 4-5 years, has been undertaking local IT projects. This company also worked on the Aadhaar project in J&K and was handling data for seven to eight districts.

Internet dependence: All data entry projects are completed online. The billing for the Ujala scheme (LED bulb scheme) in J&K is also done online.

Impact of shutdown: Current turnover of his company is less than Rs 100 crore. 2-3 years back it was Rs. 70 crore. 50% of the current revenue has fallen because of the shutdowns.

He stated that shutdowns have not had much of an impact on the hardware and system integration industry. The software industry in Kashmir is not so big. Many are considering relocating overseas. Some companies relocated to Jammu. Losses to BPOs were approximately Rs. 30-40 crore. Cellular operators are said to have lost business worth Rs. 150 crore. Thousands of businesses have shifted to local leased lines connections.

Shutdowns have also impacted governance in the state. Employees in offices have been sitting idle. From a legal point of view, there is an obligation to provide services to citizens. 10-15 services are in the process to migrate to the Internet and shutdowns will hamper them.

Before December 2016, there was 80% Aadhaar penetration in J&K. Since Dec 2016, the process came to a halt and the project was given to the state IT department.

Challenges and/or recommendations: Political problems are outside Srinagar, especially in South Kashmir and some parts of North Kashmir. If only social networking sites are blocked, then other economic functions can be continued. According to the respondent blocking social networking sites does help the security apparatus. Subsidy schemes cannot be implemented and compliance with GST is likely to become an issue in the future. Shutdowns triggered due to security issues compromise on the development that Internet can enable in the state.

4.1.6 Industry Association

Background: The representative of the industry association is a distributor for brands like Clarks and Lotto. Physical catalogues have become obsolete and everything is online. He stated that the access to the Internet is now a basic human right, similar to access to water and electricity. Internet shutdowns spell losses for traders, and with the extension of GST to J&K, their problems have been exacerbated. GST is a paperless, Internet-based tax. After every 10 days, traders have to submit invoices through the Internet which will be difficult, given the high frequency of shutdowns.

Internet dependence: Shutdowns make it harder for them to pitch their ideas with brands as they fail to show catalogues online. The potential loss from not being able to go online is presumably 70 percent of revenue. He had considered online business in 2015, but it did not work out due to shutdowns and unrest. Through online sales, he could have increased his revenue by hundred times. Their shop maintains stock but billing happens on the Internet. Long term shutdowns hinder them from investing in technology.

Impact of shutdowns: Sales are affected as cards and PoS machines don't work. He receives about 60 - 70 clients per day. 60 percent to 70 percent of these clients use cards to make payments. Average value of sales through PoS machines is 30,000 – 60,000 INR per month.

Owing to frequent shutdowns, approximately 80 percent of the IT entrepreneurs in Srinagar shifted base to other cities like Delhi-NCR and Bangalore. In 2012, there were orders for a ban on social networking sites in Kashmir, however this was politically opposed, since these sites

are a primary source of entertainment for the youth in Kashmir.

Challenges and/or recommendations: The state reasoning for Internet shutdowns is that they prevent loss of civilian life. However, experiences show that even in the event of the shutdown, the targeted impact is not met and lives are still lost in Kashmir. People have found out ways to access the Internet and have moved to VPNs and proxy servers. However, no particular site is blocked. According to him they can block social media but not the public Internet to minimise economic loss.

4.1.7 Journalist-A

Background: The person is a journalist working with a newspaper agency. According to him, shutdowns help in adverse law and order situations, but they also create problems. Frequent shutdowns are not helpful; though they help administer control in conflict situations.

Internet dependence: Online resources are particularly useful in submitting stories and providing updates. Communications with colleagues, and accessing sources of information are largely dependent on availability of Internet services.

Impact of Shutdown: According to him, there are two aspects to be noted – losses to local businesses and losses to online ventures. As per a written query sent by him to COAI, telecom companies in Kashmir suffered losses worth approximately Rs. 2 crore daily during the complete ban on voice and data for 90 days in Kashmir in 2016. However, local telcos are hesitant to give out numbers. Not only telcos, but customers also suffered losses as the money they spent on recharges were wasted since they could not avail of the services.

