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14. ABSTRACT

Since 2011, Burma has taken a series positive, but not irreversible, steps to depart from a 50-year history of draconian controls on information content, communicators and connectivity. In parallel to these reform actions, the government has embarked on a massive effort to build telecommunications infrastructure to make information available to a wider range of its citizens. Encouragement of principled private investment, infused with human rights protections, in selected telecommunications technologies represents a positive way for the U.S. to help Burma continue, and make permanent, their recent reforms.

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Truth in Reform: Reversing Fifty Years of Information Suppression in Burma

by

Brian R. Denman
Lieutenant Colonel, United States Air Force

A paper submitted to the Faculty of the Naval War College in partial satisfaction of the
requirements of the Department of Joint Military Operations.

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Paper Abstract

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Introduction

A businessman reads an overseas business journal. A college student surfs the Internet and views breaking news stories on CNN. A young parent snaps photos of their newborn child using a camera phone and emails them to a friend. A journalist emails an article for publication that could be picked by news sources worldwide. While commonplace in our globally connected world, these activities are new and novel for citizens in Burma.

Recent infrastructure improvement and censorship policy changes by the Burmese government have opened all these activities to their citizenry. On the surface, Burma appears to have made great strides since 2011 to create an open and free information environment[*1] that is positive for its people, its economy and its relationship with the greater world community. These changes, however, do not yet represent an irreversible change to Burma's legacy of repressive control of information, and may signal an era of more sophisticated and perfidious government controls. Burma is at a crossroads for information growth and, in order to truly open Burma's information environment, the U. S. must encourage continued legal reform in Burma and responsible and transparent investment in key technologies to build an infrastructure with balanced ownership that is untethered from government controls.

This paper will examine impediments and opportunities associated with external elements of information flow between Burma and the greater world community. As today's Internet-connected world transcends national boundaries with ease, this also necessitates a parallel discussion of internal Burmese laws, infrastructure improvement efforts and actors. The foundation for this examination is Burma's history of information control. From this, we

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[*] This paper describes the information environment in Burma in terms of content, connectivity, and communicators, perspectives that align well to actors in the country.   These terms are similar to those used by Dr. Daniel T. Kuehl (content, connectivity and cognition) and are also logically rooted in DoD's Information Environment definition (informational, physical, and cognitive) as described in Joint Publication 3-13, Information Operations.

can assess the fast-moving and promising changes that have occurred within Burma's information governance structures since 2010 – changes that appear to be opening one of the most repressive information control regimes in the world. With this context in hand, the necessity for principled and targeted private industry engagement becomes more obvious.

Counter-Arguments

Cynics and supporters alike offer a variety of counter-arguments regarding the robustness of Burma's reforms, and the involvement of private industry in continuing these reforms. The most direct statement on Burma's reforms predictably comes from the government itself. In early 2012, Ko Ko Hlaing, Burmese President Sein's chief political advisor, extolled his President's commitment to a top-down approach to reform, citing that recent reforms are "irreversible."[2] Less than a year later, in an interview with BBC News, Burmese President Thein Sein used identical words to describe the government's reform agenda, which includes both information and economic reforms, as "irreversible."[3] Neither, however, offered details on what measures prevent a regression in information policy.

The potential for foreign business complicity in human rights abuses and the possibility of external exploitation of Burma have been hotly debated since the government's first reforms in 2011, and there is truth to these concerns. Perhaps the most visible example in this debate is Burma's 2011 decision to halt the controversial $3.6 billion Myitsone Dam project, a joint venture between Burma and China. Opponents raised concerns the dam would displace thousands of local Kachin villagers, destroy cultural sites, spoil natural resources, and reignite violence in the area.[4] These activists decried this as another example of Chinese exploitation of Burma. Despite the expected devastating consequences, Burma was only expected to receive 10% of the dam's 3,600 MW[5] of electricity, with the remaining

