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A Global Panopticon - The Changing Role of International Organizations in the Information Age

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A GLOBAL PANOPTICON? THE CHANGING ROLE OF INTERNATIONAL ORGANIZATIONS IN THE INFORMATION AGE

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"We were squashing the pyramid down to a flat plain in which in-formation could come from any particular place at any time. And governments were no longer in control of their information."[1]

INTRODUCTION

The outbreaks of Severe Acute Respiratory Syndrome (SARS) in 2002–2003 and Swine Flu (H1N1) in 2009 captured a great deal of global attention. The swift spread of these diseases wreaked havoc, generated public hysteria, disrupted global trade and travel, and inflicted severe economic losses to countries, corporations, and individuals. Although affected states were required to report to the World Health Organization (WHO) events that may have constituted a public health emergency, many failed to do so.[2] The WHO and the rest of the international community were therefore desperate for accurate, up-to-date information as to the nature of the pandemics, their spread in different countries, and treatment possibilities.

The solution came from a somewhat surprising source—the internet. The first signs of both diseases were discovered by automated web crawlers[3] that screened local media sources in multiple languages, looking for specific keywords. In the case of SARS, a web crawler reported to the WHO about the early signs of the disease more than three months before the international community became aware of it.[4] In the case of Swine Flu, a web crawler was similarly responsible for unearthing early reports on the disease and triggering further inquiry by the WHO.[5] Information that flew from the internet impelled the WHO to approach local health agencies and demand that they conduct thorough investigations into the outbreaks.

The role played by the internet expanded even further after the initial discovery of the diseases. The worldwide spread of SARS and, in particular, Swine Flu was closely monitored online by global networks of scientists and volunteers who shared their experiences and tagged relevant data on interactive maps. As the Director-General of the WHO declared, "[f]or the first time in history, the international community could watch a pandemic unfold, and chart its evolution, in real time."[6]

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1.   Eric Mykhalovskiy & Lorna Weir, *The Global Public Health Intelligence Network and Early Warning Outbreak Detection: A Canadian Contribution to Global Public Health*, 97 CAN. J. PUB. HEALTH 42, 43–44 (2006) (quoting a member of the Global Public Health Intelligence Network [GPHIN]).

2.   *See* discussion *infra* Part II.A.

3.   A web crawler is a software program that browses the internet in a methodical and automated manner, looking for predefined keywords. For more information, see generally *infra* discussion accompanying notes 162–186.

4.   *See infra* discussion accompanying notes 188–198.

5.   *See infra* discussion accompanying notes 199–212.

6.   WORLD HEALTH ORGANIZATION [WHO] DIRECTOR-GENERAL, PROGRESS IN PUBLIC HEALTH DURING THE PREVIOUS DECADE AND MAJOR CHALLENGES AHEAD: REPORT BY THE DIRECTOR-GENERAL TO THE EXECUTIVE BOARD AT ITS 126TH SESSION (2010) (by Dr.

This Article argues that these technological developments are not just helpful for better disease detection and surveillance, but rather, they reflect a deeper, broader conceptual shift in state compliance with international law. Information technologies allow international organizations (IOs) to play an unprecedented, and so far overlooked, role in this respect. In particular, they transform one of the core functions of IOs in international relations: compliance monitoring.

As compliance monitors, IOs serve as information clearinghouses— they collect data on state compliance and disseminate it to third-party states, international nongovernment organizations, or domestic groups. The latter can then use this information to influence the behavior of violating states or support the efforts of complying states (for example, by demanding domestic public health investigations). However, in many cases, IOs' access to compliance information is limited. As a result, they cannot properly perform their monitoring functions and the effectiveness of international regulation is undermined. Information technologies change this reality.

Theories of internet and democracy have celebrated the potential of the internet to begin a new era of governmental transparency and accountability, creating effective channels of communication between government and civil society.[7] However, as of now, IOs have not been on the agenda of the transparency movement, and the burgeoning internet literature has largely ignored them. Although some IOs have been consistently using information technologies as part of their monitoring efforts in the past decade, a systematic analysis of these endeavors has been missing and a coherent policy prescription is yet to be developed. Given the gravity of the compliance monitoring challenge, this void begs to be filled.

Focusing on the international regulation of health, environment, and human rights, this Article explores the changes brought by information technologies to the contested field of state compliance with international law. The Article argues that by enhancing the monitoring capacities of IOs, information technologies can strengthen state compliance and improve the efficacy of international regulation. Not only can the internet amplify the amount of the available compliance information, it can also improve its substance. However, as this Article demonstrates, the use of the internet for monitoring purposes may also raise challenges and trigger

Margaret   Chan),   http://www.who.int/dg/speeches/2010/executive_board_126_20100118/ en/index.html.

7.   *See, e.g.*, YOCHAI BENKLER, THE WEALTH OF NETWORKS: HOW SOCIAL PRODUCTION TRANSFORMS MARKETS AND FREEDOM 212–72 (2006); BRUCE BIMBER, INFORMATION AND AMERICAN DEMOCRACY: TECHNOLOGY IN THE EVOLUTION OF POLITICAL POWER (2003); ANDREW CHADWICK, INTERNET POLITICS: STATES, CITIZENS, AND NEW COMMUNICATION TECHNOLOGIES (2006); STEPHEN COLEMAN & JAY G. BLUMLER, THE INTERNET AND DEMOCRATIC CITIZENSHIP: THEORY, PRACTICE AND POLICY (2009); DEMOCRACY ONLINE: THE PROSPECTS OF POLITICAL RENEWAL THROUGH THE INTERNET (Peter M. Shane ed., 2004); A. Michael Froomkin, *Habermas@Discourse.net: Toward a Critical Theory of Cyberspace*, 116 HARV. L. REV. 749 (2003); Jennifer Shkabatur, *Cities @ Crossroads: Digital Technology and Local Democracy in America*, 76 BROOK. L. REV. 1413 (2011).

adverse reactions. In fact, it may turn IOs into the wardens of Foucauldian "panopticons,"[8] who can at any time inspect state behavior without the state's consent or awareness that it is being watched. This Article examines the normative implications of this novel phenomenon and offers a legal framework that mitigates the negative aspects of the "panopticon" while preserving the desirable ones.

Part I discusses the compliance challenge in international law and explains the monitoring functions of IOs. Part II delves into the details of compliance monitoring within three international regulatory regimes[9]—health, environment, and human rights—and demonstrates its current ineffectiveness. Part III explores the promise of new information technologies for compliance monitoring by IOs. It first examines the access to information policies employed by IOs and discusses their implications. It then focuses on the use of information technologies by the WHO, and suggests similar strategies in the context of international environmental and human rights regulation. Part IV explores the implications of information technologies for compliance monitoring by IOs. It discusses the empowerment of IOs and the likely countermeasures of the monitored states. Lastly, it suggests several normative proposals that could facilitate the smooth adoption of information technologies for purposes of compliance monitoring.

I. THE COMPLIANCE CHALLENGE

State compliance with international obligations has been one of the most persistent challenges of international law.[10] "The absence of a centralized enforcement authority" has been regarded as "a crucial and distinctive deficiency"[11] of international law, raising the question of why governments would honor obligations that do not reflect their interests. A plethora of theories in international law and international relations tackle this challenge from a variety of angles. This Part first surveys the major theories of com-

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8.   *See generally infra* notes 250–253 and accompanying text. I am grateful to Professor Sheila Jasanoff for referring me to the "panopticon" metaphor.

9.   An international regime can be defined as "principles, norms, rules, and decision-making procedures around which actor expectations converge in a given issue-area." Stephen D. Krasner, *Structural Causes and Regime Consequences: Regimes as Intervening Variables,* in INTERNATIONAL REGIMES 1, 1 (Stephen D. Krasner ed., 1983).

10.   Compliance is defined as "a state of conformity or identity between an actor's behavior and a specified rule." Kal Raustiala & Anne-Marie Slaughter, *International Law, International Relations and Compliance,* in HANDBOOK OF INTERNATIONAL RELATIONS 538, 539 (Walter Carlsnaes et al. eds., 2002). The literature discusses several dimensions of compliance: compliance with procedural obligations (e.g., submitting reports), compliance with substantive obligations under an international agreement, and compliance with the spirit of the agreement. *See* ENGAGING COUNTRIES: STRENGTHENING COMPLIANCE WITH INTERNATIONAL ENVIRONMENTAL ACCORDS 1, 4 (Edith Brown Weiss & Harold K. Jacobson eds., 1998).

11.   Jack Goldsmith & Daryl Levinson, *Law for States: International Law, Constitutional Law, Public Law,* 122 HARV. L. REV. 1791, 1823 (2009).

pliance in international law and then examines the role of IOs in the compliance framework.