The other entities that suffered losses were local IT companies; however, many of them migrated to other cities. Freelancers faced an adverse impact. People engaged in work like data entry and other data related services. There are 3000 such freelancers in Kashmir. Earlier freelancers would use BSNL broadband services, but with Jio entering the market, most of them switched to the Jio service. Most of the affected freelancers were full time. One of the companies was forced to start an office in Delhi because of the frequent shutdowns.

Although, the shutdown was a loss for many, it did present an opportunity to BSNL to increase subscribership in 2016. Overall, Internet shutdowns result in wastage of data. There are over 1 crore mobile subscribers in J&K. In 2016, the frequent shutdowns and suspensions of services led to deactivation of 4.5 lakh connections. Many people converted from prepaid to postpaid connections. People also shifted to a Jio connection. Students were also affected as a lot of their work including research, extra-curricular activities etc. is dependent on the Internet.

Challenges and/or recommendations: According to him, COAI had written to DoT saying that Internet bans are counter-productive for telcos. However, there hasn't been any response from the Government yet. He stated that the government needs to find alternate ways to handle such law and order situations.

4.1.8 Journalist-B

Background: The stakeholder is a freelance journalist. According to him, the repeated Internet shutdowns have been counter-productive. They have had a deep psychological impact on Kashmiri youth. Due to lack of spaces for free expression in Kashmir, the Internet was simultaneously a platform for voicing resistance as well as a source of entertainment.. Contrary to claims by law enforcement agencies, despite Internet shutdowns, protests and resistance did not stop. According to him, these gags on freedom have aggravated situations of unrest. During the Burhan Wani case, Internet was suspended for 4 months, however protests took place every day and 96 people were killed.

Internet dependence: Freelancers are affected as they are unable to submit their work in a timely manner. During a shutdown, he had to send his article in parts through text messages and sometimes narrating over the phone for another person to type.

Impact of shutdown: Big media houses with VSAT connections did not suffer. However, approximately 40 percent journalists lost their jobs since they couldn't report effectively due to lack of connectivity. Local newspapers also sacked their staff. In 2016, there was a blanket suspension of the Internet for 4 months

(needs verification). The worst affected was the business community. Some offshore businesses and IT service companies faced huge losses as they could not keep up with demands.

Internet shutdowns have impacted the economy adversely. It also affects education in the state as students are denied online resources to enhance their knowledge and exploit their potential. Shutdowns are a mockery of the government's Digital India Initiative. There were losses involved for customers who paid for Internet services. Banking infrastructure was not affected much as they work on intranet. The Burzala exchange number 243 was kept running on certain instances for broadband only because it links to VIP connections.

Challenges and/or recommendations: Up until now, Kashmir had its own tax system; however, the extension of GST to J&K requires traders to file returns online, thrice a month which is impossible without the Internet. He says that it is unjust to deny 95% of the population their basic right of using the Internet due to problems created by fringe groups that possibly make up only 5% of the population. The apparent objective of Internet shutdowns which is to stop false propaganda and halt rumour mongering is not effectively addressed as without the Internet, the rumours remain unverified and leads to further spread of false rumours.

4.1.9 School

Background: Internet shutdowns had a huge impact on the school last year. Due to the unrest after Burhan Wani's death, schools were shut down for more than 6-7 months. The school has more than 800 students. Due to stone pelting, coming to school was a challenge for both students and teachers. The school was functioning with 10-15 teachers. The school has classes from Nursery to the 8th grade and is in the process of expansion.

Internet dependence: This school's functioning is highly dependent on the Internet. They use Internet for uploading study design, conducting exams, sharing information with management via emails etc.

Impact of shutdown: During this period, study material would be uploaded online but with great difficulty.

Students could not write exams. Their Internet management software connecting other partner schools across the country did not function. They could not update the management about progress made and other important information.

The school tried tying up with an online examination portal, but the frequency of shutdowns made it unviable. Their biggest cost was that of printing hard copies of question papers for the examinations as the papers could not be accessed online due to the shutdown. From June 2016 to November 2016, 25 cartons of paper were printed, the cost of which was approximately Rs. 62,500. This was an additional cost incurred by the school because of the shutdown. They also lost a photocopy machine worth Rs. 1, 50,000 because so many photocopies were taken. Due to the protests and curfews, they also had to book a safe area to conduct classes, especially remedial classes before exams. Many other schools also adopted similar measures. Video lectures could not be uploaded online.

