

No Longer Bit Players
Internet Governance & Economic Growth in Developing Countries
Joshua Goldstein¹

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0 | Introduction

For developing countries interested in economic growth and social welfare, internet governance can no longer be ignored. What were once a set of esoteric technical issues: peering agreements between telecommunications providers, protection against SPAM, cyber-security and rules for measuring internet traffic across borders, are now critical to innovation, business development, export growth and for addressing governance failures related to public service delivery.

The economic evidence is uncontroversial. Kenya's 'Ngong Road' has pushed internet related exports from \$16M in 2002 to \$360M in 2010.² In the United States, the internet ad-supported industry has created more than 3 million jobs.³ The World Bank has found that a 10 percent increase in internet penetration leads to 1.7 percent increase in GDP growth.⁴ The internet creates productivity gains through platforms such as cloud computing, allows the smallest startups to challenge global businesses, and enables distributed access to investments via 'crowd sourcing.'⁵

The internet also matters to governments, particularly those in developing countries, where there is an increasing recognition that weak and unequal economic growth are due to governance failures.⁶ Poor governance is about misaligned incentives, between public officials and those that elect them, and between service providers and users. In practice, civic technology - the tools that help connect governments and service providers to their citizens - has the ability to transform the relationships between these principals and agents by helping to overcome weak monitoring and accountability.

These gains, however, are fragile. The internet as we now know it is a product of a multi-stakeholder governance structure, bringing engineers together with civil society, governments and corporations. As the internet becomes more central in the lives of citizens and consumers, the stakes of these technical decisions around internet governance and standards rise as well.

¹ Joshua Goldstein is a PhD candidate at Princeton University, where he is affiliated with the Center for Information Technology Policy.

² "Upwardly Mobile: Kenya's Technology Start-Up Scene is About to Take Off", *The Economist*, August 25th, 2012

³ Hamilton Consultants, *Economic Value of the Advertising Supported Internet Ecosystem* 24 (June 10, 2009)

⁴ Caroline Freund & Diana Weinhold, *The Internet and International Trade in Services*, 92 A.E.A. Papers & Proc. 236, 236 (2002); see also Caroline Freund & Diana Weinhold, *The Effect of the Internet on International Trade*, 62 J. Int'l Econ. 171, 172 (2004) (for trade in goods)

⁵ Betsy Masiello & Derek Slater, *Embracing An Innovation Stimulus Package*, available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2104350

⁶ see, for example, Benjamin Olken and Rohini Pande, "Corruption in Developing Countries", *National Bureau of Economic Research (NBER) Working Paper 17398*, September 2011

This article is about how the internet works today, why it matters for developing countries, and how some states are seeking to change the fragile multi-stakeholder model of internet governance. In particular, this article will evaluate the proposals made by some of the 200 sovereign state members of the United Nations International Telecommunications Union (ITU) who will gather in Dubai in December 2012 for the World Conference of International Telecommunications (WCIT)⁷. The WCIT is a treaty developed to facilitate global interconnection and interoperability between telecommunications carriers. The treaty was last reviewed in 1988, an era where the majority of telecommunications networks were state owned and controlled.

The WCIT itself is unexceptional; ITU member states meet regularly to develop voluntary standards for spectrum allocation, satellite orbital slots, and international telecommunications standards. However, this meeting has attracted attention because member states have made a number of proposals that would expand the international telecommunications regulations (ITRs) to give states a role not only in regulating traditional interconnection issues, but also in regulating the functioning, security and architecture of the internet.

This article is also designed to help pose questions for economists and political scientists interested in internet governance. For economists, areas for future research include producing more robust macro evidence of the link between internet access and economic growth, and at the micro level, understanding the causal mechanisms and effects of specific internet governance policies. For international relations theorists, internet governance raises important questions related to sustainability of a global, rule-based, open, liberal order (Ikenberry 2011), and to the role of non-state networks in international affairs (Slaughter, 2010). While answering these questions is beyond the scope of this paper, a detailed case is the first step in a broader project on understanding the role of information technology in the context of public policy.