A. *Why Do States Obey International Law?*

Theories of international relations widely differ in their answers to the question of why states obey international law. The realist tradition adheres to the belief that international law simply reflects the existing distribution of power among states. According to this vision, international law provides powerful nations with flexible tools to pursue their self-interests and exercise control over the international agenda, leaving less powerful states unprotected.[12] International law therefore utilizes two separate regimes of compliance. Powerful nations "can violate the rights of a small nation without having to fear effective sanctions on the latter's part."[13] At the same time, small nations cannot influence the international agenda but have to comply with obligations that are imposed on them by others.[14] A variation on this approach suggests that compliance with international obligations does not reflect politics of power, but is rather the result of a mere coincidence of interests. Compliance is thus understood as incidental—"nations doing what they would have done anyhow, in the absence of law."[15] Hence, international regulatory regimes that achieve high compliance rates do not indicate the effectiveness of a treaty, but rather represent shallow commitments that nations would undertake either with or without the treaty in place.[16]

Functionalist (also known as "institutionalist") scholars take a different stance on international compliance. This body of literature suggests that states are willing to compromise their short-term self-interest and comply with international obligations in order to achieve their larger long-term goals.[17] Under this vision, IOs establish the terms for cooperation and

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12.   HANS J. MORGENTHAU, POLITICS AMONG NATIONS 270–71 (2d ed. 1954); John Mearsheimer, *The False Promise of International Institutions*, INT'L SECURITY, Winter 1994/1995, at 5, 7.

13.   MORGENTHAU, *supra* note 12, at 271.

14.   Goldsmith and Levinson mention several examples of such "power politics": anti-proliferation regimes that allow states holding nuclear weapons to preserve them but prohibit other states from obtaining them; intellectual property agreements that favor First World states; the U.N. Charter that grants veto powers to powerful states. *See* Goldsmith & Levinson, *supra* note 11, at 1825.

15.   *Id.* at 1825–26; JACK L. GOLDSMITH & ERIC A. POSNER, THE LIMITS OF INTERNATIONAL LAW 27–28 (2005); MORGENTHAU, *supra* note 12, at 271–72.

16.   *See* George W. Downs et al., *Is the Good News About Compliance Good News About Cooperation?*, 50 INT'L ORG. 379, 382–83 (1996). Examples of such commitments include the Nuclear Non-Proliferation Treaty or the Mine Ban Treaty. *See* Goldsmith & Levinson, *supra* note 11, at 1826.

17.   *See, e.g.,* ROBERT O. KEOHANE, AFTER HEGEMONY 7–10 (1984); Robert O. Keohane & Lisa L. Martin, *The Promise of Institutionalist Theory*, 20 INT'L SECURITY 39, 41–42 (1995); James D. Morrow, *Modeling the Forms of International Cooperation: Distribution Versus Information*, 48 INT'L ORG. 387, 387–88 (1994).

coordination among nations. As part of this process, international obligations turn into effective "self-enforcing" mechanisms without requiring a centralized enforcement body because nations share a common long-term interest that is reflected in the regime's provisions.[18] Compliance is therefore explained "by the ability to structure incentives in such a way as to make noncompliance too costly to consider."[19]

While realist and functionalist approaches to compliance with international law reach different conclusions, they share a similar basis—both perceive international relations in an instrumental manner. According to both, states engage in international regimes and comply with international obligations only when "the perceived benefits of doing so outweigh the costs."[20] However, this understanding of international relations is not uncontested. Constructivism, another influential tradition in international relations, takes a different path by asserting that state behavior is shaped by international norms and structures, and not vice versa. Constructivists argue that the international system in fact precedes state behavior, "shap[ing] the policies of nations and limit[ing] national behavior."[21] States operate within certain "givens" of the international system (e.g., nationhood, sovereignty, territoriality, recognition), rather than pursue their short- or long-term interests.[22] Operating within these "givens," international regulatory regimes generate and inculcate norms of proper behavior that affect state conduct through processes of persuasion, norm internalization, or acculturation.[23] State compliance is therefore seen "as a product of the normative force of international law and its ability to shape the interests and values of states."[24]

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18.   For instance, the rules developed by the World Trade Organization are largely observed, even if they are not backed by enforcement mechanisms and violate the immediate interests of some of the parties, because states share an ongoing long-term interest in free trade. Other examples include the customary laws of war, the law of the sea, extradition, diplomatic immunity, investment, and arms control. *See* Goldsmith & Levinson, *supra* note 11, at 1827; *see also* BETH SIMMONS, MOBILIZING FOR HUMAN RIGHTS 117 (2009).

19.   SIMMONS, *supra* note 18, at 118.

20.   Goldsmith & Levinson, *supra* note 11, at 1828.

21.   LOUIS HENKIN, HOW NATIONS BEHAVE 22 (2d ed. 1979).

22.   *Id.* at 15–17.

23.   *See, e.g.,* MARTHA FINNEMORE, NATIONAL INTERESTS IN INTERNATIONAL SOCIETY 128–49 (1996) (evaluating constructive norms that "constitute, create, or revise" other rationales, like realism and institutionalism, for state compliance with international obligations); THOMAS M. FRANCK, THE POWER OF LEGITIMACY AMONG NATIONS 3–26 (1990) (focusing on specific historical events and addressing why "powerless states obey powerless rules"); JOHN GERARD RUGGIE, CONSTRUCTING THE WORLD POLITY: ESSAYS ON INTERNATIONAL INSTITU-TIONALIZATION 11–39 (1998); ALEXANDER WENDT, SOCIAL THEORY OF INTERNATIONAL POLITICS 46–190 (1999); Ryan Goodman & Derek Jinks, *How to Influence States: Socialization and International Human Rights Law*, 54 DUKE L.J. 621, 626–30, 667–74 (2004) (building upon constructivism and developing a new theory of acculturation, which is primarily concerned with social compliance mechanisms such as assimilation); Harold Hongju Koh, *Why Do Nations Obey International Law?*, 106 YALE L.J. 2599, 2633–34 (1997).

24.   Goldsmith & Levinson, *supra* note 11, at 1830.

B. *International Organizations and Compliance Monitoring*

The role of IOs in the compliance game varies from one theory of international relations to another. For realists, IOs are "arenas for acting out power relationships."[25] They reflect and enhance state power and interests, and lack the capacity to independently affect state behavior.[26] While this observation may be accurate at times, it lacks full explanatory force: If governments are indeed not constrained by IOs, why do they waste time and other resources on intense bargaining over them?[27]

The functionalist approach answers this question, suggesting that IOs are important because they allow states "to overcome problems of collective action, high transactions costs and information deficits or asymmetries."[28] As part of this state-centric vision, IOs are regarded as islands of cooperation and coordination that are necessary in order to solve problems of cooperation between nations.[29] A central function of IOs in this respect is that they facilitate reciprocity, "enabling states to use carrots and sticks on each other," and credibly build their international reputation.[30] Reciprocity and reputation are therefore regarded as two mechanisms by which IOs constrain and alter state behavior.[31]

IOs are similarly important for the constructivist tradition of international relations. According to this approach, IOs are a major vehicle for the systematic development, dissemination, and inculcation of shared international norms and knowledge.[32] Serving as "chief socializing agent[s],"[33] IOs

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25.   Tony Evans & Peter Wilson, *Regime Theory and the English School of International Relations: A Comparison*, 21 MILLENNIUM: J. INT'L STUD. 329, 330 (1992).

26.   Beth A. Simmons & Lisa L. Martin, *International Organizations and Institutions*, in HANDBOOK OF INTERNATIONAL RELATIONS, *supra* note 10, at 192, 195; *see, e.g.*, MORGENTHAU, *supra* note 12, at 301–02; KENNETH N. WALTZ, THEORY OF INTERNATIONAL POLITICS 117–23 (1979); Mearsheimer, *supra* note 12, at 7; *see also* JOSE E. ALVAREZ, INTERNATIONAL ORGANIZATIONS AS LAW-MAKERS 29–32 (2005).

27.   Simmons & Martin, *supra* note 26, at 195.

28.   *Id.* For an overview of functionalist theory, see generally ALVAREZ, *supra* note 26, at 17–29.

29.   Simmons & Martin, *supra* note 26, at 195.

30.   XINYUAN DAI, INTERNATIONAL INSTITUTIONS AND NATIONAL POLICIES 17 (2007).

31.   *Id.; see, e.g.*, Robert Axelrod & Robert O. Keohane, *Achieving Cooperation Under Anarchy: Strategies and Institutions*, in COOPERATION UNDER ANARCHY 226, 249–51 (Kenneth A. Oye ed., 1986); Daniel W. Drezner, *Bargaining, Enforcement, and Multilateral Sanctions: When Is Cooperation Counterproductive?*, 54 INT'L ORG. 73, 86–87 (2000); Keohane & Martin, *supra* note 17, at 44–46. For more information on the relationship between reciprocity and cooperative behavior in international relations, see generally ROBERT AXELROD, THE EVOLUTION OF COOPERATION (1984); COOPERATION UNDER ANARCHY, *supra*; Duncan Snidal, *Relative Gains and the Pattern of International Cooperation*, 85 AM. POL. SCI. REV. 701 (1991).