The school has Smart Labs designed like an integrated Science Lab, Math Lab, and Language Lab etc. Students are not able to access this facility at home during the time of unrest and curfews when schools are shut down. In terms of quality of curriculum and teaching, academic audits happen every 3-4 months where the management comes over from Delhi. The intra school network where teachers and other members constantly upload their work is mostly inaccessible. However, this system does not work on intranet and therefore is not functional during shutdowns.

In 2016, most parents could not pay their wards' school fees and drop in business was a factor. However, there were no challenges related to staff payments. Most teachers and staff were paid in cash and money could be deposited since bank systems were functional (HDFC in this case). Since 2017, there is resumed continuity in the school's operations. In 2016, the DMAT exam that is conducted by Kashmir University had to be cancelled because of lack of communication due to Internet shutdowns. This exam is conducted physically, but all communication and coordination happen online.

4.1.10 University student

Background: The Stakeholder is a student at a university in Kashmir and also engages in freelancing.

Impact of shutdown: Many young people, who are taking to social media as a creative outlet, are affected by shutdowns. Students are also adversely affected as universities put their material online but networks are shut frequently. Additionally, young students are also digital entrepreneurs and run businesses online, for example, an Instagram photographer from Kashmir faced significant losses in business during the Internet ban.

Due to the frequent shutdowns, the entrepreneurship culture is not picking pace in Kashmir. Till July 2016, many youngsters who had gone to study abroad, came back and opened cafes. There were 42 network shutdowns. Since Kashmir is a disaster prone area, it is difficult for people to connect. Tourists cannot operate phones with prepaid connections. There are businesses that conduct group treks and all the background work happens online. But, all these businesses are shutting down due to losses from frequent Internet blackouts.

The start-up culture in Kashmir is as good as dead because of the instability of the Internet. These shutdowns stop a lot of people from freelancing and there is a high impact on this community as there are many Kashmiris in the freelancing business. Most Kashmiris suffer from PTSDs. There are online counseling platforms, but they don't function during a shutdown. The suicide rate is very high in the valley and it is also witnessing an emergence of domestic violence.

4.1.11 Doctor

Background: The stakeholder is a doctor at a hospital and also teaches at the attached medical college.

Internet dependence: Patient data and operations remain largely undigitized in Kashmir. There have been no payment related issues since most people usually pay in cash at hospitals. However, doctors need to be able to connect online to learn about new drugs, diagnostic tools and consult colleagues at other places.

Impact of shutdown: According to him 2016 was the worst year in terms of unrest in Kashmir. There

were many pellet injuries. Doctors needed to use the Internet to update themselves and learn about new drugs, diagnostic tools etc. Without access to this, the quality of patient care was affected. They were not able to communicate with colleagues in other cities and countries. They needed to know and confirm drug dosages, and many of these activities requires access to the Internet.

During shutdowns, people are unable to call ambulances on time in the event of a medical emergency. This leads to loss of lives. Health and disease prevention related messages like vaccination notices cannot be transmitted to people. Civilians have adapted to the situation and have discovered ways to deal with the issues.

Challenges and/or recommendations: With the Internet shutdowns, people are denied a platform to express their opinions. Mental issues like anxiety, depression and suicidal tendencies are rampant among the youth due to deteriorations in emotional well-being. There are post-traumatic stress disorders and restriction of access to resources negatively affects patient outcomes.

4.2 Government

4.2.1 Law Enforcement Official

Background: One of the officials stated that in 99 percent cases, the shutdown is a preventive measure. The reason behind the shutdowns is usually negative propaganda on social media and a shut down helps thwart such rumour mongering.

Very often fake pictures and videos of militant encounters are circulated online. Facebook/WhatsApp groups/accounts administered by people in PoK or militancy groups try to mobilise people, especially the youth. Previously, blocking instructions to Facebook/WhatsApp/Google have also not made much of a difference, as rampant use continued through proxy servers and VPNs.

Process: There are DoT guidelines on reasons and circumstances for Internet shutdowns. Home Ministry has the power to order a shutdown. There are Zonal IGs that send these orders. For Srinagar, it is IG Kashmir. State and Central home ministries can also order a shutdown.

