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PAPER SERIES: NO. 5 — DECEMBER 2014

Innovations in Global Governance: Toward a Distributed Internet Governance Ecosystem

Stefaan G. Verhulst, Beth S. Noveck, Jillian Raines and Antony Declercq

INNOVATIONS IN GLOBAL GOVERNANCE: TOWARD A DISTRIBUTED INTERNET GOVERNANCE ECOSYSTEM

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Published by the Centre for International Governance Innovation and Chatham House.

AUTHORS' NOTE

With key support from Samantha Grassle and Akash Kapur. The authors welcome any suggestions and comments. Corresponding author: Stefaan G. Verhulst (sverhulst@nyu.edu).

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ABOUT THE GLOBAL COMMISSION ON INTERNET GOVERNANCE

The Global Commission on Internet Governance was established in January 2014 to articulate and advance a strategic vision for the future of Internet governance. The two-year project conducts and supports independent research on Internet-related dimensions of global public policy, culminating in an official commission report that will articulate concrete policy recommendations for the future of Internet governance. These recommendations will address concerns about the stability, interoperability, security and resilience of the Internet ecosystem.

Launched by two independent global think tanks, the Centre for International Governance Innovation (CIGI) and Chatham House, the Global Commission on Internet Governance will help educate the wider public on the most effective ways to promote Internet access, while simultaneously championing the principles of freedom of expression and the free flow of ideas over the Internet.

The Global Commission on Internet Governance will focus on four key themes:

- enhancing governance legitimacy — including regulatory approaches and standards;
- stimulating economic innovation and growth — including critical Internet resources, infrastructure and competition policy;
- ensuring human rights online — including establishing the principle of technological neutrality for human rights, privacy and free expression; and
- avoiding systemic risk — including establishing norms regarding state conduct, cybercrime cooperation and non-proliferation, confidence-building measures and disarmament issues.

The goal of the Global Commission on Internet Governance is two-fold. First, it will encourage globally inclusive public discussions on the future of Internet governance. Second, through its comprehensive policy-oriented report, and the subsequent promotion of this final report, the Global Commission on Internet Governance will communicate its findings with senior stakeholders at key Internet governance events.

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ACRONYMS

ARPANET	Advanced Research Projects Agency Network
CERN	European Organization for Nuclear Research
GCIG	Global Commission on Internet Governance
GIPO	Global Internet Policy Observatory
IATA	International Air Transport Association
ICANN	Internet Corporation for Assigned Names and Numbers
IETF	Internet Engineering Task Force
IGF	Internet Governance Forum
IP	Internet Protocol
ITU	International Telecommunication Union
JSAG	Joint Slot Advisory Group
MSC	Marine Stewardship Council
NTIA	National Telecommunications and Information Administration
WSIS	World Summit on the Information Society

EXECUTIVE SUMMARY

The growth and globalization of the Internet over the past 40 years has been nothing short of remarkable. Virtually all sectors, from development to health care to education to politics, have been transformed. Yet developments in how the Internet is governed have not kept pace with this rapid technological innovation. Figuring out how to evolve the Internet's governance in ways that are effective and legitimate is essential to ensure its continued potential. Flexible and innovative decision-making mechanisms are needed in order to enable disparate governance actors to address and respond effectively as changes in the network occur. Actors need mechanisms to coordinate and cooperate around a variety of different governance approaches that may be used to address urgent issues that impact users in various ways from the local to global level. As for legitimacy in decision making, this is typically derived from citizen participation, or membership in a territorial community — an unobtainable metric for Internet governance given the global, cross-sector nature of the network. Internet governance frameworks have traditionally handled this challenge through interest group or stakeholder representation, limiting broader participation in certain kinds of governance decisions that increasingly impact all users across borders and cultures — and also by treating technical and informational Internet practices as falling within national borders, which has led countries to adopt divergent or competing approaches on issues that affect the stability of the global network, risking Internet fragmentation.

This paper seeks to address the need to develop an effective and legitimate Internet governance ecosystem by proposing a distributed yet coordinated framework that can accommodate a plurality of existing and emerging decision-making approaches, and that enables participation, independent of notions of membership, by embracing new kinds of collaboration between and among institutions and actors across borders and sectors. This proposed framework builds on an already emerging paradigm shift in the Internet ecosystem toward more collaborative, global and decentralized models of decision making, and specifically calls for:

- enhanced coordination and cooperation across institutions and actors;
- increased interoperability in terms of identifying and describing issues and approaches for resolution throughout the ecosystem (i.e., creating a common Internet governance ontology);
- open information sharing and evidence-based decision making; and
- expertise- or issue-based organization to allow for both localization and scale in problem solving.

In proposing ways to realize this framework, the paper draws on the lessons of open governance, adopting innovative techniques such as opening data, crowdsourcing and expert networks to facilitate coordination, information sharing, and evidence generation by and across increasingly diverse and global groups of Internet actors, who seek to address the current complex and pressing issues — from increasing access to privacy to cyber security — without risking the stability of the underlying network. The paper also calls for creating practical tools to support such an effective, legitimate and evolving Internet governance ecosystem, including an issue-based map and data repository of current responses to Internet-related governance issues, which can serve as a resource for modelling alternative approaches to tackling urgent issues. Although no right answer or single model for how to manage all issues of relevance to the Internet is suggested within this paper, the proposed framework intends to allow for diverse experiments in distributed governance approaches to learn what works and what does not.

INTRODUCTION AND CONTEXT

Increased Internet adoption is radically altering people's lives across the world, mostly for the better. Individuals, communities, institutions, cities, countries and regions have increasingly become "networked," with transformative implications for how we live, work, play and learn. Following the initial "Internet of links," which made computers and the information on them searchable, the growing "Internet of data" emerged — marked by big and open data — greatly expanding the variety, velocity and volume of data on the network (Dumbill 2012). The "Internet of people," enabled by social and collaborative software (often labelled Web 2.0) (Kurbalija 2014a) has similarly changed the Internet and the way it is used. We are now entering the era of the "Internet of things," where every device from watches to refrigerators to heart monitors is getting connected, generating enormous quantities of rich and revealing data that promise further innovations and challenges in coming years (Weber and Weber 2010; Chui, Löffler and Roberts 2010; Leung 2014; Cooper 2014; Schulze 2014).

The precise shape of these changes — and how they affect society — is likely to depend to a significant extent on how the Internet is governed domestically and internationally. Historically, Internet governance has been seen as an arcane and even marginal topic, of interest primarily to a few "geeks" and government officials. But in recent years, the topic has been receiving greater attention, particularly following the disclosure of classified US National Security Agency documents by Edward Snowden. That episode highlighted how connected and vulnerable to surveillance we all are; it shed a spotlight on some of the key issues (for example, privacy and security) central to discussions about Internet governance. In addition, Internet governance has begun to assume greater significance in a number of sectors not traditionally seen as Internet-enabled — for instance, health care, education, manufacturing or even government. Overall, there is a new level of awareness that the way in which the Internet is governed at global and domestic levels will have a significant effect on our society, economy and polity.

Despite this awareness, however, global collective action and coordination on Internet-related issues have to date been considered by many as ineffective, too slow and often illegitimate for a global public good such as the Internet, whose value stems from interoperability. Concerns about governance fragmentation undermining the global nature of the medium arise as a result of often divergent and hard to reconcile national approaches to privacy, security, freedom of expression and access. Existing decision-making mechanisms designed for addressing these problems within national borders have not kept pace with advances in society. It is increasingly clear that in order to accelerate and broaden the potential of the Internet, new paradigms of governance are needed that embrace the global, distributed and open nature of the Internet. Such paradigms must integrate and embrace new tools and methods that help to realize twenty-first-century principles such as openness, collaboration (Young et al.) and inclusiveness, along with a respect for human rights and freedom of expression (Lewis 2014). Crucially, all these principles must be applied without damaging or limiting the technical layer of the Internet, which has been so central to the rapid growth and success of the network (Meinel and Sack 2014). In short, a system of governance that is as innovative as the network itself is needed.

Several recent developments suggest that the contours of such new paradigms are emerging — encompassing a shift in Internet governance from an interest-driven, disordered and entitled exercise to one that is more expertise based and coordinated at and across local, national and global communities; this emerging paradigm suggests a distributed, yet collaborative approach, one supporting ad hoc groups of engaged actors and experts working together through open information exchanges across the ecosystem. The recent developments catalyzing this shift include: the US government's announcement in March 2014 of its intention to transition stewardship of Internet addressing functions to a global multi-stakeholder community (National Telecommunications and Information Administration [NTIA] 2014); the Global Multi-stakeholder Meeting on the Future of Internet Governance held in Brazil; and the principles outlined in the outcome document of that meeting, the NETmundial Multi-stakeholder Statement (NETmundial 2014). In addition, the Panel on Global Internet Cooperation and Governance Mechanisms, chaired by Estonian President Toomas Ilves, produced a report earlier this year on the evolution of Internet governance that focused on new distributed governance approaches, titled "Towards a Collaborative, Decentralized Internet Governance Ecosystem" (Panel on Global Internet Cooperation and Governance Mechanisms 2014), and the Internet Corporation for Assigned Names and Numbers (ICANN) Panel on Multi-Stakeholder Innovation offered a range of detailed proposals for innovating upon current problem-solving practices to make them legitimate, effective and evolving. At the time of writing, a NETmundial Initiative was launched, convening leaders of government, academia, civil society and business, with the intention of developing a pathway to execute on the spirit of NETmundial through "dialogue and concrete cooperation" (World Economic Forum 2014). All of these developments present significant opportunities for the global Internet community to begin to meaningfully address current challenges, in particular the need for coordinated action across the ecosystem in order to produce effective and legitimate approaches to a breadth of interconnected issues caused by the rapid growth of the Internet.