1 | A Brief History of Internet Governance & The Multi-Stakeholder Model

For much of the history of global communications, governance decisions were made exclusively by states in the context of international institutions such as the ITU. This was the case in the most recent negotiation of the ITRs at the 1988 World Administrative Telegraph and Telephone Conference (WATTC). The WATTC treaty addressed the behavior of state run, monopolistic telecommunications operators. The treaty articles were largely oriented around ‘calling party pays’ agreements and set of strict service demands related to quality of service (QoS).

The internet, a decentralized network of interconnected computers, has a very different founding history. “Built with strains of American libertarianism,”⁸ the Internet developed through ad-hoc agreements between engineers through groups like the Internet Engineering Task Force (IETF), which made decisions about internet protocol (IP) standards.

The story of internet governance is the story of states seeking increasing power in this decentralized system. In 1996 states sought to take control of the domain names system (DNS) away from the United States Government, where it had rested since its invention, to an international institution like the ITU. The US ultimately avoided such measures, but instead

⁷ The WCIT is a closed door meetings, but over twenty proposals are available at WCITLeaks.org

⁸ Jack Goldsmith & Tim Wu, *Who Controls the Internet*, Oxford University Press, April 2006.

created the Internet Corporation for Assigned Names and Numbers (ICANN), a nonprofit private corporation based in California with strong ties to the United States Department of Commerce. At ICANN, the United States continued to play a strong role in the form of the Government Advisory Council (GAC).

The multi-stakeholder process was codified between 2002 and 2005 at the World Summit on the Information Society (WSIS), a process that affirmed an open, competitive and pro-market governance structure for the Internet. Again during the WSIS, the European Union, joined by many developing countries, attempted to create stronger non-US government control in ICANN, but they were again rebuffed. The US aggressively used the GAC to drive their agenda, for example, blocking global top level domains (gTDL) such as .xxx.

In 2009 – 2010, a number of states tried to take a larger role in the management of IP addresses. At the Guadalajara Plenipotentiary Meeting, ITU member states passed Resolution 181, which argued that the ITRs should be updated in the context of the move to internet protocol (IP). Russia and other countries sought to turn ICANN GAC into an intergovernmental body with oversight powers. During the same year, important rising powers such as Brazil signaled a move away from the multi-stakeholder process by withdrawing their support for a UN Committee on Internet-Related Policies (CIRP), a non-binding stakeholder body promoted by India to advise the UN General Assembly on issues related to internet governance.

Corporations, particularly those at the content and carriage levels of the value chain, have continuously sought to influence regulatory outcomes in their favor. In 2000, an era when the content industry was quickly losing profitability, these companies sought a regulatory solution for sharing profit with the network operators, the carriage providers. The content industry argued that the structure of the internet must recognize opportunities for future growth. Today, with the growth of a robust and profitable content industry, carriage companies are now making similar arguments for a monetary flow in the opposite direction.

In recent years, the internet has become integral to both the free flow of information and global trade. This has only strengthened the resolve of states seeking to increase their power over the internet. The December 2012 WCIT negotiations in Dubai is only the latest showdown between parties seeking to change the existing multi-stakeholder process.

2 | Analysis of Country Proposals and Issue Areas

ITU member states are proposing a plethora of changes to the ITRs. So far, member states have thus far proposed the following issues: countermeasures against SPAM, dispute settlement, peering arrangements, misuse of numbering, names and subscriber information, quality of service, cyber-security including data, traffic and billing information, ‘new technologies’ regulation and internet address allocation and distribution. While an exhaustive analysis is not possible here, this section highlights a number of key issues that seem to have the strongest support, as well as those that would have the biggest impact on internet governance.

Inter-Connection

The most recent ITR treaty laid the ground work for interoperability, allowing telephone traffic to flow across international borders while guaranteeing clear rules for settlements. The ITRs

included an exemption, Article 9, which allowed certain unregulated traffic, including virtual private networks and banking transactions. This is the same exemption that allows internet protocol (IP) traffic to exist outside of the boundaries of the ITRs.