32.   *See* ALVAREZ, *supra* note 26, at 43–45; *see, e.g.*, FINNEMORE, *supra* note 23, at 3; MARGARET E. KECK & KATHRYN SIKKINK, ACTIVISTS BEYOND BORDERS: ADVOCACY NETWORKS IN INTERNATIONAL POLITICS (1998).

33.   Martha Finnemore & Kathryn Sikkink, *International Norm Dynamics and Political Change*, 52 INT'L ORG. 887, 902 (1998).

can "alter the identities and interests of states, as a result of their interactions over time within the auspices of a set of rules."[34]

A common thread in the functionalist and constructivist traditions is that they both assign IOs a central role in international regulation and entrust them with meaningful duties.[35] Specifically, a major responsibility of IOs is the monitoring of and collection of information on state compliance with international obligations. Under this framework, IOs are supposed to perform the role of *information clearinghouses*. They often do not enforce legal obligations on their own,[36] but rather aggregate compliance-related data that flows from various sources. Then they rely on the information to "name and shame" violators and disseminate it to other international or domestic actors.[37] Third-party states may use this information to punish defectors and reward cooperators, relying on the reciprocity and reputation mechanisms of international regulatory regimes.[38] Nongovernmental organizations (NGOs) and domestic advocacy groups may rely on the data in order to put pressure on legislators or use it in court proceedings.[39] While monitoring is particularly important under the functionalist tradition, it also plays a major role under the constructivist vision. Information on state compliance is necessary for purposes of knowledge sharing and norm diffusion and in order to empower domestic groups and NGOs that may use the information to promote their own agendas.[40]

Compliance monitoring is therefore a necessary ingredient of any international regulatory regime.[41] However, it is far from an easy task. Effective monitoring "requires a continuing flow of information on the parties' performance of their treaty obligations and on the general situation in the regime's field of operation."[42] In practice, IOs can hardly ensure such flow of information. Independent data collection often proves costly and overly intrusive.[43] Hence, in order to fulfill their monitoring duties, IOs rely on two

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34.   Simmons & Martin, *supra* note 26, at 198.

35.   *See* DAI, *supra* note 30, at 17–18.

36.   DAI, *supra* note 30, at 50–53. Notable examples of IOs that do possess an enforcement authority are the International Monetary Fund and the Nuclear Non-Proliferation Treaty regime. *See id.*

37.   For a related view of international institutions, see *id.* at 3; Songying Fang, *The Informational Role of International Institutions and Domestic Politics*, 52 AM. J. POL. SCI. 304 (2008).

38.   DAI, *supra* note 30, at 20–23.

39.   SIMMONS, *supra* note 18, at 127–39; *see* discussion *infra* Part II.C. For the influence of domestic groups on international regulation, see generally Eyal Benvenisti, *Exit and Voice in the Age of Globalization*, 98 MICH. L. REV. 167 (1999).

40.   *See* DAI, *supra* note 30, at 19; Finnemore & Sikkink, *supra* note 33, at 902–04.

41.   For a thorough analysis of how and why monitoring arrangements are being adopted in different international regimes, see DAI, *supra* note 30, at 33–38.

42.   ABRAM CHAYES & ANTONIA HANDLER CHAYES, THE NEW SOVEREIGNTY: COMPLIANCE WITH INTERNATIONAL REGULATORY AGREEMENTS 154 (1995).

43.   *Id.*

major sources: self-reports provided by member states, and information produced by nongovernmental entities.

1. Self-Reporting

Self-reporting by states is the central means of compliance monitoring that is currently employed by IOs. The general purpose of such reporting is "to generate information about the policies and activities of parties to the treaty that involve treaty compliance and regime efficacy."[44] However, while the primary function of self-reporting is informational, it can also serve other purposes. For example, in cases where states are genuinely interested in implementing certain international obligations, reporting requirements may encourage self-examination and domestic policy reforms. Reports may also serve as effective vehicles for norms diffusion—allowing domestic actors to learn about novel policies or helpful technological solutions.[45] Additionally, reporting can help detect authentic compliance difficulties, flesh out scientific or political challenges, and assess the practical success of the regime.[46]

However, as justly questioned by Chayes and Chayes, "[w]hy would a state report information that shows it to be out of compliance with its obligations?"[47] Self-reporting, as a way to monitor compliance, has indeed many reasons to fail—states may not submit reports or may provide inaccurate, incomplete, or unreliable information.[48] Some states would not provide the required compliance data in order to avoid the potentially high reputation costs of public noncompliance (for example, in cases when a state bluntly violates its treaty obligations). Others, in particular developing nations, may not possess the financial and bureaucratic means that are required in order to prepare comprehensive and reliable reports (particularly in cases in which information collection and analysis are costly). As self-reporting cannot reliably guarantee that states will indeed issue comprehensive reports about their compliance situation, IOs seek alternative monitoring methods and turn to nongovernmental entities.

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44.   *Id.*

45.   DANIEL BODANSKY, THE ART AND CRAFT OF INTERNATIONAL ENVIRONMENTAL LAW 239 (2010).

46.   *Id.*; CHAYES & CHAYES, *supra* note 42, at 155.

47.   CHAYES & CHAYES, *supra* note 42, at 155.

48.   *Id.* at 155–66; DAI, *supra* note 30, at 58. For instance, in the context of environmental regulation, a survey conducted by the U.S. General Accounting Office demonstrated that only twenty-three percent of the parties to the major environmental treaties filed any report in 1990. CHAYES & CHAYES, *supra* note 42, at 156. A survey conducted by the U.N. Secretary-General in 1992 revealed similar findings. Of the 164 member parties to the major human rights conventions, nearly all were lagging behind on at least one compliance report and most on several. DAI, *supra* note 30, at 58.

2. Information Produced by Nongovernmental Entities

Due to the deficiencies of self-reporting and the costliness of centralized data collection, most IOs substantially rely on compliance information produced by NGOs.[49] The shape and scope of NGOs' activity with regard to compliance monitoring substantially differs from one organization to another. Some NGOs may embark on ambitious fact-finding missions and report unique findings and first-hand evidence to IOs. Some may aggregate and convey to IOs data that has been held by domestic groups. Others may evaluate state reports and draw the attention of IOs to internal inconsistencies or misreporting.

While reports produced by NGOs offer a precious source of compliance information, they can hardly replace other monitoring endeavors. Compliance monitoring by NGOs is often not sufficiently comprehensive, systematic, or neutral, as their efforts are focused on certain issues, particular instances of noncompliance, or specific states.[50] As Philip Alston explains, "this goes to the very nature of NGOs. They are political organisations in the sense that the heart-felt advocacy of specific policies is their very *raison d'être.*"[51] Hence, as NGOs operate under independent agendas that are not necessarily aligned with the interests of official IOs, their contributions can complement but cannot substitute for the monitoring functions of IOs.

<p style="text-align:center">* * *</p>

In sum, while the monitoring of and collection of information on state compliance is an important function of IOs and a necessary component of international regulatory regimes, IOs do not possess effective means to perform this function. The following Part illustrates how this challenge comes into play in the context of three major international regulatory regimes: health, environment, and human rights.

II. COMPLIANCE MONITORING IN ACTION: HEALTH, ENVIRONMENT, AND HUMAN RIGHTS

International regulatory regimes, and the IOs that represent them, vary widely. Their compliance monitoring functions differ accordingly. As it is hardly possible to depict a fully representative picture of compliance moni-

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49.   *See, e.g.*, discussion *infra* Part II.B. Third-party states can also serve as monitors, although this monitoring method is not common. One example is international trade regulation. World Trade Organization rules are only enforced as a result of formal complaints from member states. *See* DAI, *supra* note 30, at 54–56.

50.   *E.g.*, DAI, *supra* note 30, at 61–65.

51.   Philip Alston, *Beyond 'Them' and 'Us': Putting Treaty Body Reform into Perspective, in* THE FUTURE OF UN HUMAN RIGHTS TREATY MONITORING 501, 509 (Philip Alston & James Crawford eds., 2000).

toring across IOs, this Article focuses on three major fields of international regulation: health, environment, and human rights. Several reasons underlie this choice.

First, these international regulatory regimes comprise an almost universal membership: the central body responsible for international health regulation, the WHO, has 193 members;[52] the primary environmental treaties are signed by a large majority of states;[53] and the international human rights regime applies to a large number of the 192 member states of the United Nations.[54]

Second, these regimes reflect a diversity of compliance monitoring arrangements. International health regulation is structured around the WHO— a single institution that lacks a formally binding legal authority, but in some cases, exercises a *de facto* authority. International regimes of environmental regulation lack a centralized enforcement body, but draw on increasingly stringent treaty provisions that attempt to ensure state compliance (or at least transparency about noncompliance). The U.N. human rights treaty committees, in contrast, are an example of toothless bodies that lack the capacity to enforce member states' reporting obligations.