This paper reflects on these developments and their underlying rationales in order to articulate a needed and emerging framework of Internet governance that is distributed, open and collaborative. It describes this new model and shows how it builds on the existing theory and practice of open governance. Several key functions of the proposed distributed model are outlined, in the process explaining how such a model is based on the underlying technology of the Internet, and how the model is related — similar but distinct — to the existing multi-stakeholder model of Internet governance. Real-world case studies of networks and institutions that embody key characteristics of this distributed governance framework are provided. Finally — because coordinating the formulation of more legitimate, effective and flexible responses to increasingly complex and connected Internet governance issues requires going beyond the merely conceptual — this paper describes a set of tools that can be used to support such a distributed governance ecosystem. It concludes by presenting and expanding on a few open questions that will inform the adoption of the proposed distributed governance framework.

THE NEED FOR DISTRIBUTED INTERNET GOVERNANCE

The World Wide Web — the Internet as a mass, consumer-based platform with a global audience — is now over two decades old. In that time, the network has evolved significantly. In some ways, including Internet Protocol (IP) adoption rates, active domain names, search functionality and social media usage, it is unrecognizable from the network of the early 1990s, or even the early years of this millennium. For the most part, Internet governance has not kept pace with these changes. Existing governance mechanisms are largely outdated and insufficient to the needs of the current network.

The framework for distributed Internet governance proposed in this paper (and described in detail below) encompasses the following key functions that could enable adopting diverse, multi-institutional approaches to the governance of different, technical and non-technical, Internet-related issues:

- enhanced coordination and cooperation across institutions and actors;
- increased interoperability in terms of identifying and describing issues and approaches for resolution throughout the ecosystem (i.e., creating a common Internet governance ontology);
- open information sharing and evidence-based decision-making; and
- expertise- or issue-based organization to allow for both localization and scale in problem solving.

Through these functions, a distributed framework seeks to address some shortcomings present in existing governance models — from the completely centralized approach[1] to the more prevalent multi-stakeholder[2] and devolved national governance[3] approaches used in Internet governance today. This framework also goes beyond a model of pure decentralization, which key work in the field has made clear does not always work (Cheema and Rondinelli 2007). It promotes the development of decision-making mechanisms that are more flexible, decentralized, accommodating and innovative, and further supports the creation of new collaborative arrangements for actors and institutions to coordinate collective action. Broadly, a distributed framework embodying these functions would address two key shortcomings in the existing approaches: the need for great innovation, and the need for more cooperation and coordination.

THE NEED FOR GREAT INNOVATION IN HOW WE GOVERN THE NET

Internet governance, like the Internet itself, has humble beginnings. When the Advanced Research Projects Agency Network (ARPANET) emerged in 1969, consisting of a few connected computers located in the basements of university and military buildings, there appeared to be little need for governance or any process of decision making (Think Team 2001). The subsequent creation of TCP (Transmission Control Protocol)/IP protocols by US academics and the development of World Wide Web protocols at CERN (the European Organization for Nuclear Research) in Geneva, laid the foundations for a global expansion of

1 For critiques of a purely centralized governance approach, see Johnson, Crawford and Palfrey (2004) and Ivanova and Roy (2007) who discuss, in part, the ineffectiveness of centralization in global environmental policy as a result of the fact that environmental problems stem from a variety of causes, rather than from a single, central cause.

2 Multi-stakeholderism has surfaced as the most workable and prevalent approach for governing the Internet, especially in terms of its technical aspects, as it anticipates the need for global participation to ensure sound functioning of one, unified network. In support of the multi-stakeholder model, see Costerton (2014), Cooper (2012), Higgins (2012), and Hintz and Milan (2009). How multi-stakeholderism works in practice, however, often centres around interests rather than expertise and, as a result, has been critiqued at times for being slow, "messy," ineffective or illegitimate as a result of under- or insufficient representation of relevant global actors. See DeNardis and Raymond (2013), Dickinson (2014), and Hintz and Milan (2014).

3 The devolved governance model is typically applied to informational or behavioural Internet issues, as it allows for countries to govern speech and information exchange according to its own values systems. See Trebilcock and Howse (1998), arguing that regulatory diversity can "minimize the threat points that each country brings to these negotiations so as to reduce the risk of coerced forms of harmonization reflecting asymmetric bargaining power, or worse, coerced forms of discriminatory managed trade arrangements." Governance diversity as a model, however, does pose challenges when its application results in "legal competition[, which] could have unintended consequences, ranging from increased collisions of laws and inter-state tensions to cyberspace fragmentation" (Internet & Jurisdiction Project 2014c).

the Internet during the mid-1990s (Kurbalija 2014a). Internet governance also evolved during this period of rapid network expansion; in general, it did so in a bottom-up, participatory manner, shepherded by the private sector and civil society, and in cooperation with national governments. Essential Internet governance mechanisms grew from this approach, such as the Internet Engineering Task Force (IETF), formed in 1986 to coordinate the setting of standards for the Net; the Internet Society, created in 1992 to promote the open development, evolution and use of the Internet; and ICANN, incorporated in 1998 to coordinate the development of policies related to the Internet's addressing systems, particularly the Domain Name System (ibid.).

In addition to these civil society-driven, participatory approaches to governing some of the Internet's technical functions, national governments "layered on" domestic regulations that impact how businesses and people can use the Net (that is, to address more non-technical, "informational" or "behavioural" issues). For example, Iranian authorities restricted access to online content in advance of the parliamentary elections in March 2012, when the Iranian Office of the General Prosecutor threatened to block any website that would "boycott, protest, or question the validity of" the election (Freedom House 2012). In the United States, the Supreme Court's recent Aereo copyright law ruling restricted how businesses can stream live broadcast content to consumers (Brandom 2014). In China, the Standing Committee of the National People's Congress issued rules in 2012 requiring individuals who use pseudonyms online to provide their real names to Internet service providers. This would make it easier to identify and hold users accountable for content they produce online, with potentially chilling effects to online expression (Bradsher 2012).

By the late 1990s, however, it had become clear that Internet governance needed a more coordinated and more global approach. In 2003, the World Summit on the Information Society (WSIS) took place in Geneva, followed by another round two years later in Tunis. WSIS, inspired by the model pioneered by the G8 Digital Opportunity Taskforce or DOT Force, laid the foundations for multi-stakeholdership as the preferred way forward in global Internet governance (International Telecommunication Union [ITU] 2005). WSIS also helped identify several important challenges facing Internet governance, and made it clear that existing mechanisms had not kept pace with the underlying technology. It brought into sharp relief the necessity of a system that was better equipped to respond to the needs of a global, distributed network.

All these applications and technological advances have shaped the Internet into something like a global commons, or a "global public resource" (ICANN Strategy Panel on Multistakeholder Innovation 2014; Kroes 2014) that benefits and potentially empowers the entire planet.[4] For instance, in the education sector, students throughout the world have greater access than ever before to learning resources to expand their knowledge (CyberEthics 2011). Increasingly, and to an extent never seen before, the Internet has enabled people to "seek, receive and impart information and ideas...regardless of frontiers," as envisaged by the Universal Declaration of Human Rights.

Even as the Internet's unprecedented growth and globalization (ITU 2014) have increased the complexity and dynamic nature of the associated governance-related issues,[5] our methods for addressing those issues remain largely confined to national borders. As a result, issues relating to the flow of information across the network, such as messaging abuse (spam), though global in nature, are governed in a fragmented manner, where isolated national approaches do little to remedy the spam mail received by an Internet user connected to a global communications platform.

To be fair, the participating patchwork of institutional players in Internet governance has experimented with a variety of different forms of decision making. For example, the IETF adopted a "rough consensus" model to make decisions around setting standards, a model that was supposed to be more flexible and adaptable (Van Beijnum 2011; Hoffman 2012). The European Union has applied a layered approach in attempts to resolve informational or behavioural issues in Internet governance, working to balance input from public and private, individual and institutional, and national and international entities (Walker and Akdeniz 1998); ICANN has experimented with "direct governance" by "netizens" to make decisions regarding the Internet's unique identifier systems (GovLab 2013); and in the early 2000s, as mentioned previously, DOT Force paved the way both for multi-sector and multi-stakeholder governance models with experiments in cross-sector engagement (United Nations ICT Task Force 2004) that were adopted by WSIS and the Internet Governance Forum (IGF).

However well-intentioned they may have been, these initial experiments have not mitigated the serious and complex governance challenges of today, especially around issues such as privacy, access and spam. The more general crisis of legitimacy with regard to governance around the world only exacerbates this (Pew Research 2013; Sannon 2013). Add to this a growing fear of fragmentation on the Internet — a result of the divergent approaches among various nation-states to find ways for dealing with issues

4 Notably, this process of globalization is only likely to intensify over the coming years and decades, with a growing majority of the next billion connected users coming from the developing world. See Evan (2014).