For this reason, some developing countries, who have seen their state run telecom revenues decrease in recent years, see re-opening of negotiation of the ITRs as an opportunity to bring new technologies under the existing legal framework while extracting revenues. In particular, countries are seeking to bring internet traffic under the ITRs in two specific ways. The first set of proposals seeks to set up a centralized quality of service (QoS) mechanism. The second set of proposals, would establish a “sending-party-network-pays” system of settlements similar to that of legacy telecom operators. Both proposals pose risks to network latency and will erect barriers to innovation that are particularly damaging to developing countries. Russia, Iran, and some countries in Africa and the Caribbean have indicated initial support for these proposals.⁹

Today, a robust interconnection market exists amongst internet backbone, access and content distribution networks. Transit agreements are bilateral agreements to pass along traffic to downstream end users, while peering agreements are agreements between two network operators who agree to carry one another’s traffic. According to the OECD, “the terms and conditions of the Internet interconnection model are so generally agreed upon that 99.5% of the interconnection agreements are concluded without a written contract.”¹⁰ A Treaty on QoS would introduce borders and global regulations to a currently efficient and borderless interconnection market. Further, such a treaty would lock in particular technical and commercial approaches that would limit the development of alternative approaches to interconnection.

The “sending-party-network-pays” ITRs proposals follow a set of regulations that emerged in the circuit-switched telephone model. Under this model, a circuit is opened between two parties and occupied by these two parties for the duration of the call. With a limited number of switches, network operators make up the opportunity cost of using a switch by charging per minute rates to parties initiating the calls. The internet, on the other hand, is a packet-switched network, or a network based on “hot potato routing”, where data is routed through a series of networks at the earliest possible opportunity. For this reason, the loose network of bi-lateral agreements between companies ensures that appropriate mutual interest is the driving market force.

The “sender pays” model from the telecom era is inappropriate for the multi-party nature of internet routing. Further, such a model would lead to “the international and regional fragmentation of the network into low-cost, content-rich regions and high-cost, content-poor regions.”¹¹ Such globally mandated approach would be particularly problematic for developing countries in two ways. First, high cost / low revenue markets could be sanctioned because they

⁹ CWG-WCIT12 Temporary Document 62 Rev. 2, Council Working Group To Prepare for the 2012 World Conference on International Telecommunications, International Telecommunications Union, 21 June 2012

¹⁰ “Internet Traffic Exchange: Market Developments and Policy Challenges”, OECD Working Party on Communication Infrastructure and Services Policy, October 2011, in “Internet Interconnections: Commercial Arrangements and the Need for Quality of Service”, Internet Society Working Paper

¹¹ Internet Interconnections: Commercial Arrangements and the Need for Quality of Service. The Internet Society

are more expensive to send traffic through. Second, content providers in developing markets could be hampered by the prohibitive cost of launching a new initiative for a global audience. While legacy operators in developing countries might benefit from the short term by these agreements, the longer term consequences would be catastrophic for both innovation and access.

Cyber-Security

A number of member states see the WCIT as an opportunity to establish an international treaty on issues related to cyber-security. Russia, for example, seeks to constrain the United States, who is viewed as superior in their control of the DNS root, their strong internet content companies and recent successes with Stuxnet and Flame cyberattacks. The United States has continually evaded Russia's attempts to engage in a treaty that would prohibit the use of cyber space for military purposes. Some researchers see the movement of this effort to the WCIT, primarily a treaty related to the actions of telecommunications actors, as a sign of weakness that they have failed in other diplomatic venues that target weapons issues rather than telecommunications regulations.¹²

Further, a number of Arab States and the Chinese have supported Russia's proposal because of a general uneasiness with Israeli cyber-war capabilities. Further, Arab States see the broader cyber-security agenda as an opportunity to strengthen state prerogative to control the free flow of information. These states seek to set up firewalls to control political and cultural content they deem to be against state interest. The Russians have sought to control the flow of information, not through over censorship, but by building national internet companies with strong state ties to rival their US counterparts.