Details on the time are given to telcos to execute the shutdown, and these are available in the DoT guidelines. At best TSPs shut down network in an hour or hour and half. This depends on the technology of network management available with the TSPs.

Challenges and/or recommendations: In order to minimise the impact of shutdowns authorities often throttle speeds instead of completely shutting down the Internet. Sometimes voice calling is also shut down, however, these are under extreme circumstances. The news and rumours circulated online are mostly unverified. Legal action against the groups involved can only be taken if evidence is available. Satellite based connections are also monitored

Authorities try to localise the shutdown to the extent possible. It could be a district, a locality or even just a village or a single tower. Sometimes the situation is mishandled. But, in most cases the situation can be controlled with shutdowns and transfer of provocative information can be delayed. J&K Police is also there on social media. Counter speech by civil society and J&K police also helps.

Banks and financial institutions as well as some other big businesses work on intranet which are not affected during shutdowns. Their services are not disrupted. In majority cases, GPRS mobile networks are shutdown as they are popular among militants. In some extreme cases, broadband services are also shut down.

5. Bihar

5.1 Non-Government

5.1.1 Telecom Operator

Background: The stakeholder was an employee of a telecom operator in Kishanganj, Bihar. He stated that the shutdown was ordered in 7 districts - Purnia, Kishanganj, Katihar, Araria, Supaul, Saharsa and Madhepura districts after cow carcasses were found floating in a canal in Madhepura district. The phase wise shutdown orders were issued from Patna, Katihar and Kishanganj. The Government did not issue any public notification before ordering the shutdown. While most networks were

completely shut down some service providers continued to operate the 2G network.

Internet dependence: Most of the work including sharing data, receiving orders from telecom departments and email communications are dependent on Internet.

Impact of shutdown: The shutdown impacted students who couldn't register for the Bihar Board Exam. Deadlines for registration were consequently extended. Students were not able to access information on job vacancies etc.

5.1.2 Media/News Agencies

Background: The stakeholders were a group of journalists working with different regional print media organizations.

Internet dependence: Much like most news agencies, the journalists stated that a majority of their work relies on the Internet, particularly in delivering stories for publication.

Impact of Shutdown: According to them, the Internet shutdowns (for 4 -5 days) was effective in controlling the law and order situation. In order to send news pieces, the journalists hopped into the neighbouring state of Bengal (2 km away from Kishanganj). They would share information and complete their work on the Internet from this location.

5.1.3 Bank

Background: The stakeholder is a deputy manager at a bank in Kishanganj, Bihar.

Internet dependence: About 10 percent of the people in Kishanganj use the Internet for banking transactions. With the push for Digital India, there has been an increase in card-based transactions from 20 percent to 60 percent of total transactions.

Impact of shutdown: Banks didn't face any issue in their daily operations during the shutdown as they used dedicated leased lines for Internet connectivity. The government did not issue any prior notification for the shutdown. Since only 10 percent customers used Internet banking services, the impact of the shutdown was very limited. There were no complaints by citizens on disruption of banking activity.

5.2 Government

5.2.1 Law Enforcement Officer

Cause: According to this officer an Internet shutdown is a useful tool, as it avoids spread of rumor and the consequent caste or communal conflicts.

Process: After the DoT's recent notification, the rules for implementing shutdowns have become streamlined however it now involves too many steps to comply with, even when faced emergencies.

Challenges and/or recommendations: The officer stated that the social media sites need to be monitored. He suggested that social media companies establish offices in each state to effectively monitor the content and posts by the people, He also expects Internet companies to provide timely responses to take-down notices.

5.2.2 Administrative official

Cause: The stakeholder stated that Internet shutdowns are ordered when loss of life and damage of public property is anticipated from communal violence and general conflict situations.

Process: According to him, the Internet shutdown has been useful in checking spread of rumors. Order implementations are fairly smooth.

6. Gujarat

6.1 Non-Government

6.1.1 IT Company

Background: This company offers IT solutions to global clients. It is based out of Ahmedabad, Gujarat.

Internet dependence: They use the Internet for app testing, especially location-based apps. They mostly depend on a fixed line broadband connection for their operations.