90% bound for China.[6] Central to the topic, researchers have also raised concerns of

corporate collusion in human rights abuses in the telecommunications sector. In the past five

years, businesses such as Amesys[7] and Blue Coat Systems have been accused of furthering

government surveillance and information repression in Libya, Syria and Burma.[8]

The Roots of Information Control in Burma

The Burmese first learned information control from their Colonial British masters and

grew these seeds of oppression into a set of draconian controls during the Burmese military

junta's rule. These controls targeted three activities in the information environment -

content, communicators and connectivity – through a combination of legal, regulatory and

direct controls that still persist to this day. These constricting actions systematically

destroyed what was one of the most vibrant media cultures in Asia, eventually earning the

nation the title of 2nd most oppressive nation on the Internet in 2011[9] and designation as an

"enemy of the Internet."[10] Understanding of the depth and breadth of these controls is

critical to comprehend the work Burma still must do to reform its information environment.

Content

Of all three information activities, content controls have the longest history. The

roots of Burmese information content suppression can be traced to 1878 and the British

government's Vernacular Press Act, which banned "defamatory reporting" against the

government by local newspapers. British controls continued with the Official Secrets Act of

1923, which created a new class of content (state secrets) and criminalized possession,

control and communication of information that may, if disclosed, have a negative effect on

the sovereignty, integrity, or safety of the state or its foreign relations.[11] The modern

incarnation of the Vernacular Press Act, the 1950 Emergency Provisions Act, was one of the

first passed by the Burmese parliament after the country gained its independence and continued to suppress criticism of public servants (including government ministers) by controlling content "liable to affect the morality or conduct of the public…in a way that would undermine the security of the Union or the restoration of law and order."[12] Following the 1962 military coup, the subtle undertones of control became an overt flood of draconian content controls. The country's new dictatorship replaced nearly all of Burma's existing press laws with a new single law, the Printers and Publishers Registration Law of 1964, which enacted strict press control via registration of all books and journal, and pre-publication censorship.[13] By 1965, all of Burma's newspapers were nationalized, and by 1969, only six of the originally hundreds of newspapers publishing in Burma remained.[14]

Content controls adapted as Burma connected to the Internet in 1999. Though ostensibly built to regulate technologies associated with online transactions and commerce, the Electronic Transaction Law of 2004 extended many of the existing content controls by making illegal a wide, and vague, range of offenses associated with the content inside electronic transmissions which include acts "detrimental to the security of the State…law and order…peace and tranquility…national solidarity…national economy, or national culture." Most troubling, this same law also guarantees government access to the cryptographic keys (certificates) necessary to tie content to communicators.[15]

Communicators

Open suppression of communicators is a newer phenomenon in Burma, but follows the same framework of regulatory, direct and legal controls as content and connectivity. The same law that established censorship controls, the Printers and Publishers Registration Law of 1964, also requires registration of journalists themselves. Using this law, the military

junta established a single government mouthpiece for news in and out of the country and, in a de facto manner, expelled all foreign journalists by requiring all journalists in the country be registered (government-approved) Burmese citizens.[16]

Direct controls against communicators emerged into public view during the nation's 1988 pro-democracy uprisings and have been consistently used since. In 1988, the nation's pervasive intelligence apparatus took direct action against communicators by arresting dissidents and journalists, labeling them as informers and spies, and creating an atmosphere of paranoia so high that anyone with a camera feared arrest on the spot. Thus, demonstrations with millions of participants and over 3,000 killed, largely escaped scrutiny from the world community.[17] These same controls, however, did not work with the same effect during the 2007 Saffron Revolution, when citizen journalists used grainy mobile phone video, Burmese Internet cafes, and web proxy servers to circumvent the nation's technically unsophisticated Internet controls and transmit a shocking picture of Burmese government suppression of the demonstrations to a host of world news outlets.[18] To combat these "information leaks," the government further constricted direct controls on internet cafes, adding requirements for registration (to include extensive background checks), detailed logging, and filming of all internet sessions, with the products of these actions turned over to the national security apparatus.[19]