One unattributed ITR proposal states:

"A Member State shall have the right to know through where its traffic has been routed, and should have the right to impose any routing regulations in this regard, for the purposes of security and countering fraud."¹³

Many cyber-security proposals contain generic language related to "taking actions to controlling SPAM" or advocate for "national regulation for internet security". A coalition of African countries, for example, has lifted language nearly verbatim from the US Strategy on Cyber Security.

There is little evidence that the ITU is an appropriate venue for addressing cyber-security issues. On the standards front, the single impactful decision is X.509¹⁴, which sets formats for cryptography such as public key certifications, attribute certificates, and certification path validation algorithms. Other activity has been limited to the capacity building front, such as Resolution 130 and 146, which have supported minimal security work in developing countries. Further, the United States Government, a much more powerful and well funded institution than

¹² Milton Mueller, Threat Analysis for the WCIT Part 4: The ITU and CyberSecurity, Internet Governance Project, June 21, 2012

¹³ WCIT TD-64

¹⁴ <http://www.itu.int/rec/T-REC-X.509>

the ITU, has had troubles changing the network security practices of its own government departments, let alone enhancing broader international standards.

Expanding the Scope of the ITU

A number of developing countries have submitted proposals to expand the capacity of the ITU as a one-stop shop for domestic dispute resolution, control of internet names and number systems, and standards making. From a historical perspective, this is understandable, as the ITU has been the go-to body for these countries in telecommunications space. However, two examples, Multiprotocol Label Switching (MPLS) and 56K modem standards, illustrate why the ITU is inappropriate to play an expanded role in the internet era until they take steps to address their own opaque and closed processes.¹⁵

For over twenty years, the Internet Engineering Task Force (IETF) has led the standards setting process for MPLS, which handles packet labeling on the internet backbone. IETF is an open and inclusive process, encouraging engineers from all over the world to take part in the consultative process. In recent years, the ITU announced that it would begin standards work on MPLS. The ITU website stated that this work was taking place in Geneva, but no other information was available.

The IETF responded: “If both technologies are deployed, it is likely that there will be confusion; if only one is deployed, the existence of the other is irrelevant. In this instance, there are believed to be commercial products in development for both proposals, so confusion appears to be inevitable.”¹⁶ Such confusion is ultimately detrimental to the industry and internet users globally.

Second, the ITU could have played a critical role in bringing 56K modems to market. When 28K modems were broadly used, companies like 3COM, X2 and Rockwell made competing standards for the next generation 56K modem. The ITU sought to resolve this conflict, but by the time they did, the world had moved on to broadband, and 56K modems were no longer relevant. These are just two of many of the examples of why state driven governance is inappropriate to govern the internet, a decentralized, quickly evolving entity.

Booz Allen recently called the ITU one of the world’s most stable organizations. Founded in 1865, the ITU is a “story of organizational and institutional resilience against all odds.”¹⁷ Indeed, the ITU made analog communications possible globally, paving the way for the communications networks of today. First, the institution established interoperability of telegraph signals, and later the non-interoperability of light bulbs, ensuring that low voltage light bulbs did not fit into high voltage sockets and cause fires. The international telephone system was made possible by the ITU.

¹⁵ These examples are detailed in Jacob Glick and Patrick Ryan, *The ITU Negotiations: A Call for Openness and Participation*, North American Network Operators’ Group 55th (NANOG 55) Meeting, June 2012

¹⁶ *IETF and Internet Society Statement Relating to Today’s ITU-T SG15 Decision That Will Lead to Non-Interoperability in MPLS Development*, February 25, 2011, available at <http://goo.gl/DL8Nr>

¹⁷ Booz Allen Hamilton, *The World’s Most Enduring Institutions*, available at <http://www.boozallen.com/media/file/143411.pdf> (tracking the ITU’s history from 1865 to the present)

Yet, the ITU remains wholly unprepared for the internet era. Several multi-stakeholder bodies, such as the IETF, W3C and ICANN, grew up with the internet, and are structured as open, participatory, ad-hoc internet governance processes. The next section illustrates focus areas for developing countries seeking to take part in this broader, participatory process.