Impact of shutdown: They did not report being affected by the shutdown. While the testing of location-based apps could have been affected, they were not working on any such app at the time. The only losses were perhaps efficiency losses because people could not come to office

due to the curfew; however, there were no financial losses.

Challenges and/or recommendations: They expressed a general concern about network issues and recommended improvements in testing and provision of network infrastructure in the state.

6.1.2 Bank Employees' Association

Background: It is an association of bank employees that regularly raises issues of interest to the banking sector as well as the civil society. The body has bank unions as its members. They mostly collaborate with nationalised banks. Most of their clientele are middle class/rural/poor people.

Internet dependence: The Association as such does not depend on the Internet, it is mostly personal Internet use that gets affected. Moreover, poor networks already affect banking operations. Failure of banks' intranet has become a regular phenomenon and there have been numerous complaints from clients.

Impact of shutdown: Total cheque transactions through banks are valued between Rs. 10,000-Rs. 15,000 crore and 10 percent of this value is processed through net banking. The Internet shutdown, might have affected a total of Rs. 1000 crores. However, most employees and employers prefer going to the bank and depositing cheques as opposed to online transactions and money transfers. Internet based transactions are very low in Gujarat, therefore shutdowns did not majorly affect banks. According to them, the penetration of online payments is not very high in Gujarat. Students and youngsters who use the Internet for transactions constitute about 10 percent – 20 percent of the society. Middle class traders prefer visiting bank branches to carry out transactions. However, targets have been given to bank officials to reduce the footfall in banks and bring more banking activities on to the Internet. But, only 4 percent -5 percent of the total population uses online wallets and these facilities are mostly used for purposes like online ticket booking for movies, travelling etc. The number of transactions done might be high, but the total value of these transactions is low. According to them, the only communities that are likely to be significantly

affected by the Internet shutdowns were the upper class/ upper middle class because many families within these strata of society have children studying outside the city and require Internet banking to transfer funds. POS machines had stopped functioning during the shutdowns and transactions were affected, which is another aspect worth highlighting.

Challenges and/or recommendations: Behavioural aspects of consumers in the state were highlighted and there was a clear inclination towards a higher use of broadband connections as compared to mobile data. This is also one of the reasons for low levels of online transactions in Gujarat, as people don't feel secure transacting with sensitive information using shared networks. People also find the language used by banks complicated inhibiting online transactions. Even in the post-demonetisation period, uptake of digital payments has been low and there has been no significant change in people's mindsets.

6.1.3 Business Association

Background: The business association has members from across industries. There are about 4000 members, including over 200 industry associations.

Internet dependence: In their office, the sales and marketing teams faced difficulties. Marketing, Research & Development and HR activities are supported through the Internet.

Impact of shutdown: The stakeholders anticipated that there may have been a direct impact on the finance and banking sector, especially due to the digital system of clearing in banks. According to them, ecommerce and online sites had not become as popular as they are today during the period of the prolonged shutdown, hence the impact there is not likely to be pronounced. According to them, Internet shutdowns lead to communication issues more than digital payment issues.

6.1.4 Students

Background: The stakeholders are a group of students from a college in Ahmedabad and they are involved in research-based work.

Internet dependence: They depend on the Internet for popular services like instant messaging, social media, entertainment etc. Internet connectivity is also an essential component of their work. Most of the desk-based research is on the Internet.

Impact of shutdown: A college student in Baroda was preparing for the UPSC exams when a shutdown was ordered to control a flaring conflict between two groups in Fatehpura. There was no official message informing the public about the shutdown. News spread through word-of-mouth. In Baroda, SMS services were also blocked. During the Patidar agitation, instant messaging apps were blocked on broadband as well. However, only one app called 'Telegram' was working. Another problem highlighted was related to recharge for mobile services. They think that even though the shutdown may not have stopped the agitation completely, it definitely helped reduce the intensity of it.

The stakeholders observed that the Internet, specifically communication on social media in present times, is not a cause of these agitations but acts as a catalyst. They did not think there was any loss to Internet-based cab services (Ola, Uber etc.) or food delivery services (Zomato, Swiggy etc.) because the curfew didn't permit them to venture outdoors anyway. Therefore, regardless of an Internet shutdown, these services were not available/ operational.