5 The Internet increasingly affects all areas of society, from education to health care to politics to development to the environment. See Internet Live Statistics (2014).

such as surveillance, censorship, data security and privacy — and the current crisis of governance becomes apparent (Internet & Jurisdiction Project 2014a; 2014b; Kaspersky 2013).

THE NEED FOR COOPERATION AND COORDINATION

In addition to being challenged by new technologies and patterns of innovation, Internet governance must also address the increasingly cross-border and cross-sector nature of the network — factors that make securing legitimacy in decision making (something traditionally derived from citizenship within a given territory) a more problematic endeavour. Across fields and sectors, globalization is leading to new tensions and frictions within the existing patchwork of often irreconcilable social and legal norms (Castro and Atkinson 2014).

There is consensus that issues that affect the technical operation of the Internet require global coordination to ensure the Internet functions as one coherent system (*the* Internet). Emerging and complex issues like spam, privacy or security, however, are increasingly analyzed and addressed in a fragmented way (discussed above), posing a risk to the sustained operation of the Internet if not better coordinated. When it comes to issues touching on informational or behavioural aspects, although not a consensus view, there has been an operating presumption that each nation regulates speech and information exchange (for example, copyright, pornography and so on) according to its own laws or the laws of the multinational associations, such as the European Union, of which it is a part. This has worked well to incentivize production of locally relevant content and the development of local digital economies (Wooding 2014), as well as in those instances where certain types of content are allowed, promoted or outlawed based on national or cultural circumstances and values. But this governance diversity also presents challenges when not well coordinated: take, for example, the laws passed by the United States in 2006 to block foreign Internet gambling websites, which significantly affected the economies of countries hosting online gambling websites such as Antigua and Barbuda, setting in motion a dispute resolution process at the World Trade Organization (USC 5361-5366 2006). This paper does not aim to espouse one set of rules of the road in terms of approaches to Internet governance. Rather, governance diversity should be respected for its ability to allow each country to make decisions according to the value systems of its citizens. Yet, in instances where governance diversity threatens to undermine national sovereignty or contributes to the possibility of Internet fragmentation, a need for greater coordination across the ecosystem exists.

Furthermore, ecosystem practices like forum shopping, in which institutional actors choose to engage solely with governance bodies seen as sympathetic to their agenda, demonstrate how enhanced cooperation in the ecosystem could prove meaningful. Relatedly, jurisdictional competition, in which companies or other entities seek to shelter themselves under the policies or laws of a particular nation, also poses problems. Both of these issues further contribute to crises of legitimacy or inclusiveness (Hadge 2010), where individual institutions are seen as inappropriately addressing (or "hijacking") issues that do not fall within their competencies or jurisdictions, or where bilateral arrangements between nations exclude other nations or actors. Such crises are perhaps most apparent in the sense of exclusion felt by users and stakeholders from developing countries (Esterhuysen 2014). Take, for instance, the Internet Ungovernance Forum, first organized by Turkish activists in September 2014, which was held in parallel to the 2014 IGF. The Internet Ungovernance Forum brought stakeholders away from the "main IGF" to protest unfair representation and to raise awareness of groups left out of Internet governance proceedings (Arora 2014).

For all these reasons, more coordination, cooperation, collaboration and harmonization in the Internet governance ecosystem prove necessary. Such coordination is important at the technical layer and beyond in order to enable an increasingly diverse group of institutions and actors to determine together, from a diversity of approaches, which is appropriate to adopt for handling Internet issues spanning borders and cultures. This requires (and in turn can build) greater trust and transparency among actors. It also requires a greater effort at inclusiveness, and more rigorous use of evidence, data and case studies to help stakeholders and governments from all countries determine where to turn to address issues within the intricate — and largely fragmented — matrix of Internet governance.

DISTRIBUTED INTERNET GOVERNANCE: A FRAMEWORK PROPOSAL

This section discusses how to operationalize greater innovation, collaboration and coordination via a distributed framework, which is described in terms of its key functions. It considers how the proposed distributed model builds on the theory and practice of open governance and then lays out the framework's key functions and shows how they are inspired by the Internet's architecture. It also identifies how the model builds on, but is distinct from, multi-stakeholderism. Finally, this section provides case studies of real-world networks embodying key distributed features from which we can learn.

WHAT IS OPEN GOVERNANCE AND HOW DOES IT INFORM DISTRIBUTED INTERNET GOVERNANCE?

The emerging distributed Internet governance framework draws inspiration from the theory and practice of the open governance movement. Although the meaning of open governance is debated and constantly evolving (Longo 2013), the World Bank Institute explains the movement as one that "ensures citizens have access to government (information, data, processes) in order to engage governments more effectively and that governments have the willingness and ability to respond to citizens and to work collaboratively to solve difficult governance issues" (World Bank 2012). An open governance framework supports more transparent, participatory and collaborative decision making (Obama 2009) with the intention of enabling legitimate, effective and dynamic governance structures and processes. Three main features characterize open governance in general, and form the foundations of the distributed Internet governance framework proposed in this paper.

TRANSPARENCY AND INNOVATIVE PROBLEM-SOLVING

The open governance movement has promoted the creation and sharing of data, often held by government agencies, through downloadable, machine-readable and reusable formats. Open data allows for diverse participation in governance — it provides a vital resource that any interested party can use for the development of new applications and research (Longo 2013). In fields as varied as medicine and citizen engagement, open data has shown great potential for problem solving using collaborative intelligence and increased transparency. For example, the Multiple Myeloma Research Foundation has made available open genomic data on a digital platform called the MMRF Research Gateway to engage scientists and scientist networks throughout the world to accelerate research (Multiple Myeloma Research Foundation 2013). Through the tool, scientists can share information and work collaboratively, using the most robust data available to develop therapies and cures (ibid.). Platforms for crowdsourced data collection have also generated new insights. The India-based citizen-reporting platform I Paid a Bribe, for instance, allows individuals to publicly log instances when they were shaken down for bribes in an effort to find new approaches to combatting government corruption. The platform enables the filing of official reports to the media and top government officials, raising awareness and providing data as an initial step toward changing the system.[6]

In Internet governance, ensuring that the public has access to open and available data about decision-making processes and governance practices, issues and responses is necessary to enable inclusive participation in a distributed framework. The framework should promote the development of such data in open and reuseable formats, as well as ensure a way to inject new and open data into decision-making processes, thus providing "two-way" transparency (Matt 2011). Increased availability of open data could allow Internet governance stakeholders to track and contribute to the progress of issues and responses over time, and would provide the data needed for actors to learn from others' successes and failures and to hold each other responsible for actions taken. Transparency and accountability through open data could, therefore, help to decentralize accountability and increase information sharing and collaboration in a distributed Internet governance ecosystem.

PARTICIPATION

One of the key features — and benefits — of open governance is that it promotes citizen engagement in all aspects of governance. This has helped to devolve and diversify the types of expertise and knowledge involved in decision making. In a variety of fields, new and collaborative engagement tools have enabled greater and more accessible participation opportunities to citizen "experts" who were previously unknown or whose knowledge was previously untapped (Noveck 2008). Large-scale knowledge-sharing projects such as Wikipedia and volunteer initiatives such as Apache Webserver demonstrate that ordinary citizens possess information and expertise that can enhance decision making. The application of participatory decision-making processes have in some cases also proved to lead to better services, ultimately improving lives. Brazil, for instance, has become an international leader in participatory budgeting, directly incorporating citizen input into budget allocation decisions, which researchers have found are correlated to positive policy outcomes in areas such as infant mortality: by 2008, over 120 of Brazil's 250 cities had adopted participatory budgeting. In these same municipalities, infant mortality rates decreased by almost 20 percent — an improvement that researchers found statistically significant even after accounting for political and economic factors (Wampler and Touchton 2014). Adoption

6 See www.ipaidabribe.com/#gsc.tab=0. Other examples in crowdsourcing and open data include: for education, Unigo, a crowdsourced review of colleges that provides data regarding the true cost of colleges from current students (see www.unigo.com/colleges/); for energy, Earth Networks uses data from networks throughout the world to monitor weather, lightning and greenhouse gases — it then publishes this data for use by enterprises and governments for fast weather alerts (see www.earthnetworks.com).

of such participatory techniques and tools, in Brazil and elsewhere, has helped to inform, diversify and legitimize decision making. Such tools have also helped realize a shift in power from institutions to networks, and from centralized decision-making authorities to knowledge at the edge.[7]

Enabling distributed groups within the Internet governance ecosystem with these participation techniques and tools would help operationalize this shift in power. Leveraging and expanding on emerging tools and techniques (for example, expert networking, crowdsourcing and open data) could also help to break down barriers between experts in different disciplines, and foster collaboration between networks and locations of expertise (Raines 2014b; 2014d). Such a shift could help to empower Internet users with meaningful opportunities to participate and collaborate directly in decision making, rather than merely provide feedback from the outside. It would, in effect, move users of the Internet to the centre of Internet governance.