3 | What Are Developing Countries To Do?

By participating in internet governance structures, developing countries have the opportunity to advocate for the participatory models and specific technical policies that will lead to more and cheaper connectivity, secure the free flow of information, and ensure home grown entrepreneurs have a fair playing field in global markets. This section outlines four steps developing countries might take. While these steps are not exhaustive, they aim to help set the tone for participation in internet governance structures.

First, developing countries should argue at the ITU that the state-led ITR treaty is an inappropriate venue for internet governance. Internet protocol traffic currently should remain under its Article 9 exemption, in order to remain a dynamic and evolving entity. In order to remain relevant in the internet era, the ITU should first focus on reforming its own institutions to become more open and participatory.

Second, developing countries should ensure that multi-stakeholder governance groups take the lead. Examples include the IETF for standard-setting, ICANN and IGF as multi-stakeholder bodies, and WSIS, a forum that envisions a “people-centered, inclusive and development-oriented Information Society where everyone can create, access, utilize and share information and knowledge, enabling individuals, communities and peoples to achieve their full potential in promoting their sustainable development and improving their quality of life.”¹⁸ Each of these institutions operates under principles of interoperability, mutual agreement, collaboration, and focus on independent standard development organizations.

Yet, there are relatively few voices from developing countries at these gatherings. One important step would be the reform of the ICANN Government Advisory Council (GAC). The GAC is a set of government representatives that report to the powerful ICANN board. Too often, the GAC makes recommendations that are at odds with the hard fought multi-stakeholder process in the wider ICANN. Further, the GAC gives governments a false idea that they represent a broader set of constituents on the internet. They make seemingly authoritative decisions on the censorship of top level domain (TLD) applications, surveillance of domain name registrants, and is not restrained by any treaties or international legal principles.

Instead of abolishing the GAC, which would isolate governments from the technical decisions made about the internet, the GAC could expand beyond the unitary state model, which limits each country to a single representative. Instead, the GAC could reflect the broader multi-stakeholder structure of the internet, allowing members of government from any level: law enforcement, diplomacy and regulatory, to join in the GAC as a way to take part in internet governance. It is imperative that ICANN and other institutions should continue to encourage participation from developing countries wherever possible.

¹⁸ WSIS, Declaration of Principles, Geneva, 12 December 2003, Principle 1

At the IETF, engineers in developing countries can take part in the standard setting that makes the internet work through joining online working groups and commenting via request for comments (RFCs). Over 4,000 engineers have contributed to open standards for email, online shopping, downloading, chat, video conferencing and security in the last forty years. For email alone, over 400 RFCs set the standard for recognizing, parsing, transporting, routing and displaying messages. Through these standards, over 284 billion emails are sent each year.

Third, developing countries should focus on strengthening local internet exchange points (IXP), an important step in ensuring the affordability and access that is critical to ensuring the social and economic gains of the internet. IXPs help internet players interconnect, improving quality of service and decreasing transmission costs. Further, IXPs allow ISPs to connect and exchange domestic traffic, usually through settlement-free peering, and avoid cost of “tromboning”, where ISPs are charged an extra cost for having their domestic capacity carried internationally.

A recent report from the Internet Society demonstrated that Kenya and Nigeria were able to establish dramatic cost savings and increased revenue from establishing an IXP.¹⁹ The Kenya Internet Exchange Point (KIXP) was able to dramatically reduce latency, noticeably increase performance for end users, and generate over \$6 million of revenue annually based on increased use. A similar IXP induced Google to place a cache in Lagos, the first step to building out internet infrastructure in Nigeria. In both countries, IXPs have a particularly strong effect on mobile internet revenues, an enormous growth industry in countries where over 90 percent of users access the internet via their mobile phones.