The most oppressive controls on communicators, still commonplace today, come in the form of the disproportionate prison sentences levied on those found guilty of violating the country's vague content and connectivity laws. The aforementioned Electronic Transaction Law, one of the most liberally used, carries a sentence of 7 to 15 years per offense.[20] The high-profile conviction of journalist blogger Maung Thura, who was sentenced in 2008 to 45

years for covering the government's inept handling of Cyclone Nargis disaster relief, is a

prime example of how quickly the government can stack these prison sentences.[21]

Connectivity

In the Internet age, Burma has been accused of using a blend of cyber attacks,

bandwidth throttling, website blocking, and in extremis, an "internet kill switch" to directly

control the ability of communicators to connect to objectionable content in the government's

eyes. Because Burma's Internet controls were not technically sophisticated, the government

quickly resorted to a complete block on mobile and Internet access during the 2007 Saffron

Revolution -- the same weapon later employed by its Arab Spring contemporaries.[22] Since

2007, however, the government has been accused of employing subtler and difficult-to-trace

methods of external information control. A number of high-profile cyber attacks and

telecommunication equipment failures have occurred coincident with the significant national

events, including the anniversaries of the 1988 and 2007 demonstrations and the 2010

election. Many observers interpret massive dynamic denial of service attacks and emanating

from external sources and weakly explained bandwidth reductions in the weeks leading up to

these anniversaries as government attempts to disrupt dissident plans for demonstrations.[23]

Ironically, these attacks also serve as justification of the need for increased government

influence in cyber security and the disruptions are clear evidence of the need for a more

robust telecommunications infrastructure capable of withstanding both power fluctuations

and disruptions of their primary undersea cable.[24]

Finally, in 2011, the Citizen Lab researchers discovered strong evidence of systemic

and nationwide website blocking using Blue Coat web proxy devices. While these devices

have legitimate uses to combat cyber attacks and optimize web performance in the face of

scarce bandwidth common across Burma, they can also be used to block access to websites altogether. Researchers were able to comparatively match near-total blocks on political, media, religious and social sites both inside and outside Burma, as well as blocks to sites allowing media sharing (such as YouTube) and offering methods to circumvent Internet controls, to default categories for Blue Coat ProxySG devices. In total, over 500 of 1,669 surveyed websites in 2009 and 2010 were denied to Burmese Internet users.[25]

Burma at an Information Crossroads

Today, Burma stands at the juncture of a reforming, but fragile, information environment and potential explosive technological growth. Since 2011, the Burmese civilian government has taken the first tenuous steps to open its information environment after fifty years of repression – enacting three significant reforms aimed at communicators, content and connectivity. Simultaneously, the government has taken strong steps to boost its stunted infrastructure and now is considered one of the world's last remaining mobile telecom "green fields," making it highly attractive for internal and foreign investment.[26]

Reform Measures

The first reform measure, the opening of internet access to a wider range of dissenting voices, occurred in parallel with the installation of the new quasi-civilian government in 2011 and can be best represented by the symbolic granting of Internet access to Aung San Suu Kyi, the country's popular democratic opposition leader. Suu Kyi had expressed a strong desire during her years of house arrest to reach her followers via Twitter and Facebook, and in January 2011, she was granted access to the Internet from her home via one of Burma's two Internet Service Providers (ISPs). Equally symbolic, though, was the fact that the government determined her access would be provisioned through Burma's military-affiliated

ISP, rather than the public ISP as she requested. This likely contributed to her year-long delay in accessing the Internet, leading observers to speculate she was watching government actions to determine whether these access reforms were legitimate.[27]

A more significant reform for the average Burmese citizen, given the high price of Internet access, culminated in August 2012 with the end of pre-publication censorship. Beginning in June 2011 with the exemption of 180 non-political newspapers, the government incrementally exempted journals from pre-publication censorship, continuing with business and legal publications in December 2011, educational and literary works in May 2012 and finally all publications.[28] The government extolled this change with the announcement of the end of "48 years and two weeks" of censorship on 20 August 2012.[29]