Challenges and/or recommendations: According to these students, it is difficult to track people who are at the centre of rumour-mongering, primarily because WhatsApp groups are completely encrypted. The option of phase-wise shutdown or blocking of apps may not be effective because it is based on the presumption that people would not be able to find loopholes in the system. The stakeholders also felt that counter-speech may not be effective as aggravators have already lost faith in the system. However, it is worth a try.

6.1.5 Lawyer

Background: The lawyer works as an advocate with a prominent law firm in Ahmedabad and had argued the case in the Gujarat High Court against Internet shutdowns.

Internet dependence: Most of his work, including payments that he receives for his services, is dependent on the Internet.

Impact of shutdown: The PIL filed after the shutdown was by an intern from the law firm. The intern could not hire a cab to office, access any applications or communicate with his family. Shutting down mobile Internet affected the public. SMS services were blocked and most mobile applications did not work.

The stakeholder also argued the Public Interest Litigation case against Internet shutdowns in the Gujarat high court. One of the grounds on which it was argued was the lack of clarity and rationale in the classification of what part of the Internet should be shutdown, with regard to the fact that mobile Internet was shut down because rumour mongering happened through social media using mobile Internet. There is no data to suggest how the rumours were spread; however, law enforcement officials claimed that there were 2000 WhatsApp groups. According to him, shutting down mobile Internet and not broadband does not solve the purpose of the shutdown. There are Wi-Fi zones in malls, there is Wi-Fi even inside the Gujarat High Court and many other public buildings have these zones. People can easily connect to the network there and continue spreading rumours.

While the Internet was shutdown to due to miscreants abusing the Internet as a communications medium, there has been no punitive action against the perpetrators. No cases have been filed against the rioters. People spreading rumours through the Internet can be charged under the law but no such action has been taken. IP addresses of these people have been tracked, but the cyber crime cell has not taken any action. Since SMS services were also blocked people would not be able to receive OTPs and were unable to make online transactions. He could not get money from his clients during that period. Fee for 3-4 cases worth Rs. 75,000 each, could not be transferred due to disruption of Internet services.

Personally, he could not work from home because he did not have a broadband connection and relied on mobile Internet via dongles and mobile hotspots.

Challenges and/or recommendations: According to him, shutdowns have not been effective in controlling the situations Such extreme measures have led to frustration among the youth. Contrary to some other stakeholders, he mentioned that during the last instance of an Internet shutdown, broadband services were also unavailable. There have been lots of shutdowns of small durations that were ordered unofficially. Hence, the number of shutdowns that have actually happened in Gujarat is a lot higher than the number shown in official documents. According to him, it was not only through social media that rumours were spreading but a large part could be attributed to news channels that were already broadcasting video clips and incorrect information. So, despite the shut down, people could saw provocative content through messages and ideos on news channels. Technology is available to shut down certain apps and websites and selectively block/ban Internet based services. When area specific shutdowns are technically possible, a blanket shutdown was ordered in Gujarat. In official records however, only three locations are mentioned.

6.2 Government

6.2.1 Administrative Official 1

Cause: The last shutdown was one ordered during the Talati examination in Ahmedabad (which lasted for a few hours). The primary reason was to check rumour mongering on social media. More than 90 percent social media users are on a mobile Internet network. Therefore, mobile data was shut down, Wi-Fi was also restricted, but fixed broadband services were available.

Process: The administrators collected information on groups using social media, the nature and content of messages being circulated, spread of the propaganda, area covered, communities involved etc. Essential services like banking were not disrupted. The option to selectively block a website or app was also available instead of a complete blackout. All shutdowns ordered in Gujarat are under Section 144 of the CrPC and the orders are published in the newspapers.

Challenges and/or recommendations: According to the administrator, impactful steps need to be taken and

punitive provisions of law must exist to check the spread of fake news. He believes that while complete free flow of information can be harmful, monitoring of content is not feasible, either. Therefore, proper studies and thorough research should be used to formulate policy.