Lastly, and perhaps most importantly, these three regimes were chosen because of their inherent weaknesses in effectively monitoring and collecting information on state compliance.[55] While other international regimes (including finance, trade, and nuclear nonproliferation) possess, by and large, sufficient tools to assess (and, at times, enforce) state compliance,[56] the IOs that are discussed below lack these capacities. Hence, the use of information technologies for compliance monitoring purposes can be particularly attractive to these international bodies.

A. *Health*

The past decade has been marked by several severe and acute outbreaks of infectious diseases that captured a great deal of attention and caused heavy losses to the global economy. Such diseases spread quickly, frequently defy efforts to develop effective and timely medical responses, and require coordinative, institutional solutions to contain their damage.

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52.   *Countries*, WHO, http://www.who.int/countries/en/index.html (last visited Oct. 15, 2011).

53.   UNITED NATIONS DEV. PROGRAMME [UNDP], HUMAN DEVELOPMENT REPORT 2007/2008: FIGHTING CLIMATE CHANGE: HUMAN SOLIDARITY IN A DIVIDED WORLD 314 tbl.25 (2007), *available at* http://hdr.undp.org/en/media/HDR_20072008_EN_Complete.pdf.

54.   *Human Rights*, STANFORD ENCYCLOPEDIA OF PHILOSOPHY § 4.2, http://plato.stanford.edu/entries/rights-human/ (last updated Aug. 24, 2010).

55.   See DAI, *supra* note 30, for a discussion of the weaknesses of environmental and human rights IOs. The WHO has, at least partially, overcome this challenge. This account mostly refers to its past practices. *See* discussion *infra* Part III.B.1.

56.   For a discussion of IOs' monitoring capacities in these regimes, see Xinyuan Dai, *Information Systems of Treaty Regimes*, 54 WORLD POL. 405, 406 (2002).

The burden to provide such solutions generally lies on the WHO—an international organization established by the United Nations to fulfill the mandate of protecting global health. The membership of the WHO currently consists of 193 countries, all of whom are also members of the United Nations.[57] The WHO is governed by a constitution that grants the organization authority to promulgate regulations and make nonbinding recommendations regarding the preservation of global health and safety.[58] Pursuant to these powers, the WHO adopted in 1951 the "International Sanitary Regulations," which were later renamed as the "International Health Regulations" (IHR).[59] The IHR regime was based on two principles: states' duty to share with the WHO information related to several specified infectious diseases on their soil, and the WHO's obligation to minimize the interference of its recommendations with international trade and travel in response to disease outbreaks.[60]

The IHR provided a poor solution to severe outbreaks of infectious diseases. Fierce criticism regarding the overly limited scope of the WHO's authority led to a decision to revise and expand the regulations.[61] Following a decade of negotiations, the new IHR entered into force in June 2007. They required each WHO member state to "develop, strengthen and maintain . . .

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57.   *Countries, supra* note 52.

58.   Constitution of the World Health Organization art. 2(k), July 22, 1946, 62 Stat. 2679, 14 U.N.T.S. 185; *e.g.*, WHO, *Revision of the International Health Regulations* arts. 21, 23, WHA58.3 (May 23, 2005), *available at* http://www.who.int/gb/ebwha/pdf_files/WHA58/ WHA58_3-en.pdf [hereinafter *Revised IHR*].

59.   U.S. DEP'T OF STATE, TREATIES IN FORCE: A LIST OF TREATIES AND OTHER INTERNATIONAL AGREEMENTS OF THE UNITED STATES IN FORCE ON JANUARY 1, 2011, at 382 (2011); *see also* David P. Fidler, *From International Sanitary Conventions to Global Health Security: The New International Health Regulations*, 4 CHINESE J. INT'L L. 325, 337–33 (2005).

60.   Fidler, *supra* note 59, at 328. The IHR initially applied to six diseases—cholera, plague, relapsing fever, smallpox, typhus, and yellow fever. It was slightly modified in 1973 (particularly for cholera) and again in 1981 (to exclude smallpox, in view of its global eradication).

61.   *See* DAVID P. FIDLER, INTERNATIONAL LAW AND INFECTIOUS DISEASES 221–78 (1999); Lauren Z. Asher, *Confronting Disease in a Global Arena*, 9 CARDOZO J. INT'L & COMP. L. 135, 149 (2001); John D. Blum, *Law as Development: Reshaping the Global Legal Structures of Public Health*, 12 MICH. ST. J. INT'L L. 207, 228 (2004); Michelle Forrest, *Using the Power of the World Health Organization: The International Health Regulations and the Future of International Health Law*, 33 COLUM. J.L. & SOC. PROBS. 153, 154–55 (2000); Allyn L. Taylor, *Controlling the Global Spread of Infectious Diseases: Toward a Reinforced Role for the International Health Regulations*, 33 HOUS. L. REV. 1327, 1328–29 (1997); Barbara von Tigerstrom, *The Revised International Health Regulations and Restraint of National Health Measures*, 13 HEALTH L.J. 35, 35 (2005).

The resolution to revise the IHR was adopted in 1995 pursuant to the outbreaks of cholera in Peru, plague in India, and Ebola hemorrhagic fever in Zaire. WHO Secretariat, *Revision and Updating of the International Health Regulations: Progress Report*, ¶ 5, A52/9 (April 1, 1999); *see also* Lawrence O. Gostin, *World Health Law: Toward a New Conception of Global Health Governance for the 21st Century*, 5 YALE J. HEALTH POL'Y L. & ETHICS 413, 416–17 (2005).

the capacity to detect, assess, notify and report events" that may constitute a public health emergency of international concern.[62] As part of this obligation, member states were required to establish "focal points"[63] that must notify the WHO of such events and any health measures taken in response to them.[64] Upon notification, the WHO Director-General "shall determine, on the basis of the information received, ... whether an event constitutes a public health emergency of international concern in accordance with the criteria and the procedure set out in these Regulations."[65] If the Director-General finds that international concerns do arise, the WHO issues recommendations in response to the emergency.[66]

Although the WHO is formally obligated to limit the interference of its recommendations with international trade and travel, the primary weakness of the IHR is that they do not provide states with incentives to cooperate and share information about detected trends of emerging diseases. A notification about a rapidly spreading disease practically isolates the affected state from the rest of the world: it limits or even eliminates movement of people and goods to and from the country, deters foreign investments, requires costly response and precautionary measures, and often generates public hysteria. For example, in the case of Swine Flu, some foreign states issued travel notices warning against travel to Mexico—the declared epicenter of the disease—and quarantined passengers arriving from the country with fever.[67] Other states banned pork imports from Mexico,[68] although the WHO insisted that consumption of pork could not transmit the disease. As a result, the Mexican gross national product was expected to significantly decrease within weeks after the outbreak of the disease.[69]

Given these heavy costs, it is natural that states comply with their notification obligations to the WHO only as a matter of last resort. The IHR allow them this option. The regulations grant states wide discretion in determining whether "a public health emergency of international concern" has

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62.   *Revised IHR, supra* note 58, arts. 5(1), 13(1).

63.   *Id.* art. 4(1).

64.   *Id.* art. 6(1). An "event" is defined as a "manifestation of disease or an occurrence that creates a potential for disease." *Id.* art. 1(1). "Public health emergency" is defined as "an extraordinary event which is determined ... (i) to constitute a public health risk to other [member states] through the international spread of disease and (ii) to potentially require a coordinated international response." *Id.*

65.   *Id.* art. 12(1).

66.   *Id.* arts. 15(1), 16.

67.   Keith Bradsher, *Hong Kong, Minding SARS, Announces Tough Measures in Response to Swine Flu*, N.Y. TIMES (Apr. 26, 2009), http://www.nytimes.com/2009/04/27/world/asia/27kong.html.

68.   *E.g.*, Aleksandras Budrys, *Russia to Retain Swine Flu Pork Bans to June 1*, REUTERS, Apr. 29, 2009, *available at* http://www.reuters.com/article/latestCrisis/idUSLT884121.

69.   *The Butcher's Bill: Flu and the Global Economy*, ECONOMIST, May 2, 2009, at 71, *available at* http://www.economist.com/node/13576491; David Luhnow & Anthony Harrup, *Mexico's Economy Slumps, Dragged Down by U.S.*, WALL ST. J., May 29, 2009, at A14.

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occurred in their territory and requires notification.[70] This discretion can allow affected states to avoid notification by arguing that a disease does not meet the criteria for a public health emergency.[71] Further, the revised IHR (similar to other guidelines and recommendations issued by the WHO) are essentially nonbinding and not accompanied by a formal regime of legal sanctions.[72] Unsurprisingly, this void, coupled with the economic costs of notifying the WHO, often leads to noncompliance.[73]

Moreover, while the disincentives to provide information regarding infectious diseases seem considerable, the IHR do not provide potentially affected states with incentives to comply and share information. In fact, the IHR contain only one clause that is related to this issue: measures taken by unaffected states "shall not be more restrictive of international traffic and not more invasive or intrusive to persons than reasonably available alternatives that would achieve the appropriate level of health protection."[74] However, this vague requirement is not likely to suffice to save the economy of an affected state.[75] Historical accounts of the development of the IHR indeed demonstrate that the WHO has not managed to establish a reliable notification and monitoring system.[76] Notwithstanding the potential reputation costs, states have been willing to take the risk, hiding traces and delaying the notification of suspicious disease outbreaks.[77]

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70.   *Revised IHR, supra* note 58, art. 6(1).