EXPERIMENTATION

Finally, open governance embraces agile, iterative decision making in order to ensure that institutions and citizens can respond to a rapidly evolving governance landscape and leverage and learn from past successes as well as failures. The movement places an emphasis on experimentation, enabled through the generation and sharing of quantitative as well as qualitative data. This data is used to determine best practices and ensure that results and decisions can be meaningfully analyzed, replicated or iterated-upon for various needs and in different contexts. The distributed Internet governance framework proposed here would embrace the development and use of open data to, in particular, shift decision making from a "faith-based" to an "evidence-based" approach (Noveck 2014).

WHAT ARE THE KEY FUNCTIONS OF DISTRIBUTED INTERNET GOVERNANCE?

Distributed governance for the Internet builds on these general elements of open governance to add several features that are specific to the Internet. The following is a brief overview of the main characteristics of distributed governance on the Internet.

First, distributed governance facilitates cooperation between existing and emerging actors and organizations, in the process eliminating the need for new institutions or bureaucracy and enabling more flexibility, fluidity and creativity in the actions of existing actors. Cooperation is very much at the heart of a distributed system. By focusing on cooperation, distributed governance moves away from a top-down system in which a single authority sets agendas and decides on responses. Instead, it facilitates a decentralized dialogue about issues, implementation and accountability. In a distributed system, a diversity of actors and institutions are provided with the tools to help share and digest information, experiences and knowledge. In doing so, they are able to link up with other actors on issues and responses and form issue-based networks.

Distributed governance also employs a "routing" function to enable interoperability (Gasser and Palfrey 2012) and collaboration within the Internet governance ecosystem through the adoption and use of common "languages" or "standards" — a common ontology — among players and across actors. Issue-based networks are by their nature more flexible, fluid and creative. They have none of the formality or bureaucracy of traditional government structures; they can form and dissolve over time, with cooperation and coordination as their driving purpose.

In addition, because distributed governance networks source ideas from multiple and dispersed actors, they also encourage more creative responses to problems. In particular, a distributed governance approach recognizes that knowledge and viable responses often exist "at the edges" (Lagace 2006), away from official bodies and mechanisms of governance. Distributed governance shifts power to experts or individuals who may not otherwise have the ability to participate in power systems. It facilitates collective action and information sharing between these new actors at the edge and existing decision makers.

Distributed governance on the Internet relies very much on information sharing and evidence-based decision making. This is in part an outcome of the dispersed nature of distributed governance structures: because they prioritize coordination and knowledge sharing, they are able to collect, analyze and act upon a wide variety of evidence and data.

In an evidence-based approach to governance, different actors replicate experiments in rigorous ways that allow for comparisons, which can be shared between actors in different contexts. As such, an evidence-based approach can deepen opportunities to accurately answer questions about the impacts and effectiveness of specific governance initiatives over time. It can help us better understand whether programs work differently in different geographic spheres, what factors contributed to successes and how we can learn from failures (Barnett, Dembo and Verhulst 2013). For example, through the use of comparable metrics

7 Citizen engagement tools, whether created within or outside government, exist to engage citizens to contribute in more networked ways to governance on a variety of issues, for example, from vetting potential patent applications (Peer-to-Patent) to helping in disaster response and relief (see www.ushahidi.com) to lawmaking and voting. See examples included in Raines (2014a; 2014e) and Declercq (2014). Citizen engagement tools have also emerged at a variety of levels of government down to municipalities (see, for example, Skillville, a micro-volunteering platform for city projects in San Francisco) (Knight Foundation 2013).

and indicators, an evidence-based approach could tell us about different challenges to IPv6 interoperability in different parts of the world, thus helping to develop governance techniques and policies that ensure maximum global interoperability.[8]

Distributed governance allows for both granularity (localization) and scale (globalization) by adopting expert- or issue-based organizing principles that help coordinate decision making on issues across and between the local, national, regional and global levels. Distributed networks enable greater localization. In addition to better incorporating actors at the edges of the network (many of whom would by definition be closer to the local origins of an issue), distributed networks permit local actors with shared interests to discover each other and coalesce into expert- or interest-based bodies. Distributed networks in effect permit a "re-localization" of issues that may otherwise have unproductively escalated to the national or regional level. In this sense, a distributed, collaborative network can be a powerful tool in helping overcome the sense of marginalization that some stakeholders in Internet governance (particularly in developing countries) have felt over the years.

HOW DOES DISTRIBUTED INTERNET GOVERNANCE BUILD ON THE INTERNET'S ARCHITECTURE?

The collaborative and cooperative nature of the distributed governance approach is inspired by the nature of the Internet's technological architecture, an idea promoted by Lawrence Lessig and others, who view the Internet and "Internet governance" — that is, how the Internet is *used* and how the Internet technically *works* — as mutually constructive and inextricable processes.[9] Any proposed framework must, therefore, draw from an understanding of the Internet's architecture.

That architecture is based on principles of interoperability and neutrality — network engineering principles that value simplicity across distributed technology: "Every computer connected to the Internet is capable of doing a few, very simple tasks very quickly. By linking millions of comparatively simple systems together, complex functionality is achieved" (Zuckerman and McLaughlin 2003).

These same principles of neutrality and interoperability can be applied to how the Internet is governed. Responses to complex issues that we face today are more likely to be reached when dispersed institutions and actors have simple and accessible means for finding each other and coordinating around a particular issue or a given stage of decision making, in particular through the use of shared data. Collaboration on a distributed network can provide access to information about a variety of issues, including what governance efforts have succeeded (or failed) elsewhere, and the landscape of actors and institutions involved in working on a given issue over time.

In computer networking, interoperability describes the ability of devices to interact with other devices regardless of their specific hardware or software specifications (Slater 2012). The Internet is a "network of networks" — an "inter-network" — in which different networks can exchange information in a useful and meaningful manner. For this to work, however, it is critical that networked machines use a common set of protocols that allow for a standardized interpretation of sent and received information. The information itself must also be encoded using a common set of standards. This challenge is usually described as one of "universal adoption," which requires that network operators and software developers voluntarily adopt common protocols and standards. Interoperability is important because it allows for increased interconnectivity and exchange of information and services online.

Similarly, to facilitate a robust governance environment, it is critical that actors can cooperate by being able to speak a "common language." In the technology context, this can mean a common set of standards. In the governance context, it means a mutually understood ontology of Internet-related issues and responses (Kurbalija 2014b). The global Internet governance ecosystem thus requires "cross-domain" interoperability — that is, the ability for diverse social, political, organizational, legal and technical systems to meaningfully work together and collaborate around setting this common ontology.

HOW IS DISTRIBUTED GOVERNANCE DIFFERENT FROM MULTI-STAKEHOLDER GOVERNANCE?

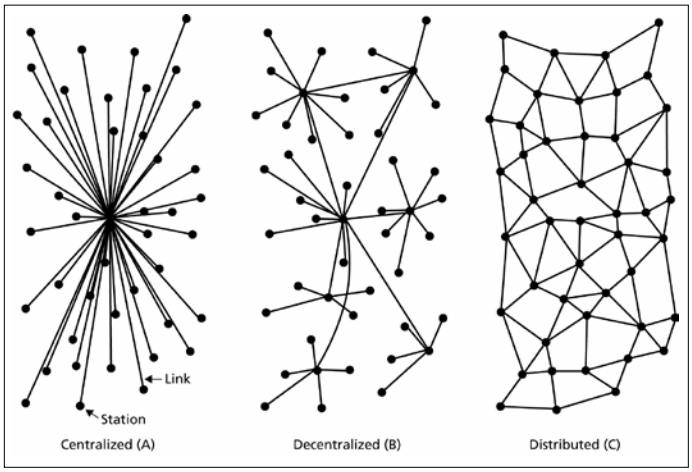
Multi-stakeholderism[10] in the Internet context reflects the view that there are different groups with diverse interests in governing the Internet, and that each of these interest groups should have an equal opportunity to participate. Interest groups include those who operate Internet-based

8 A concept promoted by the NETmundial Initiative, and currently being tested by CGI in Brazil, which is working to share data and best practices around the creation of regional and national multi-stakeholder Internet governance structures.

9 See Lessig (1999) arguing that "code is law" and can have profound social effects as a result, and the work of anthropologist Clifford Geertz, who argued that "legal thought is constructive of social realities rather than merely reflective of them" (Geertz 1985, 232).

10 The 2005 WSIS working group described multi-stakeholderism as: "Internet governance is the development and application by Governments, the private sector and civil society, in their respective roles, of shared principles, norms, rules, decision-making procedures, and programmes that shape the evolution and use of the Internet." See Working Group on Internet Governance (2005).

Figure 1: Centralized, Decentralized and Distributed Networks



Option (c) in the above graphic helps to visualize how a distributed network enables easier linkages and connections across nodes (i.e., actors and issues) compared to a centralized or entirely decentralized approach.

Source: Paul Baran. 1964. "On Distributed Communications: I. Introduction to Distributed Communications Networks." Memorandum RM-3420-PR. August. The RAND Corporation. www.rand.org/pubs/research_memoranda/RM3420.html. Reprinted with permission.

businesses such as Amazon or Google. They also include those that make their living selling Internet access services such as Internet service providers or domain name registries. Multi-stakeholderism also accommodates the individual views of national governments that have a responsibility to safeguard the values of their societies and citizens. Those having a "stake" also include individuals and groups with an interest in safeguarding certain values such as economic flourishing, creative expression or educational achievement. By emphasizing interests and stakes, however, the multi-stakeholder model tends toward the concept of entitlement over expertise.