In the same year, Burma removed connectivity blocks to external websites, allowing nearly unfettered access to content on the Internet for its citizens with network access. In a 2012 revisit to their previous research, The Citizen Lab confirmed that only 132 of the 1,669 surveyed websites remained blocked and those blocks were primarily associated with pornographic, alcohol or drug-related subjects.[30]

The State of Information Access and Technology in 2014

The statistics tell the tale for the state of Burma's information environment. Burma has twice the number of fixed line Internet users (534,810)[31] and landline telephone subscribers (560,000) as active newspaper subscriptions (235,000)[32], yet those Internet and fixed telephone users represent less than 1% of the nation's 55 million inhabitants. Television and radio use is significant – Gallup estimated 62.8% of working-age citizens listen to the radio weekly and 44.7% watch television news at least weekly – but these modes are unidirectional flows of government influenced information.[33]   The government operates

two television stations and one radio station and holds stakes in two television and nine radio stations run by Burmese public-private partnerships. More compelling, and certainly relevant to the nation's information future, is the country's 5.4 million mobile phone users[34]– a number anticipated to exceed 6.5 million by October 2014 with the start of an ambitious $2 billion mobile telecommunications roadmap aimed at growing mobile phone penetration in Burma to over 80% (48 million users) by 2016.[35] Non-technological options, such as print journals and newspapers, are plagued by physical distribution challenges caused by Burma's poor road network and the economic impoverishment of its client base – average Burmese citizens cannot afford to buy individual newspapers or books, even if they can reach them.[36]

The nation's telecommunications infrastructure, both external and internal, is inadequate and plagued by frequent interruptions in service and power. External data and telephone access flows through three main cables, two dry cables to China and Thailand respectively, and a single undersea cable (SEA-ME-WE 3) which alone supplies 80% of the nation's bandwidth but is prone to frequent interruption at key nodes.[37] Power is the most essential ingredient for Internet, telephone, radio or television access and it is hard to obtain in Burma today. Power shortfalls have affected both end users and the telecommunications backbone itself. The World Bank estimates less than 66% of Burma has access to power, dropping to less than 16% in rural areas, and those with access still experience dramatic power fluctuations that cycle with the monsoon season and the country's hydroelectric dam production.[38]

Internet access within Burma flows through two primary ISPs, one state-owned ISP to handle public traffic and a second military-controlled ISP for defense traffic, plus a handful of appreciably smaller public-private ISPs. This arrangement effectively separates

government traffic from private traffic. All traffic through these ISPs, in turn, flows through a government-controlled Internet Gateway for external Internet access.[39] This Internet Gateway, or alternatively its subscribing ISPs, is the most likely point for Blue Coat proxy installation for Internet filtering and defense[40] and, therefore, the greatest single influence point to restrict external information flow to and from Burma regardless of user device (mobile internet, fixed internet or even potentially Voice-over-IP phones).

For the average Burmese citizen, the biggest obstacle to information access is cost. Under Burma's state monopoly however, the costs of a cell phone SIM card could range from $50 – 500 (in equivalent US dollars), with high per minute costs[41] and fixed Internet access could range from $30 – 500 a month.[42] This is an enormous burden in a country where even urban dwellers earn on average $1 US dollar a day.[43]

In order to modernize the country's infrastructure and develop its economy, Burma has liberalized its telecommunications sector and is granting licenses to foreign companies. The first two licenses granted under the new 2013 Telecommunications Law were aimed at expanding mobile phone and data services nationwide. Two bidders, Qatar-based Ooredoo and Norway-based Telenor, received licenses to introduce new service by October 2014.[44] Ooredoo acted quickly to introduce 3G services in August 2014, reaching an estimated 1 million new customers within a month[45] and Telenor followed suit with a broader offering that includes next generation 3G services and legacy 2G services that are more affordable to most Burmese citizens.[46] Feeling the pressure to drive quality up and prices down, the government monopoly, run by the Ministry of Posts and Telecommunications (MPT), is partnering with two Japanese companies, KDDI and Sumitomo, to keep from losing further

market share.[47] Of all media markets, this mobile phone and data market stands to be the most lucrative, not the mention the most conducive to information freedoms.