71.   David Fidler, *Emerging Trends in International Law Concerning Global Infectious Disease Control*, 9 EMERGING INFECTIOUS DISEASES 285, 287 (2003).

72.   Although formally a dispute resolution procedure is in place, it is not mandatory. *See Revised IHR, supra* note 58, art. 56; Kumanan Wilson, John S. Brownstein & David P. Fidler, *Strengthening the International Health Regulations: Lessons from the H1N1 Pandemic*, 25 HEALTH POL'Y & PLAN. 505, 507 (2010).

73.   Indeed, analyses of WHO recommendations throughout the years demonstrate that states often tend to disregard them. For example, only forty-one of 212 countries and territories adopted the WHO's policy recommending that schools educate children about HIV/AIDS, and only 102 of 212 adopted the WHO's policy for treatment of tuberculosis. *See, e.g.*, WHO, REPORT ON INFECTIOUS DISEASES: REMOVING OBSTACLES TO HEALTHY DEVELOPMENT 30–31 (1999), *available at* http://www.who.int/infectious-disease-report/pages/graph23.html.

74.   *Revised IHR, supra* note 58, art. 43(1). States that do implement health measures "which significantly interfere with international traffic shall provide to WHO the public health rationale and relevant scientific information for it." *Id.* art. 43(3).

75.   *See* David P. Fidler, *Return of the Fourth Horseman: Emerging Infectious Diseases and International Law*, 81 MINN. L. REV. 771, 815–18 (1997).

76.   Wilson, Brownstein & Fidler, *supra* note 72, at 506–07; *see also* International Consultation on Strengthening National Capacities for Epidemic Preparedness and Response in Support to the National Implementation of the International Health Regulations (2005), Lyon, France, May 2–5, 2006, *Strengthening National Capacities for Epidemic Preparedness and Response in Support to National Implementation of IHR(2005): Report of a WHO Meeting*, §§ 2.2.2, 5.2.2, WHO/CDS/EPR/LYO/2006.4 (2006), *available at* http://whqlibdoc .who.int/hq/2006/WHO_CDS_EPR_LYO_2006.4_eng.pdf (focusing on how member states should develop their own systems).

77.   As discussed below, these considerations played a major role in the Chinese government's attempts to hide cases of SARS from the WHO. *See* discussion *infra* Part III.B.1.

Hence, despite the fact that the WHO is a centralized, consensual, and influential organization, its reporting system is deeply flawed and unreliable. Given the costs of complying with the notification obligations imposed on states, the IHR lack sufficient sticks and carrots that would impel states to share unfavorable information. However, in contrast to other international regulatory regimes, the WHO has managed to overcome this hurdle and circumvent state authority in the pursuit of information on public health emergencies. As Part III demonstrates, this has been made possible, to a large extent, because of creative uses of information technologies.

B. *Environment*

International environmental regulation is a realm of concentrated costs and diffuse benefits. Similar to international health catastrophes, environmental problems rarely stay within the borders of a single state. Moreover, the interdependency among states and the cooperation required to confront these problems is even deeper in environmental issues compared to health regulation. Bitterly contested issues such as climate change, hazardous waste disposal, desertification, or marine pollution affect the environmental conditions of all nations, even if only a handful of states are directly responsible for them.

However, despite this deep interdependency, international environmental law lacks the same centralized organization of international health regulation that could develop policies, issue recommendations or guidelines, and facilitate enforcement. Rather, this branch of international regulation relies on diffuse mechanisms of compliance monitoring. While the precise nature of these mechanisms varies from one environmental treaty to another, self-reporting is the primary source for compliance-related information.[78] Reporting obligations may require states to disclose data on their emissions or discharges, provide inventories of their natural resources, share information on private violations, or specify measures that have been taken to comply with the international environmental regime.[79] As with other international regimes that employ this measure, environmental self-reporting is

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78.   See, for example, the United Nations Framework Convention on Climate Change art. 4, *opened for signature* June 4, 1992, S. TREATY DOC. NO. 102-38, 1771 U.N.T.S. 107 [hereinafter UNFCCC], requiring information on greenhouse gas emissions and implementation measures taken by states; the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal art. 4, *adopted* Mar. 22, 1989, 1673 U.N.T.S. 125 [hereinafter Basel Convention], requiring reports on international movements of hazardous wastes and information on implementation measures; and the Montreal Protocol on Substances that Deplete the Ozone Layer art. 7, *opened for signature* Sept. 16, 1987, S. TREATY DOC. NO. 100-10, 1522 U.N.T.S. 3 [hereinafter Montreal Protocol], requiring data on production, imports, and exports of ozone-depleting substances.

79.   ELLI LOUKA, INTERNATIONAL ENVIRONMENTAL LAW: FAIRNESS, EFFECTIVENESS, AND WORLD ORDER 125 (2006).

similarly supposed to facilitate the evaluation of a state's performance.[80] In some cases, it may also contribute to the scientific and factual understanding of environmental problems, allow comparisons among states, and help assess the overall progress of member states in the implementation of their environmental obligations.[81]

Naturally, and similarly to the international regulation of health, it is difficult to expect fully accurate and reliable accounts of a state's environmental situation. A survey issued in 1992 by the U.S. General Accounting Office established that many of the parties to major environmental agreements either never issued a report or often submitted incomplete reports.[82] Even states that have provided reports may be providing inaccurate information.[83] While deliberate omissions might be uncommon in countries with relatively transparent political processes and an insulated professional bureaucracy, accurate reporting can hardly be expected from all members of an international regime.[84] Moreover, even democratically mature states are not exemplary reporters in this respect.[85]

As self-reporting can hardly be considered sufficient or satisfactory to monitor state compliance, environmental IOs also rely on NGOs.[86] At times, these NGOs evaluate the credibility of state reports and assess existing national practices.[87] In other instances, they independently collect and analyze compliance data and share their reports with environmental IOs.[88] Although

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80. Daniel Bodansky, *The Role of Reporting in International Environmental Treaties: Lessons for Human Rights Supervision, in* THE FUTURE OF UN HUMAN RIGHTS TREATY MONITORING, *supra* note 51, at 361, 365–66.

81. *Id.* at 366–67. For instance, self-reporting by states under the Montreal Protocol aided an understanding of whether additional regulation of ozone-depleting substances is required. *Id.*

82. U.S. GEN. ACCOUNTING OFFICE, GAO/RCED-92-43, INTERNATIONAL ENVIRONMENT: INTERNATIONAL AGREEMENTS ARE NOT WELL MONITORED 3–4 (1992).

83. Bodansky, *supra* note 80, at 361–62.

84. Two cases that are discussed in the literature in this context refer to the Soviet Union's inaccurate reporting with regard to whale hunting and dumping of radioactive waste at sea. *See* CHAYES & CHAYES, *supra* note 42, at 155–56; Bodansky, *supra* note 80, at 362.

85. For instance, democratic and transparent states may provide reports on general measures they have undertaken to address an environmental obligation, "but rarely do they provide information to enable a third party to determine whether these measures have been sufficient." *See* LOUKA, *supra* note 79, at 125. While this difficulty could have been dealt with by conducting a formal review of state reports, environmental regimes rarely allow independent experts to evaluate reports. *See* Jesse H. Ausubel & David G. Victor, *Verification of International Environmental Agreements*, 17 ANN. REV. ENERGY & ENV'T 1, 20–22 (1992) (noting that formally, international regimes do not usually verify national reports, though informal verification does take place); Dai, *supra* note 56, at 431 (stating that treaty organizations almost never review national reports, though NGOs do).

86. *See* BODANSKY, *supra* note 45, at 234–35; CHAYES & CHAYES, *supra* note 42, at 164–65; DAI, *supra* note 30, at 63–64.

87. DAI, *supra* note 30, at 63–64.

88. For instance, the Climate Action Network examines national plans to mitigate climate change; Greenpeace monitors hazardous waste trade and whaling activities; TRAFFIC

such reports usually lack an official status, they may offer IOs some timely and valuable guidance. Despite these benefits, NGOs cannot guarantee a comprehensive and systematic monitoring of a complex regulatory regime.[89]

The lack of effective compliance monitoring mechanisms is particularly detrimental in the context of environmental regulation because exposing noncompliance (also known as the "naming and shaming" of violators) is the main stick available to IOs.[90] In some cases fear of exposure is indeed a sufficient measure to prompt compliance.[91] However, the effectiveness of this measure depends on the ability to obtain accurate and timely incriminating information. Under the current regime, IOs' access to such information is limited.