The notion of "respective roles" in the multi-stakeholder model represents its most contested aspect. Different organizations in today's ecosystem (for example, ICANN, the IETF or the ITU) engage in different "flavours" of multi-stakeholderism in that their schemes of prioritization of particular interests or roles vary. For instance, the ITU supports a multilateral approach, which tends to question whether participating non-governmental stakeholders are truly representative of certain segments of society. Alternatively, those advocating for ICANN's multi-stakeholder model, for instance, often question the multilateral approach and the legitimacy of governments to regulate the Internet without greater involvement from non-governmental stakeholders. These varied approaches to multi-stakeholderism can perhaps be taken as proof, as some have put it, that the Internet is "resistant to traditional forms of regulation" (Verhulst 2004), and that many debates over Internet governance end up being a "battlefield" (Stone 2012) of political ideologies, at the expense of solving real issues.

Distributed governance in fact mediates between the "purely multi-stakeholder" and "purely multilateral" approaches. Its goal is not to replace or devalue the existing model, but rather to enhance it by adding a way to operationalize notions of collaborative, transparent and bottom-up responses to pressing and complex issues. The mediating function is apparent in the fact that the fundamental unit of governance in a distributed model is the *issue at hand* and not the *stakeholder*. Thus, positioning and agreeing to respective stakes as to a specific issue (or range of issues) is no longer the (often impossible) prerequisite for participation; rather, legitimacy is derived from one's capacity and willingness to contribute information and approaches for problem solving around specific issues. This point was made at the April 2014 NETmundial meeting and is reflected in the NETmundial Multi-stakeholder Statement:

> Internet governance should be built on democratic, multi-stakeholder processes, ensuring the meaningful and accountable participation of all stakeholders, including governments, the private sector, civil society, the technical community, the academic community and users. The respective roles and responsibilities of stakeholders should be interpreted in a flexible manner with reference to the *issue* under discussion. (NETmundial 2014, emphasis added)

The focus of a distributed governance model is thus less on the internal mandates of specific stakeholders, and more on the specific features of issues at hand. In such a governance context, the use of evidence in decision making and evaluations is critical. Furthermore, it is essential that evidence is shared across the distributed governance ecosystem, so that a common "information architecture" exists for all Internet governance actors, regardless of sector or role to identify issues, and identify and test responses — in the process building common understanding as to what has worked (and what has not) over time.

DO REAL WORLD CASES EXHIBIT ANY OF THE DESIRED FEATURES OF DISTRIBUTED GOVERNANCE?

Distributed governance is a fledgling concept in the context of Internet governance, but a variety of examples, many drawn from non-technical fields, do exist. Considering such examples can help us better understand the principles of distributed governance and how they could be applied to Internet governance.

The following discussion focuses on the key functionalities and properties that are brought to the fore by distributed governance and, for each, points to some existing examples.

FUNCTION 1: FACILITATING AND ENHANCING COOPERATION BETWEEN ACTORS AND ORGANIZATIONS

OpenStand is a movement driven by groups from industry, civil society, government, the technical community and academia to promote a unified set of standards for the Internet and the Web (OpenStand 2014a). The OpenStand community experiments with new designs and technologies, and provides ongoing feedback based on these experiences to shape the next generation of standards. In this way, existing organizations coordinate to build a global standards environment that is straightforward and easy to navigate. This process eliminates the burden of country-by-country standard requirements that slow technological innovation (OpenStand 2014b).

To support the establishment of a modern paradigm for global, open Internet standards, OpenStand has a guiding set of principles that include:

- cooperation among standards organizations;
- adherence to due process, broad consensus, transparency, balance and openness in standards development;
- commitment to technical merit, interoperability, competition, innovation and benefit to humanity;
- availability of standards to all; and
- voluntary adoption (Kolkman 2014).

FUNCTION 2: SERVING AS A "ROUTING" FUNCTION USING A COMMON ONTOLOGY TO ENSURE INTEROPERABILITY THROUGHOUT THE ECOSYSTEM

The Marine Stewardship Council (MSC), which was initiated in 1997, serves as a good example of an organization that provided a routing function aimed at empowering actors around specific issues and actions. The MSC emerged as a response to growing pessimism about the status of fish stocks, the impacts of fishing on the marine environment and the future of the fishing industry and communities (Vallejo and Hauselmann 2004). In an effort to increase the overall sustainability of the world's seafood supply, groups and individuals with a stake in or concern for the fishing industry and fish population joined to develop and maintain a common MSC standard, which serves as the basis for their eco-label certification. This certification was developed as a result of consensus from all affected and concerned players as to the criteria for indicating via MSC eco-label that seafood comes from a sustainable fishery. This standard evolves over time, to reflect input from the MSC Stakeholder Council and, as part of the certification process, requires input from local stakeholders, ensuring that local interests are consistently incorporated in this global effort.

The effort began when diverse stakeholders and concerned parties organized around a specific issue, using evidence-based policies to inform the development of their certification. Over the years, the certification has served as a common standard for the industry's networks and has gained significant legitimacy in the global markets, with major corporations vying for the official MSC eco label (Skoll and Osberg 2013).

Another frequently cited example of a distributed governance network involves the International Air Transport Association's (IATA) Joint Slot Advisory Group (JSAG). This airline industry working group consists of an equal number of IATA member airlines and airline coordinators. Since 1947, JSAG has met twice a year to agree on slot allocations, defined as the scheduled time of an airplane's arrival or departure on a specific date. In the 1960s, increased congestion at several major airports prompted the IATA to broaden slot allocation discussions to include acceptable levels of anticipated delays. Today, the need to hold biannual meetings where members jointly consider proposals for changes to IATA continues the Worldwide Slot Guidelines. Through bilateral discussions, the process established by the JSAG working group ensures that all airline operators follow a common set of coordinated standards that are consistent for all airports throughout the world (IATA 2014).

FUNCTION 3: PROMOTING OPEN INFORMATION SHARING, CAPACITY BUILDING AND EVIDENCE GATHERING TO ENABLE OPEN PARTICIPATION AND SUPPORT COORDINATED ACTION

A growing international concern involves maritime governance of oceans (Schiffman 2014), in particular the Arctic Ocean. This body of water is experiencing dramatically reduced ice coverage each year, creating the potential for major changes in worldwide shipping and access to new energy resources. Since there is a severe lack of information and no single entity with sovereignty over the Arctic Ocean, the US Coast Guard, along with traditional maritime governance organizations from around the world, are pursuing a new strategy to broaden international partnerships to enhance critical information-collecting efforts. The US Coast Guard describes this as a "collective effort that includes international collaborative forums, drawing upon their cumulative authorities, capabilities and experience" (Lagan 2013).

An information-sharing arrangement has emerged from this initiative, called the North American Ice Service (a collaborative partnership featuring a diverse set of actors including the International Ice Patrol, the National Ice Center and the Canadian Ice Service), which provides ice information and services to marine interests throughout North America. The group shares data on weather and environmental modelling, international treaty obligations and ecological analyses for safe and efficient maritime operations, and publishes this information online via a regular bulletin and chart visualizations (US Coast Guard Navigation Center 2012).

FUNCTION 4: ALLOW FOR GRANULARITY (LOCALIZATION) AND SCALE (GLOBALIZATION) BY ADOPTING EXPERT- OR ISSUE-BASED ORGANIZING PRINCIPLES TO HELP COORDINATE DECISION MAKING ACROSS SPHERES

VIVO is an open-source semantic web application originally developed and implemented at Cornell University in 2003, further developed by a National Institute of Health-funded consortium, and is now being established as an open-source project with community participation from around the world (VIVO 2014). At the "local" level, when installed at an institution and populated with a researcher's interests, activities and accomplishments, the application enables the discovery of research and scholarship across disciplines at the institution and provides data to facilitate connections and information sharing around specific research topics or agendas. The VIVO web also scales beyond individual universities and enables the discovery of research and scholarship from experts on particular issues across institutions by creating a semantic cloud of information that can be searched and browsed. Current efforts aim to also extend VIVO to enable searching and links "to cover research resources, ranging from datasets to spacecraft and their scientific instruments, to agriculture, cell lines, and research impact" (ibid.). VIVO had over 20 countries and 50 organizations provide information in VIVO format on more than one million researchers and research staff, including publications, research resources, events, funding, courses taught and other scholarly activity at the close of 2012.

Another example of this function is exemplified in Nextdoor, a social networking site built for neighbours grouped within a community to communicate on topics such as safety, services and crime.[11] On a granular level, the website enables neighbourhood-specific networks and allows for individual connections and hyperlocal information sharing around particular topics (for example, an individual can share information regarding the sale of furniture within a single building).

Additionally, the platform allows for larger-scale communications and more dynamic coordination. The site has the capacity to deliver real-time city alerts, crowdsourced reports and crisis maps that connect users to resources (Brown 2014). Expanding its scale, Nextdoor partnered with AlertSF, a text-based notification system in order to alert an entire community about a massive fire in the Mission Bay area in San Francisco (Shueh 2014).