If Burma can build up both the power and telecommunications infrastructure to support it, it stands to become the world's first nation predominated by mobile Internet use.[48] The nation is taking additional future steps to address raw bandwidth availability via involvement in the SEA-ME-WE 5 undersea cable consortium, slated for completion in 2015.[49] Unlike many developed nations, Burma is unencumbered by a legacy infrastructure that is costly to update, more work remains to be done than Burma can do on its own. External investment will be key, but an information environment whose trajectory, positive or negative, is still unclear may affect this investment.

Incomplete and Reversible Progress

Burma's recent strides to open its information environment both internally and to the outside world are remarkable but, contrary to previous statements by national leaders, are neither complete nor irreversible. Although cautious optimism abounds today, each of the three major reforms undertaken are surface deep at best. Further, new laws, written to open economic development, have not effectively cleaned up the legal landscape. Most concerning, however, end of the pre-publication censorship "safety net" and continued aggressive prosecution of citizens under nebulously constructed laws has created a insidious culture of fear and self-censorship that is corrosive to growth of information freedom.

First and foremost, each of the major reforms enacted in since 2011 can be undone nearly instantaneously and at the discretion of the government. The looser interpretation of licensing regulations, which have allowed dissidents like Aung San Suu Kyi to have Internet access, did not come as a change of policy, but rather an interpretation or conscious decision

to allow access.[50] Similarly, the end of pre-publication censorship did not spell an end to the

bureau responsible for censorship, the Press Scrutiny and Registration Department (PSRD).

The PSRD remains, still chartered to archive and register published works in Burma, and

some observers claim it is still using its "red ink" for post-publication censorship and

prosecution actions and a return to pre-publication censorship may only be only a

government decision away.[51] Lastly, the unblocking of websites done by the MPT (ostensibly

via Blue Coat devices that the government has not admitted to using) can be reversed with a

few short system commands using default Blue Coat filtering categories.[52]
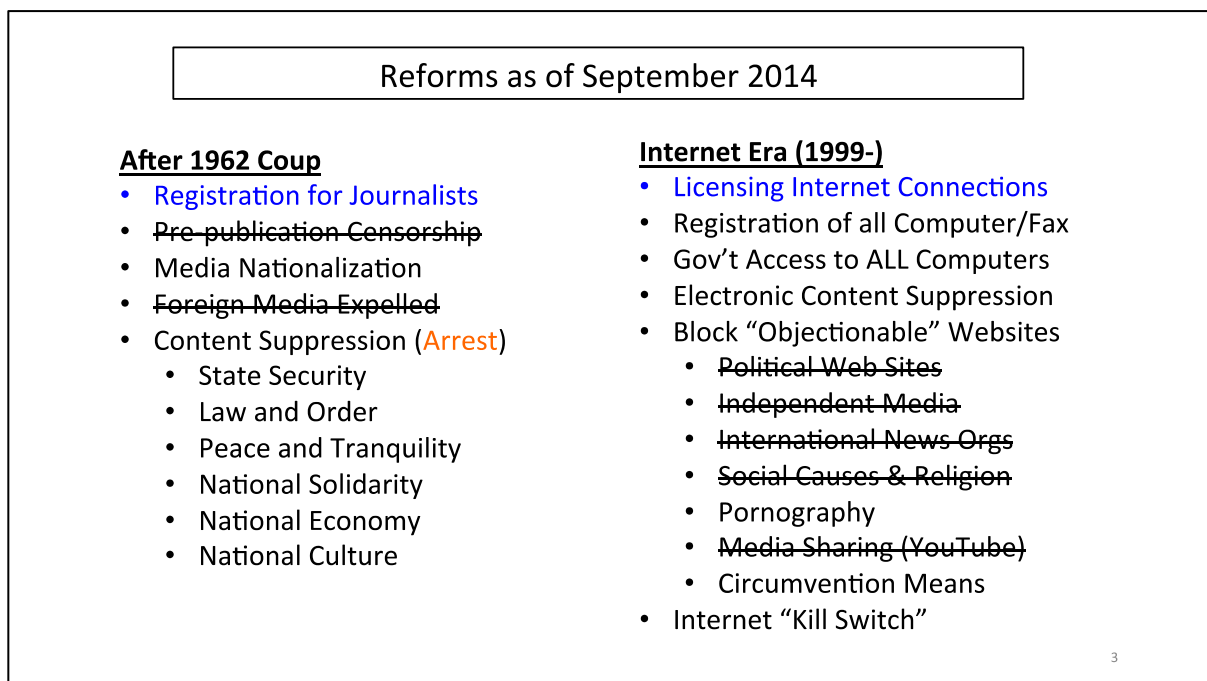
Figure 1: Net Effect of 2011 Reforms