C. Human Rights

International human rights present an even bigger challenge for compliance monitoring endeavors. State compliance with human rights treaties is one of the most difficult aspects of international law. At times, it puts the whole human rights project in question.[92] As human rights violations usually concern the citizens of one state and do not spill over, they do not result in the interdependency that is typical of international health or environmental regimes. Lacking direct self-interest in global compliance, foreign governments are reluctant to intervene in human rights violations in other countries and are wary of intrusive international regimes. In such circumstances, a "naming and shaming" strategy cannot guarantee success, as states do not necessarily incur its negative consequences. "[I]nformation is largely internal" and "even reputational punishment is fraught with collective action

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provides information about trade in endangered species under the CITES agreement; the International Council for the Exploration of the Seas conducts independent scientific studies on fisheries; the International Union for Conservation of Nature (formerly known as the World Conservation Union) has been the primary authority on the status of threatened and endangered species. *See, e.g.,* BODANSKY, *supra* note 45, at 234–35; CHAYES & CHAYES, *supra* note 42, at 164–65; DAI, *supra* note 30, at 64.

89.   DAI, *supra* note 30, at 65.

90.   BODANSKY, *supra* note 45, at 227; Jutta Brunnée, *Enforcement Mechanisms in International Law and International Environmental Law, in* ENSURING COMPLIANCE WITH MULTILATERAL ENVIRONMENTAL AGREEMENTS 1, 18–19 (Ulrich Beyerlin, Peter-Tobias Stoll & Rüdiger Wolfrum eds., 2006) (explaining that many agreements allow for publication of noncompliance records, but noting that some regimes may suspend privileges for noncompliant states).

91.   *See* Oran R. Young, *The Effectiveness of International Institutions: Hard Cases and Critical Variables, in* GOVERNANCE WITHOUT GOVERNMENT: ORDER AND CHANGE IN WORLD POLITICS 160, 176–77 (James N. Rosenau & Ernst-Otto Czempiel eds., 1992).

92.   *See* SIMMONS, *supra* note 18, at 122 (mentioning that "[g]overnments are quite unlikely to comply with their international treaty obligations with respect to human rights if it is not in their interest to do so").

problems."[93] International human rights regimes may therefore "fall flat because [they] do not involve either joint gains or reciprocity."[94]

The understanding of these realities has led some scholars to reevaluate the role of international human rights regimes. Instead of examining their influence on international relations and politics, scholars' focus has shifted to the regimes' effects on *domestic* actors. According to Beth Simmons, a champion of this position, international human rights regimes influence domestic politics in several ways.[95] First, they affect national agendas by putting "new issues on the legislative table."[96] While these issues are not necessarily controversial or politically challenging, they may nonetheless lead to positive developments in a state's human rights practices.[97] Second, human rights treaties may serve as a helpful tool for domestic courts that aim to challenge existing state practices.[98] Lastly, Simmons posits that human rights treaties "can encourage local groups to mobilize to demand attention to rights compliance."[99] As part of this vision, treaties serve as "identity" mechanisms that "encourage domestic stakeholders to begin to see themselves as such."[100]

However, the mere existence of human rights treaties is not sufficient for the realization of this scenario. Accurate and timely information on state compliance is a necessary component without which domestic mechanisms cannot be set in motion. While information from human rights IOs can clearly play a major role in this context, these IOs' monitoring and collection capabilities are weak.

In the context of international human rights, monitoring requirements were first adopted in 1966, with the signing of the two International Cove-

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93.   *Id.* at 125.

94.   *Id.; see also* Beth Simmons, *Treaty Compliance and Violation*, 13 ANN. REV. POL. SCI. 273, 288 (2010); Xinyuan Dai, *Why Comply? The Domestic Constituency Mechanism*, 59 INT'L ORG. 363, 374 (2005).

95.   SIMMONS, *supra* note 18, at 125–39.

96.   Simmons, *supra* note 94, at 291.

97.   *See id.* ("Dealing with what comes from the international community can alter practices—as long as the changes are not too controversial."). For instance, a state with developed and progressive employment laws may undertake some further antidiscrimination obligations without substantial political constraints.

98.   Domestic human rights litigation was particularly helpful in the cases under the Convention Against Torture in Chile and Israel, and under the Convention on the Elimination of All Forms of Discrimination Against Women in Japan and Colombia. SIMMONS, *supra* note 18, at 362.

99.   Simmons, *supra* note 94, at 291.

100.   *Id.* This approach implies that compliance with human rights treaties is strongest "in polities in which domestic stakeholders have both the motive and the means to organize to demand compliance." *Id.* Simmons states that these conditions are absent both in stable autocracies (where citizens have no means to mobilize) and in stable democracies (where rights are already protected and citizens lack strong motives to mobilize). Hence, human rights treaties are likely to strengthen states' human rights records in partial and transitioning democracies, where citizens have both motives and means to mobilize. *Id.*

nants[101] and other human rights treaties.[102] As part of these requirements, member states were subjected to regular reporting obligations "on the assumption that the examination of reports would lead to a dialogue between each state and the relevant treaty body, and to progressive improvements in compliance."[103] States are required to assess their human rights practices and report about their progress and the difficulties associated with the domestic implementation of treaty obligations.[104] Reports are submitted to independent treaty committees that are responsible for monitoring the implementation of the core U.N. human rights treaties.[105] These committees evaluate states' submissions and publish concluding observations about the reported implementation measures.[106] If necessary, they may also issue nonbinding recommendations on further implementation steps.[107]

Not surprisingly, self-reporting is considered to be the weakest monitoring mechanism available to human rights treaty committees.[108] While it may, occasionally, raise awareness of a state's treaty obligations, there are no effective measures to oblige a noncooperative state to file reports on a timely

101.   International Covenant on Civil and Political Rights, *opened for signature* Dec. 16, 1966, S. TREATY DOC. No. 95-20, 999 U.N.T.S. 171 [hereinafter ICCPR]; International Covenant on Economic, Social and Cultural Rights, *opened for signature* Dec. 16, 1966, 993 U.N.T.S. 3 [hereinafter ICESCR].

102.   The International Labour Organization (ILO) was the first human rights body that obliged member states to periodically submit compliance reports. *See* Lee Swepston, *The International Labour Organization and Human Rights, in* INTERNATIONAL PROTECTION OF HUMAN RIGHTS: A TEXTBOOK 323, 329–31 (Catarina Krause & Martin Scheinin eds., 2009).

103.   *See* James Crawford, *The UN Human Rights Treaty System: A System in Crisis?, in* THE FUTURE OF UN HUMAN RIGHTS MONITORING, *supra* note 51, at 1, 1.

104.   WALTER KALIN & JÖRG KÜNZLI, THE LAW OF INTERNATIONAL HUMAN RIGHTS PROTECTION 210–11 (2009); *see also* AnnJanette Rosga & Margaret L. Satterthwaite, *The Trust in Indicators: Measuring Human Rights*, 27 BERKELEY J. INT'L L. 253, 289–91 (2009) (discussing how state reports are used by treaty bodies in monitoring treaty implementation).

105.   The committees are the following: Committee on Economic, Social and Cultural Rights (ICESCR); Human Rights Committee (ICCPR); Committee against Torture (CAT); Committee on the Rights of the Child (CRC); Committee on the Elimination of Racial Discrimination (CERD); Committee on the Elimination of Discrimination Against Women (CEDAW); Committee on the Protection of the Rights of All Migrant Workers and Members of Their Families (ICRMW); Committee on Enforced Disappearances (CPAPED); Committee on the Rights of Persons with Disabilities (CRPD).

106.   Human rights committees increasingly rely on quantitative indicators and benchmarks to measure state compliance with human rights treaties. For an overview of this practice, see generally Maria Green, *What We Talk About When We Talk About Indicators: Current Approaches to Human Rights Measurement*, 23 HUM. RTS. Q. 1062, 1076–84 (2001); Rosga & Satterthwaite, *supra* note 104, at 288–89. For a general analysis of the use of indicators by a variety of international institutions, see Kevin E. Davis et al., *Indicators as a Technology of Global Governance* 28–48 (N.Y.U. Sch. of Law Pub. Law & Legal Theory Working Paper Series, Working Paper No. 10-26, 2010), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1583431.