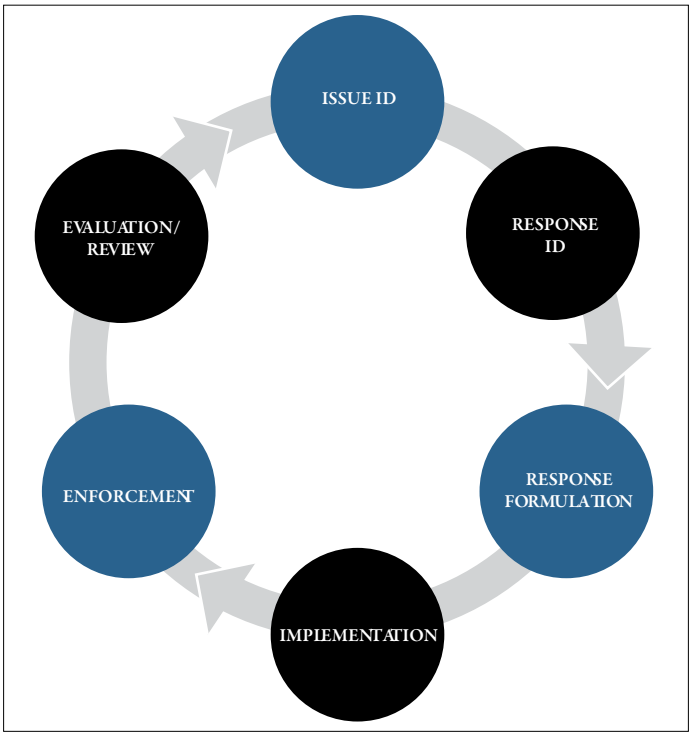
ENABLING AN EFFECTIVE, EVOLVING AND LEGITIMATE DISTRIBUTED INTERNET GOVERNANCE ECOSYSTEM

To realize a framework for distributed Internet governance — one that is effective, evolving and legitimate — the Ilves panel report suggests that the decision-making process should be deconstructed into four "elements" that could help simplify what is and often appears as a complex set of abstract governance processes. These elements include issue identification, mapping, response formulation and response implementation. Other observers have likewise suggested the value of a deconstructed approach in simplifying and clarifying opaque governance ecosystems. For example, Bertrand de la Chapelle — echoing the policy sciences literature on the stages of decision making in every policy-making process (Anderson 2000; Bardach 2000; Birkland 2001; Dye 2001; Gramberger 2001; Munger 2000; Stone 2002) — has described a five-stage "workflow model" of governance (agenda setting, drafting, adoption, implementation, monitoring and enforcement) that allows for "participation by various stakeholders" in the "creation of a flexible global architecture" (de la Chapelle 2003).

Separating out the various elements of Internet governance would help actors identify their roles in developing responses to issues. It would also help coordinate the different responsibilities of actors within the ecosystem (ICANN Strategy Panel on Multistakeholder Innovation 2014). A staged decision-making approach provides a road map for operationalization and helps to address the current fragmentation of governance on the Internet. For instance, by clearly demarcating decision-making processes and institutional responsibilities, a staged approach can mitigate previously discussed challenges such as forum shopping, jurisdictional overlap and competition, and the prevalence of "orphan issues" (Kleinwächter 2014) such as spam, privacy rights and intellectual property rights. A staged approach also promotes greater inclusivity while simplifying and making clearer the pathways for collaboration and participation in governance.

11 See https://nextdoor.com/.

Figure 2: Six Stages of the Distributed Internet Governance Process



Source: The GovLab.

This paper (building on The GovLab's work in support of the ICANN Panel on Multistakeholder Innovation) proposes a breakdown of the distributed Internet governance process into six "stages":

- issue identification;
- response identification;
- response formulation;
- implementation;
- enforcement; and
- evaluation or review.

The following discusses each of these stages at greater length, suggesting enabling mechanisms for participation and collaboration within the global Internet community that emphasize open data, information sharing and experimentation.

ISSUE IDENTIFICATION

Issue identification refers to the process by which the distributed Internet governance ecosystem would identify a problem or challenge that needs addressing. The process of issue identification also involves identifying the appropriate geographic sphere or level at which an issue should be addressed — i.e. at the local, national, regional or global levels. During the issue identification stage, cooperation is required to understand the various facets of a challenge or issue, so that existing responses can be understood and, if necessary, new approaches can be crafted (for example, policy model responses or technical standards responses). Cooperation is needed here also so that the most responsible or capable actors can be engaged to generate action on an issue. It is therefore necessary to develop a standardized ontology for identifying and describing issues.

Currently, the Internet governance ecosystem lacks a systematic approach to understanding existing and emerging issues, as well as each actor's roles and responsibilities with regard to any given issue. One resulting problem is the previously mentioned issue of "forum shopping" (IGF 2013). Information sharing and better dissemination of information is essential to addressing such problems. For the issue identification stage to be most productive, those within the distributed governance networks must be able to access existing data and share and understand it so that issues can be quickly identified, situated and described.

Issue identification in a distributed governance environment may at times employ crowdsourcing techniques. Crowdsourcing (outsourcing a task or function to a large group of actors) is a technique for broadening participation; it can be done in person or online, and engages networked groups to expand the tool kit for problem solving. Sourcing ideas, opinions and data from the global Internet community can play a valuable role in identifying trends in Internet-related issues (Halpin 2014). Using semantic tagging can reveal similarities between crowdsourced submissions and highlight various common or dividing aspects between issues (Rao 2010). Similarly, ranking and voting systems can highlight which issues are most widely relevant and, when combined with semantic analysis[12] can show which issues are important to which stakeholders. Ultimately, issue identification in a distributed governance environment can be supported through technical means while allowing for greater transparency and sharing of open data and information.

RESPONSE IDENTIFICATION

Once an issue is identified and better understood, a response must be identified. The response identification stage of our distributed governance framework involves the network working toward the formulation of a particular response or set of potential responses to an identified issue. To identify the "solution space," it is important to create and communicate a shared understanding regarding the several types of responses and outcomes that are already in existence (for example, laws, policy guidelines and models, technical requirements, contractual models, incentives

12 For example, along a Likert scale, as employed by the survey/polling software Agreeble. See www.agreeble.com.

and funding, procurement provisions, certification criteria or more informal procedures). In addition, response identification should consider mapping and supporting coordination of the organization(s) responsible for further formulation and implementation, as well as possible timetables.

Today, actors within the Internet governance ecosystem are either inundated with complex requests for participation or left out of the loop on decisions that most directly affect them. This creates an environment where players are responsive largely only to formal mandates and where actions taken on issues are identified in a fragmented way, with little information sharing across the ecosystem. This system is inimical to innovative and flexible problem solving. Institutional players in particular tend to rely on their internal structures to navigate complexity, and are not able to perform comprehensive scans to identify new or viable responses or collaborators (Jenks and Jones 2013). New mechanisms for coordination and collaboration are needed so that different actors can come together to identify possible responses. New means of navigating "solution spaces" are required to overcome redundancies and gaps that lead to "orphan issues" (Carter 2014).

Information shortcomings are at the heart of such challenges, but they can be overcome in a distributed governance environment. For example, information technologies that identify and collect responses or outcomes can help various actors identify and learn about possible responses. They can also help map new and innovative "solution spaces." To the greatest extent possible, such information-sharing mechanisms should be based on open data. Much as the US government has done with federal data through Data.gov (White house n.d.), vast amounts of Internet governance-related information can also be made available to the global Internet community. Data must be presented in the most accessible form possible, and tagged and cross-linked — "layered" or "linked" data (Shadbolt et al. 2012) — so that it is easy to form connections between different types of data in the search for responses. Overall, a robust response identification stage would benefit greatly from the existence of a "living data platform" of information that is updated as the Internet governance ecosystem evolves.

FORMULATION OF RESPONSE

The "response formulation" stage refers to the period during which the most responsible, capable or interested actors can be identified and engaged to collaborate in order to develop actionable responses to problems. These responses can then be compared and evaluated using objective criteria and data in a transparent process. Selecting the relevant criteria for evaluation is itself part of the process. Responses should be evaluated on the basis of technical feasibility, economic feasibility, political viability, administrative viability, legality and so on.

Central to the response formulation process is the use of agreed-upon benchmarks, metrics and indicators — that is, the use of evidence derived for the particular context and geographic sphere relevant to the issue at hand. Objective evaluation criteria are critical to build and maintain trust in a distributed governance environment, where responsibilities for implementing responses are to be allocated to different actors based on capacity.

Response formulation can be achieved in a distributed manner through the use of shared platforms that make information about Internet issues available in open formats. Techniques that allow for the standardized description of expertise, skills and experience ("expert networking" technologies) may be particularly useful in this regard (Raines 2014b). Expert networks and expert networking technologies — such as those developed by VIVO, the interdisciplinary network of research scientists discussed above, or Kaggle, an expert network and competition platform for data scientists — can be constructed using information that describes each actors' relevant expertise or knowledge (Börner et al. 2012). This can allow for the breakdown of issues into component parts that can then be matched to specific experts or areas of expertise. Expert networking can also introduce a diversity of viewpoints in the formulation of responses and, when combined with incentives for participation, can provide access to a diverse set of ideas from a wide variety of sources.

IMPLEMENTATION

At the implementation stage, actors within a distributed governance network can work collaboratively to ensure that recommended responses or binding decisions are implemented and monitored. Such monitoring must include both those identified in the response formulation stage as being most equipped for execution, and those who will be most affected by the response. Issue-based distributed networks can help facilitate this and assist in overseeing the process of implementation so that needed changes can be responsively identified and addressed, and so that those tasked with bringing about a desired response have access to the required knowledge and expertise both from those within and without the network (Panel on Global Internet Cooperation and Governance Mechanisms 2014).