6.2.2 Administrative Official 2

Cause: Both mobile Internet and broadband were shut down, in two instances, to prevent rumour mongering and mass mobilization during the Patidar agitation. The protests targeted government officers and police personnel. During such situations, all kinds of messages were doing the rounds on social media - video clips, names of people to target, calls for protest and vandalism etc. During the second Internet shutdown, there was a cricket match in Rajkot and it was feared that, Hardik Patel who led the agitation would create problems. The shutdown was used effectively to prevent any disruptions during the match.

Process: Instructions for the first shutdown came from the Home department. The general rule is that the Commissioner of Police decides on a shutdown in urban areas and the district magistrate decides for those in rural areas. A shutdown generally happens by consultation. There have always been clear notifications on the time period of these shutdowns and they have never been infinite. Options such as speed throttling and selective/ area-wise shutdowns or blocking of sites, have not been explored.

The situation was controlled with the help of feedback from officials, particularly people from the agitating community who were part of the administration. Informal sources of information were of great importance and help. For example, anganwadi workers and others employed through government initiatives conveyed important information about the protests from the ground through telephonic and personal communication. Administrators would take hourly feedback from people.

Challenges and/or recommendations: According to the administrator, the shutdowns were helpful, particularly in rural areas. The administrator also highlighted the misuse of the power to order a shutdown by the administration. Overtime, shutdowns have become an easy option for

law enforcement agencies. During the first shutdown that was ordered by the administrator, an area wise shutdown was said to be impossible. Whether that was an issue with available technology or implementation is unknown. The importance of counter-speech was also highlighted. Gujarat now has a television channel called "Sandesh Channel" which, among other things has positive messaging/counter-speech initiatives by the government.

7. Jharkhand

7.1 Non-Government

7.1.1 Heavy Industry

Background: The stakeholder is a senior level official at a steel plant in Bokaro, Jharkhand.

Internet dependence: Over time, all activities and processes at the plant have been made online – including production design, material procurement, employee management systems, etc. The tendering process at this steel plant is now completely online. The liaison firms for material acquisition has come down by 50%. Even gate passes to enter and access the plant is now issued online, along with a tracking system. All these processes are managed across different units of the company which are connected through a wide area network (WAN). Shutdowns don't affect the networking across the company units and their different functions; however, it impacts their external interface.

Impact of shutdown: A shut down can potentially impact the tendering process and will require concessions in the form of extending the deadline, handholding vendors over phone, etc. It becomes especially problematic when the tender is for a critical item with a 24- 48 hour deadline for procurement. In the longer term (7-8 days) tenders, shutdown for a day doesn't impact the business so much. In some situations, where communication over phone is also affected, the process comes to a stand-still. Translating the impact into economic costs – the loss would be on account of the additional time spent by employees in completing the tendering process (monetized using salary per hour) and in case of a tender extension- impact on the production.

Challenges and/or recommendations: Personally, he used his mobile phone for banking, e-commerce and news feeds. He noted that these and other important daily activities can potentially be impacted during a shutdown. However, in the absence of any check on trolling or control over content created on the Internet, he said, shutdowns often become important. There is a need to identify miscreants and create an environment for responsible use of social media and the Internet.

7.1.2 School

Background: The stakeholder is the administrator of a school based in Bokaro, Jharkhand.

Internet dependence: The school recently migrated to an online fee payment system. Other activities in the school that require the Internet include correspondence with vendors, district administration, other city franchises, etc. Often assignments are also given online. An ERP system (SOPAN) helps manage inventory, student evaluations and an e-library which currently hosts about 60,000 books. The ERP system was introduced about 5 years ago. A leased line connection allows smooth functioning of most activities, except for the external correspondences. The introduction of an ERP system has improved the efficiency of officers and administrative staff.

As the public relations officer of the school, poor access to the Internet also affects the quality of published articles from the school. Writers often use the Internet to verify facts and reference content they use in their writing. The quality of e-newsletters is improved with access to information on the Internet.

Impact of shutdown: The online fee payment system was troublesome during the Internet shutdown. Since Bokaro often has poor Internet connectivity, this problem is common even when networks are down. Such circumstances often lead to trust issues between parents and the school authorities since late fee payments attract penalties. The administrator also pointed out that since connectivity was a common problem in Bokaro, many people did not recognize it as a shutdown at all.

Personally, he used the Internet for online banking, cable and mobile re-charge, e-ticketing, maps and navigation.