Finally, citizens in developing countries should recognize that the internet is at a “constitutional moment” where the balance between a government led and a truly multi-stakeholder process will be decided in the coming years. In *Consent of the Networked*, Rebecca McKinnon articulates the call to strengthen citizen driven institutions on the internet. A number of nascent grassroots groups are critical to this effort. Such groups include Global Voices Online, a citizen journalist organization dedicated to raising the online profile of citizens and journalists in developing countries; Creative Commons, which seeks to established a new paradigm of free culture that constrasts with traditional copyright; Wikipedia, the world’s largest encyclopedia, and Mozilla Foundation; which offers high quality open source software, are examples of such institutions.

Each of these groups encourage citizens from developing countries to take part in efforts that help shape the way all citizens produce, access and synthesize knowledge. Further, activists have argued for a formal role in ICANN for civil society organizations in the form of a Civil Society Advisory Committee (CSAC), on par with the GAC. MacKinnon proposes that the internet needs an “Earth Day”, a global effort similar to the environmental movement, to raise awareness that the technical issues at the heart of the internet have significant repercussions on freedom of speech, access to information, and a large portion of economic activity globally.

¹⁹ Assessing the Impact of Internet Exchange Points (IXPs) – Empirical Study of Kenya and Nigeria, *The Internet Society*, April 2012

4 | Areas for Further Research

Internet governance matters for citizens in developing countries. Yet, we are only at the earliest stage at understanding how these decisions effect economic growth and state behavior. Clear research agendas around internet governance are emerging for both economists and political scientists.

For economists, clearer evidence is required for understanding the link between technology adoption and economic growth. The existing literature, the most detailed of which was produced by the World Bank Group in 2009²⁰, includes regressions with independent variables for Latin America (dummy), Africa (dummy) and education. The results (r squared) indicate that this regression only has 52 percent explanatory power for the effect of internet on economic growth. Unpacking these dummy variables, to better understand why Latin America and Africa exist unique characteristics, is an important next step.

At the micro level, research at the local level can help unearth how the causal mechanisms through which the internet can contribute through wealth creation. Following the analysis of African IXPs above, more case studies are needed that clarify return on investment and operational details related to core decisions that developing countries can make at the local and global level. Such studies could analyze proposals to control the free flow of information, or the effect of competing interconnection models.

For political scientists, internet governance provides a natural experiment to study state behavior in a networked world. As the strategic importance of the internet rises, will states seek to influence a multi-stakeholder process or consolidate decision making in traditional state based foreign policy institutions? Further, is the multi-stakeholder process simply a proxy for state power, or is there an ingrained Western biased in this ad-hoc, engineering led set of institutions? Finally, to what extent are cyber-warfare multi-lateral processes similar or different to its antecedents such as chemical warfare treaties. Examining these questions in the context existing literature on US-led, open, participatory global order²¹ and the role of networks in foreign policy²² could provide important insights.

In closing, it is important to note that some of the greatest threats to the internet come not at the international level, but from the governments of countries where the majority of internet content is produced and distributed. In 2010 and 2011, the United States Senate considered legislation, Protect IP and the Combating Online Infringement and Counterfeits Act (COICA), which would tamper with internet infrastructure in the name of copyright. The effort was shut down in large part by a global effort by 'netizens' to make their opposition heard. The global nature of the internet means that people in developing countries would feel the effects of domestic legislation in the West.

²⁰ Christine Zhen-Wei Qiang and Carlo Rossotto, "Economic Impacts of Broadband", *Information and Communication for Development*, 2009

²¹ See, for example, G. John Ikenberry, *Liberal Leviathan: The Origins, Crisis and Transformation of the American World Order*, Princeton University Press, 2011

²² See, for example, Anne-Marie Slaughter, *A New World Order*, Princeton University Press, 2010

“In today’s great small world of global communication, the questions of sustainability cannot be analyzed in isolation from Internet policies that affect information flows, exchange of knowledge and global trade.”²³ Governments, technologists and citizens have a role to play in ensuring the internet remains an engine for human creativity, and a powerful force for social and economic goods.

²³ Dan MacLean, et. al. “Internet Governance and Sustainable Development: Towards a Common Agenda”, *International Institute for Sustainable Development*. 2007.