This type of networked, collaborative and distributed approach to response implementation differs quite significantly from what exists today. At present, proposed responses too often lack adequate direction for execution and adoption. One could argue this is the result of response formulation processes that tend to prioritize notions of "multi-stakeholdership" over all else. As a result, response development and response implementation often get conflated into one decision-making phase focused almost entirely on achieving consensus around broad objectives rather than on first collaborating around the discovery,

design and testing of more nuanced and tailored responses derived from shared knowledge.

Response implementation proves difficult in today's ecosystem when the actors affected by many actions and responses are not consulted; when the processes impacted by a given response are not analyzed, evaluated or experimented with during the response-formulations stage; and in cases where proposed responses address meta-governance issues, for example improving the process of making policy on generic top-level domain names (GNSO 2014).

ENFORCEMENT

As noted, Internet governance is characterized today by significant jurisdictional confusion and overlap; this complicates the "enforcement" stage of decision making. A good example can be found at events surrounding the 2012 World Conference on International Telecommunications that reviewed the International Telecommunication Regulations global treaty, which was ultimately signed by fewer than half the members of the ITU (Reporters Without Borders 2012).

The effectiveness of enforcement requires a strong focus on measurement, using metrics and indicators to understand the impact of responses. The enforcement stage can thus provide for monitoring adherence in implementation to agreed-upon governance principles and values, such as those articulated in the NETmundial Multistakeholder Statement (NETmundial 2014). Enforcing adherence also requires identification of the responsible, capable or willing actors within the distributed governance networks during the response identification and response formulation stages. This could be achieved, for example, through the use of "dashboard" visualizations that trace the relationship of certain indicators to specific objectives over time to show impact.

Any meaningful enforcement mechanism is likely to reveal shortcomings or problems in response implementation; in a distributed governance environment, such problems need to be collaboratively resolved. This highlights the importance of information sharing and collaborative processing of data, as various actors responsible for enforcement may be distributed across regions and sectors, and require a way to access and communicate findings. For example, in many online community forums, certain users may be active enough or have gained enough "reputation points" to become forum moderators who can flag content as spam or inappropriate. In much the same way, a distributed Internet governance ecosystem could enable or suggest specific actors to enforce specific responses based on evidence of their competencies or abilities, or based on community agreement that those actors are the best suited to conduct enforcement.

EVALUATION OR REVIEW

The distributed governance network will also be responsible for re-evaluating and adjusting responses throughout or after implementation. This evaluation or review stage envisions the creation of further evidence to inform subsequent identification of issues and response formulation stages. Without comprehensive, evidence-based evaluation of implemented responses, there would exist a lack of ecosystem-wide understanding about the appropriateness or effectiveness of any given response. Similarly, there would exist a lack of collective understanding regarding the competencies or abilities of specific actors tasked with responding.

Currently, evaluation processes for Internet governance responses focus largely on internal organizational mandates: organizations rely on adherence to internal processes to the detriment of critically assessing whether issues that are relevant to the entire ecosystem are appropriately addressed (Jenks and Jones 2013). A far better solution would be for evaluation to be collaborative, and achieved in a way that allows the global Internet community to assess the impact and quality of specific responses and actions. Once again, information sharing is key. For example, Stimulus Watch technologies — a platform created following passage of the Recovery Act and the creation of Recovery.gov to help track US federal government spending of stimulus funds technologies — employs a distributed crowd in monitoring stimulus spending by the federal government by asking citizens to share their knowledge on local stimulus projects and discuss and rate those projects (Sanchez 2009).

The evaluation stage could also generate open "scorecards" developed in a transparent and inclusive manner by the global Internet community.[13] These scorecards would help identify priorities across the Internet governance ecosystem and inform the further identification of issues and responses. Moreover, evidence gained from the evaluation and review of responses can inform the selection of relevant criteria for response formulation and thus contributes to the development of a set of metrics and benchmarks that can help actors better understand the issues at hand. Given that the selection of indicators and metrics for assessment involves a determination of what is deemed important, actors in a distributed governance ecosystem must collaborate on and coordinate measurement criteria, so that information is useful for everyone. Because this scorecard approach has already been used in a number

13 See, for example, the Sunlight Foundation's "Open States Transparency Report Card," which uses a set of criteria to evaluate the "openness" of state legislative data in the United States (Turk 2013).

of sectors and industries,[14] best practices already exist to guide a pilot or trial implementation in the Internet governance ecosystem.

TOOLS TO REALIZE DISTRIBUTED INTERNET GOVERNANCE — A MAP OF INTERNET GOVERNANCE APPROACHES AND KNOWLEDGE NETWORKS

It is not enough simply to formulate a theoretical or conceptual framework for distributed Internet governance. A practical road map is also required. Such a road map would guide actors within the Internet governance ecosystem so that, confronted with an issue requiring a governance response, they could identify at least the following elements:

- the nature of the issue;
- the severity of the issue;
- the geographic sphere within which the issue may be most appropriately addressed;
- the appropriate actors to respond to the issue; and
- any existing frameworks and/or organizations that may already be equipped to address the issue, or indeed that may already be addressing it.

The purpose of this section is to introduce a number of tools and techniques that constitute at least an initial road map toward practical implementation of the proposed framework. From the Open Governance movement, we know that a number of innovative tools and techniques for connecting people and enabling collaborative decision making already exist. For instance, open data helps facilitate information sharing; expert networks and systems can help locate and leverage the skills, credentials, experiences and passions within the global Internet governance community to help solve issues. In addition, Web SMS and in-person crowdsourcing techniques can be applied to source new, diverse and expert input for identifying and framing issues, crafting responses or participating in the enforcement and review stages mentioned above (Raines 2014c).

While these techniques and tools may all be leveraged, it is possible that the existing tool kit will prove insufficient, and that a set of new tools will be needed to test and realize our proposal for a distributed Internet governance framework. This section discusses two key components of this supplementary tool kit: a map of Internet governance approaches and Internet governance knowledge networks.

A MAP OF INTERNET GOVERNANCE APPROACHES

Both the Ilves report and the NETmundial Multistakeholder Statement strongly recommended the development of mechanisms to map Internet governance issues to responses and actors (Panel on Global Internet Cooperation and Governance Mechanisms 2014). Several initiatives are exploring various purposes and functionalities of such a mapping mechanism.[15]

An Internet governance mapping mechanism that supports the distributed Internet governance framework in practice should begin with the development of a "living database" of data on Internet-related issues, actors and approaches. An issue-to-response-to-network mapping tool could serve as an "information architecture" for Internet governance. Such an "open data" platform could include a variety of interactive infographic tools that Internet policy makers, journalists, activists and Internet users could use to map top-level issues to existing initiatives and responses, and to find corresponding institutions and experts for a given geographic sphere (using data on the role, capacities and previous actions taken by such institutions). Such a mapping tool could define an information model for the issues, responses and geographic spheres that comprise the field of Internet governance. Following from the staged problem-solving model laid out in the section "The Need for Distributed Internet Governance," the mapping tool could specifically support the development of a common understanding of existing Internet governance arrangements by sphere, issue type or response type.

Such a tool would assist the Internet governance community in rethinking how decision making can and should occur in a distributed fashion by helping to enable two key functions: cooperation among actors and institutions, and open information sharing. The mapping tool could also provide a means for understanding the existing field of governance and the types of tried-and-tested responses already undertaken (whether successful or not).

Additionally, the mapping tool could embrace an information ontology that describes the various entities

14 See, for example, the US Department of Education's College Affordability and Transparency Center College Scorecard (www.whitehouse.gov/issues/education/higher-education/college-score-card).

15 For example, The GovLab at New York University is crowdsourcing and mapping an open data set of Internet issues, responses and actors for the NETmundial Initiative, while the European Commission's Global Internet Policy Observatory (GIPO) is intended to provide resources for the global Internet community, with an emphasis on "automation" (European Commission 2013); William Drake and Lea Kaspar suggest a "coordinated clearinghouse function" to "access, assess and compare…a plethora of governance activities underway in technical and policy bodies at the national, regional and global levels" (Drake and Price 2014).

of the distributed model as well as relationships within that model. For example, geographic spheres could include local, national, regional and global. Issues could be categorized according to five themes: access, content, code/standards, trust and trade. Responses may take the form of policies and laws, initiatives and events, research and advocacy, tools and resources, or standards. The information model will also define the flow and life cycle of the content to be produced, and will seek and be subject to advice from the wider governance community to ensure openness and inclusivity in the design and development of the mapping tool.

Development of this tool would embrace a coordinated and distributed effort to map issues to their appropriate governance networks within a given geographic sphere. It would additionally document "solution spaces" by providing information on responses or actions taken around a given issue, in the process helping to identify gaps in action. For instance, child pornography would map to various initiatives around the world and point to institutions working on the topic, as well as relevant laws and local experts who can be engaged in problem solving. The tool would point to all relevant data about the issue, as well as to active actors and responses already underway. In order to scale development and optimize for the Internet community, the mapping tool should be designed to enable user contribution, for example, through crowdsourced authoring of content in combination with the knowledge networks described below.