These are daily activities that get severely impacted when networks are poor or the Internet is shutdown. The administrator cited how students living in hostel accommodations use free rides on Ola to get to the school. Such economic efficiencies can get potentially impacted in the event of a shutdown. With the massive push toward digitization – digital payments, GST - the costs of an Internet shutdown will only increase in the future.

7.1.3 Bank

Background: The stakeholder is a senior relationship manager at one of the banks in Bokaro, Jharkhand.

Internet dependence: The percentage of people using online banking facilities in Bokaro is less than 10%. This is also apparent from the relatively higher number of branches in the region, as people prefer to personally visit a bank branch to complete their transaction. Even if individuals are tech-savvy and comfortable using mobile applications, the fear of losing money discourages online banking services.

Impact of shutdown: There was no loss to business on the day of the Internet shutdown in Bokaro. The move towards online banking is very gradual in the city.

7.1.4 Hospital

Background: The stakeholder is an IT administrator at a Hospital. Administrators in the hospital were not able to distinguish between a shutdown and poor connection. They said getting on the Internet was a challenge every day. This was true of connections through multiple service providers. Connectivity is smooth only on relatively expensive plans. As a low cost hospital, it left them with little choice and most tasks that needed to be completed online were in fact done manually.

Internet dependence: Internet connectivity is very important at the hospital to process cashless insurance, provide online patient prescriptions, submission of birth certificates and sharing data with the Government's Mother Child Tracking System (MCTS). Most of these activities are either completely done manually or go half or half, started online and completed physically. The hospital also uses PoS machines.

Impact of shutdown: During the shutdown when PoS machines stops working, and connectivity drops in the middle of the transaction, administrative staff have to rush to the bank to check if the payment went through. This also creates a lot of anxiety and distrust amongst patients.

Challenges and/or recommendations: There is tremendous potential for improvements in service efficiency if Internet connectivity was more reliable. The procurement process could be made smoother, software trouble shooting and maintenance can be executed remotely (they currently have to wait for a reliable connection to seek help from software companies). With the Government's expanding mandate on digitization – Income tax, GST, etc. not having reliable Internet was a central point of frustration for the hospital administration.

7.2 Government

7.2.1 Administrative Official

Cause: A 24 hour mobile Internet shutdown was ordered under Section 144 in April 2016, following communal clashes on Ram Navmi. The officer said that it was a one-off situation that went out of hand due to extensive use of social media in spreading hatred and fear between the Hindu and Muslim communities in Bokaro. He recounted that the 3 hour clash led to damage of property, 9 people injured, though no loss of life. In order to ascertain a return to normalcy, a curfew was declared for the following 24 hours.

He compared the situation to communal clashes at Hazaribagh, another neighbouring area in Jharkhand that took six days to bring under control with three people losing their life, and where Internet had to eventually be shutdown to reign in law and order. Bokaro has seen other instances of communal violence (about 18) but this

was the only time it required a mobile Internet shutdown.

Process: In terms of the legal framework within which a shutdown can be ordered, he said it was the Home Secretary, who has the authority to call a shutdown. The legitimacy of using Section 144 he argued could be debated. He was also familiar with the new guidelines under the Telegraph Act to order shutdowns.

Challenges and/or recommendations: In context to the discussion on economic costs of an Internet shutdown, he highlighted the losses arising out of an inability to control communal disharmony. He noted that costs in terms of loss of property may be measurable but and loss of lives are beyond measurement. Also, he emphasized that ordering curfews as an alternative could lead to further economic loss, as 28% of the coal trade in the country belongs to this region. He also commented on the poor connectivity in the region and highlighted how the mobile Internet has limited application to economic activity in Bokaro.

According to him the role of the Internet is significant in promoting economic activity and was aligned to the digital programs of the Central Government. However, he confessed to the lack of solutions in controlling misuse of social media and the rising trend of Internet trolls. Half truths and blatant lies on the Internet grow exponentially. Since IP addresses on mobile networks are hard to track down and social media stories snowball at alarming rates, officers are left with very few options. Shutting down the Internet or blocking social media websites is not a part of the protocol; it is one of the many instruments used to minimize damage in law and order situations. He also said the counter speech and positive affirmations by the administration have little effect in controlling a communal story once it starts going viral on the Internet.