107.   KALIN & KÜNZLI, *supra* note 104, at 211.

108.   *Id.*

basis or, in fact, file them at all.[109] Aside from the low response rate, the reliability of the reports is also questionable. Naturally, states do not have incentives to reveal their human rights malpractices; an expectation of a full and authentic disclosure is therefore ungrounded. As a variety of financial and technical constraints prevent treaty committees from thoroughly analyzing even the reports that were duly submitted, their chances to independently expose noncompliance are slim.[110]

In light of the deficiencies of the self-reporting mechanism, major human rights treaties have allowed a limited system of interstate and individual complaints. Some of the treaties enable states to file complaints against other states, even if their own interests are not concerned.[111] However, this procedure is hardly used.[112] States do not have incentives to expend their political resources to enforce human rights treaties in other nations, which could have the side-effect of impairing their relations with these nations or triggering countercomplaints.[113] Furthermore, mechanisms that are set to handle individual complaints are far from being efficacious.[114]

The weaknesses of all the above methods substantially strengthen the role of NGOs as the major source of compliance data for human rights IOs. It has been noted that "the United Nations is virtually completely dependent on human rights data collected and presented by NGOs for their own activities in the area of supervision and monitoring, since generally these are the

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109.   Reportedly, as of February 2006, only eight of 194 states that are party to one or more of the major U.N. treaties were up to date with their reports. The remaining 186 states owed 1442 reports to the human rights treaty bodies. U.N. Secretariat, *Concept Paper on the High Commissioner's Proposal for a Unified Standing Treaty Body: Report by the Secretariat*, ¶ 16, U.N. Doc. HRI/MC/2006/2 (Mar. 26, 2006). A survey conducted by the U.N. Secretary-General in 1992 reached largely similar conclusions: of the 164 member states to one or more of the major human rights treaties, substantially all were behind on at least one report, and twenty-seven were missing ten reports or more. *See* U.N. Secretary-General, *Status of International Human Rights Instruments and the General Situation of Overdue Reports*, U.N. Doc. HRI/MC/1992/3 (Sept. 25, 1992).

110.   CHAYES & CHAYES, *supra* note 42, at 161; Crawford, *supra* note 103, at 5–7.

111.   *See, e.g.,* Convention Against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment art. 21, *opened for signature* Dec. 10, 1984, S. TREATY DOC. NO. 100-201, 465 U.N.T.S. 85 [hereinafter Convention Against Torture]; International Convention on the Elimination of All Forms of Racial Discrimination art. 11, *adopted* Dec. 21, 1965, S. TREATY DOC. NO. 95-18, 660 U.N.T.S. 195; Convention for the Protection of Human Rights and Fundamental Freedoms art. 33, *opened for signature* Nov. 4, 1950, 213 U.N.T.S. 221.

112.   KALIN & KÜNZLI, *supra* note 104, at 234.

113.   *Id.* at 235; *see also* SIMMONS, *supra* note 18, at 122.

114.   *See, e.g.,* Henry J. Steiner, *Individual Claims in a World of Massive Violations: What Role for the Human Rights Committee?*, in THE FUTURE OF UN HUMAN RIGHTS TREATY MONITORING, *supra* note 51, at 15, 53.

Human rights treaties also allow treaty committees a limited authority for independent investigations "if reliable and well-founded information indicates that serious and systematic violations of the rights concerned are being perpetrated." KALIN & KÜNZLI, *supra* note 104, at 237. The effectiveness of these procedures is, however, limited. *See id.*

only readily accessible data available."[115] Indeed, NGOs strategically schedule the publication of their country reports in proximity to the review meetings held periodically by human rights committees.[116]

While NGOs' reports serve as the *de facto* primary sources of information for IOs, this situation is not ideal. As NGOs operate according to their own agendas, priorities, and internal constraints, they should not substitute for the monitoring functions of official human rights IOs that comprise universal state membership, but rather complement them. As the agendas and priorities of official IOs may be no less disputed than those of human rights NGOs, the best case scenario would be to integrate the two methods of compliance monitoring. Both IOs and NGOs should be able to inspect state behavior, draw independent conclusions, supplement each other's work, and, if necessary, expose biases and distorted priorities. While the deficiencies of IOs' monitoring endeavors currently prevent such a scenario, the discussion below demonstrates how information technologies can help realize it.

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To sum up, the institutional designers of international regulatory regimes assign IOs a substantial role in monitoring and collecting information on state compliance with international obligations. Since these bodies are not endowed with rigorous enforcement mechanisms, they are supposed to perform the role of data clearinghouses—collecting compliance-related information from various sources and disseminating it to actors that can make use of it, either domestically or internationally. Incriminating information on violations of public health obligations, for instance, can be used by domestic advocacy groups that will attempt to put the information on the national agenda, bring the responsible officials to courts, or use it for internal mobilization purposes. Data on environmental violations can be used by foreign states via formal or informal channels to compel or convince the violating state to comply. As occurred during the unrest in Egypt in 2011, information on human rights violations can strengthen local political groups and bolster their activities.[117]

However, as discussed above, IOs systematically underperform and fail to rise up to these expectations. As a result, IOs' inability to effectively collect and disseminate information on state compliance breaks the clearinghouse cycle. Without reliable compliance information, it is harder to

115.   Pieter H. Kooijmans, *The Non-Governmental Organizations and the Monitoring Activities of the United Nations in the Field of Human Rights*, *in* THE ROLE OF NON-GOVERNMENTAL ORGANIZATIONS IN THE PROMOTION AND PROTECTION OF HUMAN RIGHTS 15, 16–17 (Alex Geert Castermans et al. eds., 1990); *accord* CHAYES & CHAYES, *supra* note 42, at 164; *see also* Alston, *supra* note 51, at 509.

116.   DAI, *supra* note 30, at 59.

117.   John D. Sutter, *The Faces of Egypt's 'Revolution 2.0*,' CNN (Feb. 21, 2011, 12:25 PM), http://www.cnn.com/2011/TECH/innovation/02/21/egypt.internet.revolution/index.html.

set in motion the wheels of either domestic or international enforcement.[118] This situation clearly undermines the effectiveness of international regulatory regimes in fields as important as health, environment, and human rights. Assuming that these regimes embody a desirable regulatory framework that we wish to sustain and keep viable, the monitoring deficiency is worrisome.

There may be a variety of responses to handle this challenge. This Article illuminates one particular solution that is promising in terms of both effectiveness and ease of implementation—the use of information technologies.

III. The Promise of Information Technologies

Information technologies can support the monitoring efforts of IOs both indirectly and directly. The indirect approach is relatively modest and largely consists of enhanced transparency. However flawed the existing mechanisms of self-reporting and the compliance data provided to IOs by NGOs are, they constitute large databases that have been exclusively held and managed by IOs. Before the internet era, access to these databases was naturally limited to a handful of professionals and public officials. This state of affairs has now changed, as all compliance-related data can potentially be made available on IOs' websites. Given that the goal of monitoring and collection of compliance information by IOs is to further disseminate it to international and domestic actors, improved access to information surely contributes to the task.

The direct approach is more ambitious. The internet can also be used by IOs to independently search for compliance-related information that has not reached them via the traditional channels of states and NGOs. While this method is still uncommon, it has already been employed in the context of international health regulation where it generated promising and reliable results.[119] Three major mechanisms have been used in this respect: (a) web crawlers (i.e., automated search engines) that are programmed to browse a wide variety of online news sources looking for specific keywords; (b) online networks of experts who instantly share compliance-related information and transmit notices to the relevant IOs; and (c) online platforms that allow lay persons to report and share compliance-related information they happen to possess.

The next two Sections discuss the indirect (access to compliance information) and direct (distributed collection of compliance information) versions of compliance monitoring in the context of international health, environment, and human rights regulation.

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118.   Data that is generated by NGOs can offer some redress in this respect. However, their resources are limited, they are often perceived as biased, and they lack the credibility of IOs with universal membership.

119.   *See* discussion *infra* Part III.B.1.

A. *Access to Information*

Information technologies can open up the data that IOs already possess to wider audiences. The advantages of placing datasets online are straight-forward. Primarily, by lowering the threshold of access to compliance information, the IO better fulfills its role as an information clearinghouse. While most states may have had access to some parts of this information even without the internet, a large database that contains full compliance data on all members of an international regulatory regime had certainly been unattainable before the internet age. Governments may now rely on this information in order to put pressure on violating states, negotiate international agreements, better assess their own performance vis-à-vis the practices of other states, or frame their foreign policies.

Furthermore, easily accessible compliance information is particularly important for domestic NGOs, local advocacy groups, and private individuals who are interested in the subject matter. Official data on state compliance had been practically unavailable to many of these actors. Costless access to this information empowers them in all civil and political actions they might be engaging in—mobilization of activists, lobbying for legislative reforms, or judicial proceedings in national courts. Access to compliance information on all member states is particularly important in this respect, as comparative data may serve as a powerful tool for persuasion and political pressure. For instance, clear evidence that a state lags behind all other countries in its greenhouse gas emissions reduction may help local environmental groups to convince courts, legislators, or other public officials that certain implementation steps should be taken. While before the internet resources had to be invested in order to obtain such evidence, publicly available databases now obviate these costs.[120]

Costless access is not the only advantage of information technologies. The internet also redefines what types of compliance data are regarded as official and reliable. As the IOs in question are intergovernmental bodies with universal membership, they do not merely serve as clearinghouses of information, but rather as the *official* clearinghouses. Hence, if a human rights IO places on its website compliance reports that were produced by local or international NGOs, this may be sufficient to elevate the status of these NGOs and acknowledge the reliability and accuracy of their data. Although these reports might have been accessible without the internet, their publication on IOs' official websites signals their credibility and boosts the influence, publicity, and legitimacy of the reporting NGOs.