INTERNET GOVERNANCE KNOWLEDGE NETWORKS

Similarly built on a "living platform" describing the expertise and skills of experts, the knowledge networks (or knowledge net) could take the form of an expert network for Internet governance. Using expert discovery and networking technologies, the tool could model itself after existing systems, including reputation-based systems such as LinkedIn recommendations, credential-based systems such as ResearchGate and experience-based systems such as StackOverflow. Ultimately, this tool could present a searchable index that would allow for the tracking of skills and experiences of experts who could be tapped locally in countries or other jurisdictions to help in the various stages of governance described above.

The knowledge net could address the need for expertise at all stages of the Internet governance process. Sources and types of expertise would be diversified by allowing people to participate directly in the knowledge net, thus opening them to the chance of being called upon by Internet governance actors to contribute to issues that match their skills profile. Participants in the network could be asked to fill out a profile describing their relevant skills, experiences and interests, including, for example, courses taken or taught related to Internet issues (such as through ICANN Learn), Internet governance forums or conferences attended, online campaigns or projects they were part of, technology skills or applications built, and so on.

Embedded within the knowledge network there could be functionalities allowing individuals to self-select and form open groups around issues that they know or care about, perhaps in their specific region. Being able to self-identify around skills and expertise rather than institutional membership could remove barriers to entry for newcomers to the governance space. And, once part of the network, an expert would be able to take advantage of open discussion forums, brainstorming or Q&A tools, or challenge platforms where participants could form groups or launch challenges related to a particular Internet governance issue (for example, to design a draft evaluation scorecard for broadband deployment in a small city, or to help promote IPv6 adoption around the world).

Having a comprehensive network for Internet governance and related fields would also make it easier to identify and target experts with specific questions related to Internet governance. For example, if an institution or other actor is trying to gain insight into Internet access and affordability issues in a specific region, a policy maker will want to reach those who have actual technical, regulatory, business and specific regional experience. The database could be extremely useful in helping to identify experts who have collected, analyzed or published relevant data. Finally, a database of willing contributors with rich expertise and access to data could itself help formulate governance policies; the network could function, in essence, as a repository of knowledge that could underpin efforts to develop and operationalize the proposed new, distributed Internet governance framework.

KEY OPPORTUNITIES FOR OPERATIONALIZING THE FRAMEWORK

If a convincing case for innovating within and enabling new forms of coordination in Internet governance has been made (the "what"), then the prospect of constructing new platforms, mechanisms and tool kits to support such distributed governance arrangements can be taken up by a variety of global initiatives (the "how"). This paper proposes two specific supporting tools — a map of Internet governance approaches and Internet governance knowledge networks — both of which are actively under development. The value in both of these information tools relies on accurate and up-to-date Internet governance-related content and data. Like other open data projects, these tools will grow in both usefulness and value when experts and enthusiasts alike build an "ecosystem" of specific applications using the shared data.

The distributed governance framework presented within this paper is achievable through an action-based, participatory, experimental and analytically rigorous approach. Opportunities for action on this approach are ripe, for example in connection with the NETmundial Initiative and the Global Commission on Internet Governance (GCIG), launched by the Centre for International Governance Innovation and Chatham House.

NETMUNDIAL INITIATIVE

The NETmundial Initiative can provide an additional forum for transparent and inclusive consultations to solicit input from the global Internet community to further develop the mapping tool, including its desired functionalities, content structure, moderation processes and legal framework. Such consultations can be supported by related actions including the development of global, regional and national multi-stakeholder dialogues to deepen understanding of Internet policy issues (World Economic Forum 2014) (inspired, for example, by Brazil's Marco Civil legislation and the NETmundial Meeting).

GCIG

The GCIG, launched in January 2014, seeks to present "a comprehensive stand on the future of multi-stakeholder Internet governance." Over a two-year period, the GCIG intends to address four key themes: enhancing governance legitimacy, preserving innovation, ensuring rights online and avoiding systemic risk. The GCIG and its associated research advisory network will provide another important platform for conducting consultations with the global Internet community, convening meetings with regard to the four themes, and bridging disciplines in the construction of new models of governance for the Internet. The GCIG's research will help identify the best techniques for promoting cooperation and incentives for actors to function cooperatively in a distributed and complex governance environment.

The Internet is doubtless one of the most significant human accomplishments in history, and it should follow that Internet governance has similar significance. Clearly, the Internet has both technical and non-technical components, as must its governance. The endeavour of developing an effective and legitimate system of governance has been and will continue to be a global one, requiring not only the participation from all, but also a diversity of expertise that crosses borders, languages and disciplines. This framework proposal suggests a "construction plan" for a governance ecosystem that is distributed, flexible, collaborative and global. But this framework is not exhaustive, and critical questions must be answered to inform operationalization:

- Issue identification: How and when to decide and who decides whether an issue requires global coordination or devolution? What data is needed to help facilitate that process?
- Network identification: How do we move from actor identification to the facilitation of distributed networks capable of addressing a global issue?
- Response development: How do responses get developed in a distributed fashion, across disciplines? Acknowledging that we all have a stake in the future of the Internet, what techniques work best for promoting cooperation, not competition, in problem solving?
- Oversight: Who will, and how to, monitor adherence to principles of Internet governance in order to ensure accountability?
- Coordination: In addition to the development of the tools articulated in this paper, how do we coordinate across issue areas, sectors, cultures and regions? How do we systematically add, translate and share knowledge accumulated openly, responsively and responsibly within the ecosystem?
- Incentives: What incentives exist to use tools that support a distributed Internet governance ecosystem, and what incentives might make such tools more useful? What incentives exist to overcome issues of self-selection bias? How can we increase participation on global issues from those presently "unwilling" or "unable" (politically, technologically or otherwise) so as to avoid reinforcing existing ecosystem divisions?
- Case studies: What examples of distributed governance exist that embody the necessary functions of the distributed framework? What groups and mechanisms serve as "building blocks" for the conceptual model described here? What can we learn from these examples and how should we connect with those involved?
- Limitations: What are the limits of such an information-based approach? What are the problems it cannot solve?

It is necessary to further study whether and how a distributed framework for Internet governance could present a truly viable alternative to existing models of Internet governance. Surely many more initiatives will be launched with mandates to coordinate Internet governance approaches and to develop more effective and legitimate forms of problem solving. It is clear that the capacity to deliver a framework such as the one outlined in this paper exists, and the authors look forward to further innovations in the field.

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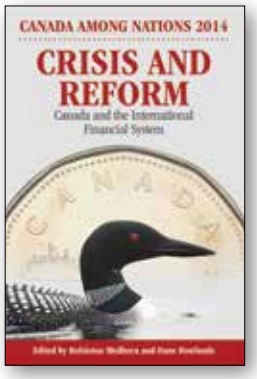

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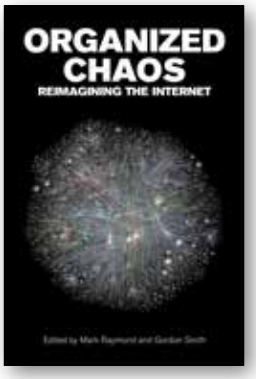

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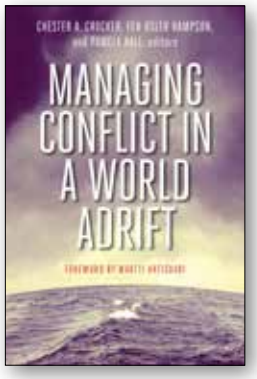

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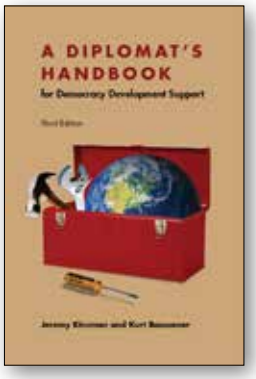

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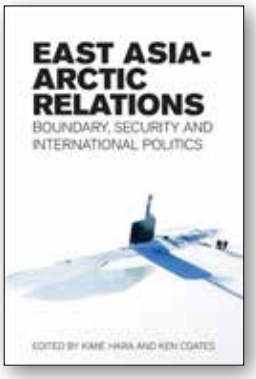

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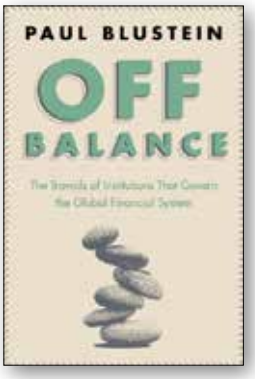

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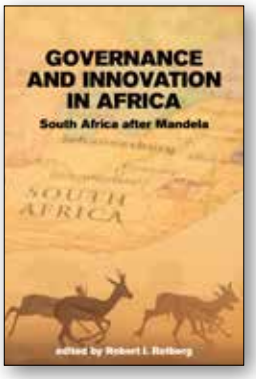

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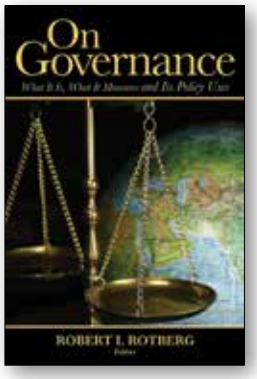

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