None of the government's information reforms involve replacement of existing law.

Legacy laws such as the 1923 Official Secrets Act, the 1950 Emergency Provisions Act, and

the 1964 Printers and Publishers Registration Law, and the 2004 Electronic Transactions

Law remain in effect. Figure 1 contains a sampling of major information suppression

measures in place prior to the 2011 reforms, most via laws and regulations, and annotates

which controls were eliminated. Items in blue have been liberalized, but involved no change in law or regulation. The item in red text (arrest) represents continued aggressive efforts by the government to prosecute offenders.

The government clearly still desires some degree of control. Following the elimination of pre-publication censorship, the government established a Press Council consisting of Burmese journalists and government representatives to "ensure that the media did not threaten the interests of the people, the state and Burma's sovereignty"[53] and paired this with dissemination of 16 media "guidelines." The guidelines included instructions to avoid coverage of topics such as "the government and its policies," "economic data or photos," "crimes committed by minors," or "corruption, illegal drug production and trafficking, human traffic, forced labour or child soldiers" in a negative light or without "reliable sources of information."[54]

With this context, the rise of a culture of fearful self-censorship is understandable, and likely represents a new focus to enforce information control both in and out of the country. Government emphasis on press accountability, continuance of repressive laws and pursuit of prosecutions based on these laws continue to fuel mistrust of government reforms. Another prime example of this was the July 2014 sentencing under the 1923 Official Secrets Act of five journalists who reported that a Burmese facility was used to make chemical weapons, and action that underlines the fear of reprisal and the fact that the media in Burma still cannot act as a check to balance to government's system. Each of these journalists received "a decade in prison with hard labor."[55]

Driving True Change

Amidst this discussion of reform and change, two questions emerge that directly frame Burma's way forward: Should the information environment, and the Internet as the most easily leveraged means, be opened in Burma at all? And if so, how, given the clear challenges the government has had in truly releasing controls on information? The answer to the first question is a resounding yes – this is not only a human right issue, but an economic one as well. The second is more complex. An opportunity exists, however, to augment the current U. S. approach to Burma, continuing emphasis on responsible and principled foreign investment while targeting specific private investments in "win-win" technologies that simultaneously support economic growth, stability and information freedom.

An open information environment is not only a human rights issue; it is essential to economic growth. The UN, via Special Rapporteur, has asserted that the access to information and the Internet is linked as a human right to freedom of expression and to international law protections.[56] This is morally important, however further research has further linked information and Internet freedom specifically to economic growth. Researchers have shown a positive correlation between Internet freedom, Internet penetration and a country's gross domestic product (GDP).[57] Further, a 2014 Deloitte study done for Facebook assessed increased Internet penetration could boost GDP 75% regionally in Southeast Asia, with a corresponding regional 27 million job boost and 16% reduction in extreme poverty.[58] In the end, information flow to and from external entities, today done most often via the Internet, is good for Burma, its citizens, and its government.

This approach is congruous with the current U.S. position on Burma, which has changed from sanction to encouragement, and aims to "support political and economic

reforms" and to "promote responsible international engagement and human rights."[59] Beginning in July 2012, the U. S. took steps to eliminate nearly all trade sanctions.[60] Further, the current approach seeks to "mobilize the unique assets of U. S. society," "build public-private partnerships with U. S. businesses," and "encourage the Burmese private sector to invest in its own transition and growth," with emphasis on small and medium businesses. The public-private partnership engagement involves over 20 U. S. companies, including tech giants such as Microsoft, Hewlett-Packard, Cisco, Google and Intel.[61]

While the government of Burma will likely never allow total privatization of information and communication technologies nor should it, Burma should seek greater balance in its portfolio. The Internet, and its emergence in a developing nation, is often described as an ecosystem of networks, devices and content that create a virtuous cycle of economic growth by creating a new information economy and boosting all other sectors. As previously mentioned, nearly all telecommunications network providers in Burma are either state-owned or heavily influenced by the state, not an unusual condition during the early stages of growth due to the large upfront capital investment necessary which naturally constrain the number of market participants. Device providers also tend to have large economies of scale, and large, multi-national device providers dominate today's market in Burma. The third component of the ecosystem is content and applications – and this is the true engine of an information economy, as it allows participation and innovation from small and medium business inside a country as well as external investment.[62] Burma must remove barriers to both foreign investment and internal small and medium business growth to enable this virtuous cycle.

The most significant barrier to investment in Burma today is the tangled web of vague, incomplete and outdated laws and regulations in place in Burma today continues to threaten citizens (consumers and producers) and frighten potential investors. The same laws and policies discussed earlier that suppress citizen freedoms also have an economically chilling effect. For example, economic data is difficult to obtain and, depending on interpretation, any number of the aforementioned laws could deem disclosure illegal, but at the same time, this data is essential for private investment. Gaps in law and policy leave many investor protections and contract or dispute mechanisms uncertain. Further, some laws, such as the 1989 State-Owned Economic Enterprises Law that specifies a lengthy list of economic activities, including telecommunications, that are the sole right of the state[63], should be significantly rebuilt.

The U. S. and other forward-thinking international partners should encourage principled private investment in Burma. This principled investment concept holds investing companies responsible for their actions. For citizens, it protects essential rights. For the government, it protects against exploitation by investing nations and companies, such as the aforementioned controversy over the Myitsone Dam. For investing companies, it provides predictable "rules of the road" that promote investment security and growth, protecting them from government overreach. A variety of frameworks exist that outline the specific measures and obligations on both the part of the government and companies necessary protection of rights, such as the multi-stakeholder Global Network Initiative.[64] Additionally, the U. S. has a variety of tools at its disposal with principled investment "built in." For example, entities such as the U. S. Overseas Private Investment Corporation (OPIC) have the ability to extend funding and, perhaps more importantly, political risk insurance for targeted projects to U. S.

companies. OPIC has funded power and telecommunications projects in the past, including

wireless infrastructure in Columbia, Pakistan, Papua New Guinea, and other developing

countries, and screens participating companies to ensure conformance to human rights

standards.

Lastly, the U.S. should encourage this principled investment by tech sector firms in

specific technologies that support both economic growth and information freedom, such as

development of an Internet Exchange Point (IXP), content delivery services, and satellite

communications. At its heart, the Internet is "a network of networks," with each network

owned and operated at some level by an ISP. An IXP is both a facility and an arrangement

that allows individual ISPs to interconnect, binding together multiple network paths via

peering and transit arrangements that allow traffic to flow to wider audiences.[65] By

combining international trunk cable upgrades, such as the planned SEA-WE-ME 5 undersea

cable landing[66] and enhancements to the land line to Thailand, Burma can seek to link ISPs

from neighboring countries, such as Bangladesh, Thailand, and India which each have IXPs

of their own, with local ISPs. Further, IXPs create a telecommunications marketplace that

allows small and medium ISPs to connect in an efficient and fair manner with larger ISPs,

allowing for telecommunications sector growth and competition. IXPs, while not perfectly

transparent, are most often associated with a multi-stakeholder environment that increases the

consequences on all in the event of a unilateral government action – potentially

disincentivizing a repeat disconnection action like those seen during the 2007 Saffron

Revolution. Proponents cite IXP development in Kenya and Nigeria as positive examples of

the openness and inclusiveness IXPs can bring.[67] Lastly, formation of an IXP in Burma need

not be only a national activity. ASEAN has long investigated the concept of forming an

ASEAN regional IXP[68] and pairing telecommunications infrastructure expansion with formation of a western ASEAN IXP may be a tremendous opportunity to boost infrastructure in a multi-stakeholder fashion. As a prime ASEAN investor, the U.S. is well positioned to encourage this growth.

Principled investment in other technologies such as content distribution networks and satellite communications may also help Burma overcome barriers to information access. Often attached to IXPs, content distribution networks (CDNs) improve the efficiency of information access and network performance by caching Internet content closer to individual users, minimizing the requirement for content requests that span the global Internet.[69] CDNs also have the secondary benefit of offering protection against distributed denial of service attacks,[70] such as those experienced by Burmese news outlets and other websites since 2007, and also reduce the need for the government's web filtering capabilities to preserve network function. Similarly, investment in satellite communications technology also, by its very nature, offers stability for information access, particularly in remote locations that may not be reliably connected to terrestrial cables due to terrain or distance limitations. Once costly, the global proliferation of direct-to-home satellite television, radio and internet have driven terminal prices down and increases in technology have driven bandwidth up, a trend comparable to both broadband wired and wireless internet installations. Most significantly, parallel development of satellite-enabled data networks for consumer use in parallel to terrestrial and undersea long-haul connectivity offers a viable means to grow connectivity rapidly and increase path diversity that can be enmeshed (via IXP or other peering arrangement) nationally but yet not be encumbered by single points of failure, adding robustness and stability to the national infrastructure.[71]

Conclusions

Since 2011, Burma has taken a series positive, but not irreversible, steps to depart from a 50-year history of draconian controls on information content, communicators and connectivity. As none of the government's recent reforms have come from a change in law or regulation, they are rapidly reversible by a simple change in interpretation of regulations or technical action. Further, Burma's information control tactics appear to have changed from direct suppression of both message and messenger to an effort to suppress objectionable messages indirectly through pressure on the messenger via the threat of prosecution.

In parallel to these reform actions, the government has embarked on a massive effort to build telecommunications infrastructure to make information available to a wider range of its citizens. This aggressive drive to create a robust telecommunications infrastructure leaves Burma, as a massive untapped market, poised to become one of the first "mobile internet" societies in the world. Growth will happen and the question is how this growth will occur.

Encouragement of principled private investment, infused with human rights protections, in selected telecommunications technologies represents a positive way for the U.S. to help Burma continue, and make permanent, their recent reforms. The technologies themselves create incentives to build an thriving information economy in Burma that is best postured to create economic growth, maintain stability and protect the rights of Burma's citizens.

Recommendations

- Burma should continue to accelerate legal and regulatory reforms, particularly for those laws that enhance individual freedoms and protect foreign investments.

- Burma must continue to upgrade its telecommunications infrastructure and, to be effective, must synchronize this growth with its power infrastructure.

- The U.S. should encourage principled private investment, in accordance with standards such as the Global Network Initiative, via means such as OPIC and regional partnerships such as ASEAN in key information technologies that build markets and inherently encourage transparency.

Final Remarks

Burma is at a crossroads. Time will tell if their newfound, but tentative, openness is a false start or signals the true beginning to a new era of information, and other, freedoms. This issue is still in doubt. With planning and principled engagement, as well as a little patience, Burma can grow into a modern and fully connected democracy. In that future, both Burma and the world community will both be better for it.

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