Despite the benefits of reliable online access to information, IOs in the fields of health, environment, and human rights lack explicit policies in this context. The following pages survey the information that can be found on

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120.   Naturally, the establishment and maintenance of online datasets impose costs on the responsible IOs. These costs, however, should not be high, as IOs already possess this information—all that is required is to make it public.

IOs' official websites. The last Subsection suggests what the cornerstones of an online access policy should be.

1. Health

The WHO website provides a profile for each member state, consisting of extensive health statistics and information on particular health issues that affect the state.[121] The statistics include basic health facts about a country, such as life expectancy under various specifications, national expenditure on health, immunizations, prevalence of diseases such as tuberculosis and HIV, and the distribution of causes of deaths.[122] For each country, the website also displays information such as its national health system, collaborating health centers, data on nutrition, risk factors, health service coverage, mortality and burden of disease (e.g., chronic diseases), and more.[123] Some of the state profiles also feature documents describing the WHO's "cooperation strategy" with the state—health aid programs, partnerships with local health institutions, and a strategic agenda for the collaboration between the WHO and the surveyed state.[124] The website contains ample amounts of interactive and easily graspable health information. However, it does not provide data on state compliance with the IHR. Although some state profiles contain data on "disease outbreaks," this information is only partial,[125] and it is not possible to discern from it whether the state complies with its obligations to the WHO.

2. Environment

One of the most comprehensive environmental websites is operated by the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat.[126] The website offers vast background information on climate change and on the operation of the UNFCCC regime.[127] More importantly, it

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121.   *Countries, supra* note 52.

122.   *See, e.g., United States of America: Health Profile,* WHO, http://www.who.int/gho/countries/usa.pdf (last updated Apr. 4, 2011).

123.   *See, e.g., Countries: United States of America,* WHO, http://www.who.int/countries/usa/en/ (last visited Oct. 15, 2011). For data on different countries, see *Countries, supra* note 52.

124.   *See, e.g.,* WHO, *Country Cooperation Strategy for WHO and Egypt 2010–2014,* EM/ARD/037/E/R/12.10 (2010), *available at* http://www.who.int/countryfocus/cooperation_strategy/ccs_egy_en.pdf; WHO, *WHO-China Country Cooperation Strategy 2008–2013* (2008), *available at* http://www.who.int/countryfocus/cooperation_strategy/ccs_chn_en.pdf.

125.   For instance, there is no information on Swine Flu on the Mexican page. *Global Alert and Response (GAR): Mexico,* WHO, http://www.who.int/csr/don/archive/country/mex/en/ (last visited Oct. 15, 2011).

126.   UNFCCC, http://www.unfccc.int (last visited Oct. 15, 2011). This site is related to both the treaty, UNFCCC, *supra* note 78, and the Kyoto Protocol to the UNFCCC, *opened for signature* Mar. 16, 1998, 2303 U.N.T.S. 148.

127.   For instance, the "Documentation" page allows for searching a vast database of official documents issued since 1991 as part of the UNFCCC and Kyoto Protocol regimes

operates as a large repository of information related to state compliance, providing several search options. For instance, the tab "Kyoto Protocol" on the homepage provides data on compliance under the Kyoto Protocol,[128] featuring reports submitted by states and notes prepared by the Secretariat with regard to the compliance of several states. Further, a category named "Parties & Observers" enables users to view national communications, in-depth reviews, demonstrable progress reports, and other implementation documents available for each member state.[129]

While the website of the UNFCCC is the most comprehensive to date, the websites of other environmental IOs are similarly well developed. The Convention on Biological Diversity website, for example, provides an analysis section on state compliance,[130] along with sophisticated search options for state reports.[131] The Convention on International Trade in Endangered Species (CITES)[132] website provides background information on the treaty regime (for example, official documents, national reports, and publications), but in contrast to websites that only provide a broad array of general information on the relevant environmental regime, CITES specifically focuses on instances of noncompliance.[133] For instance, under the category of "Trade Suspensions," the website lists a chart of states that are currently subject to a recommendation to suspend trade and the background for the recommendation.[134]

However, despite the richness of compliance-related information on these websites, they hardly represent the norm among environmental IOs. In

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(including state reports, in-depth reviews, and assessment reports of greenhouse gas invento-ries). *Documentation*, UNFCCC, http://unfccc.int/documentation/items/2643.php (last visited Oct. 15, 2011).

128.   *Compliance Under the Kyoto Protocol*, UNFCCC, http://unfccc.int/kyoto_protocol/compliance/items/2875.php (last visited Oct. 15, 2011).

129.   *Parties & Observers*, UNFCCC, http://unfccc.int/parties_and_observers/items/2704.php (last visited Oct. 15, 2011).

130.   *National Reports Analyzer*, CONVENTION ON BIOLOGICAL DIVERSITY, http://www.cbd.int/reports/analyzer.shtml (last visited Oct. 15, 2011).

131.   *National Reports and NBSAPs*, CONVENTION ON BIOLOGICAL DIVERSITY, http://www.cbd.int/reports/search/ (last visited Oct. 15, 2011). The website also offers back-ground on the convention (history, parties, mechanisms), the Protocol, specific thematic programs (e.g., forest biodiversity), cross-cutting issues (e.g., liability and redress), and mech-anisms (links to national reports, financial information, and partner organizations). *See generally* CONVENTION ON BIOLOGICAL DIVERSITY, http://www.cbd.int (last visited Oct. 15, 2011). See Convention on Biological Diversity, *opened for signature* June 5, 1992, 1760 U.N.T.S. 79, for the convention text itself.

The Basel Convention website similarly provides state reports, although its database is less comprehensive than the other conventions. BASEL CONVENTION, http://www.basel.int (last visited Oct. 15, 2011). For the full citation of the treaty, see Basel Convention, *supra* note 78.

132.   Convention on International Trade in Endangered Species of Wild Fauna and Flora [CITES] art. VIII, *approved* Mar. 3, 1973, 27 U.S.T. 1087, 993 U.N.T.S. 243.

133.   CITES, http://www.cites.org (last visited Oct. 15, 2011).

134.   *Countries Currently Subject to a Recommendation to Suspend Trade*, CITES, http://www.cites.org/eng/disc/trade_suspension.shtml (last visited Oct. 15, 2011).

fact, a substantial number of major international environmental regimes do not provide access to compliance-related information.[135]

3. Human Rights

Compared to the websites of the WHO and some environmental IOs, the websites of the human rights treaty committees are the least developed. The committees lack a common policy regarding online access to compliance data and, as a result, the scope of materials on the committees' websites and their accessibility to users varies. For instance, the website of the Committee Against Torture[136] contains state reports since 1997, concluding observations of the committee, and supplementary materials submitted by NGOs. Additionally, because the site is part of the website for the Office of the High Commissioner for Human Rights (OHCHR), the website provides a link to the comprehensive general search engine of the OHCHR. Similar information is offered by the Committee on the Elimination of Discrimination Against Women, which provides reports submitted by each state since 1994, compliance-related questionnaires sent to states and their responses, summary observations for each reporting state, and more.[137] The Human Rights Committee also publishes on its website state reports, but the website is not easily accessible and reports are not easily findable.[138] Comparable information is provided by the other committee websites.[139]

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135.   For instance, the website of the Montreal Protocol Unit states the goal of the unit is assisting countries "in complying with the Montreal Protocol's control measures," but does not provide any data on compliance. For the Montreal Protocol website, see *Environment and Energy*, UNDP, http://www.undp.org/environment/index.shtml (last visited Oct. 15, 2011). For comparable examples, see *Air Pollution*, U.N. ECON. COMM'N FOR EUR., http://live.unece.org/env/lrtap/welcome.html (last visited Oct. 15, 2011) for information related to the Convention on Long-Range Transboundary Air Pollution, *opened for signature* Nov. 13, 1979, 1302 U.N.T.S. 217.

136.   *Committee Against Torture*, OFFICE OF THE HIGH COMM'R FOR HUMAN RIGHTS [OHCHR], http://www2.ohchr.org/english/bodies/cat/ (last visited Oct. 15, 2011). This website is related to the Convention Against Torture, *supra* note 111.

137.   *Committee on the Elimination of Discrimination Against Women*, U.N., http://http://www.un.org/womenwatch/daw/cedaw/committee.htm (last visited Oct. 15, 2011). This website is related to the Convention on the Elimination of All Forms of Discrimination Against Women, *opened for signature* Mar. 1, 1980, 1249 U.N.T.S. 13.

138.   *Human Rights Committee*, OHCHR, http://www2.ohchr.org/english/bodies/hrc/ (last visited Oct. 15, 2011). This website is related to the ICCPR, *supra* note 101.

139.   For example, see *Committee on Economic, Social and Cultural Rights*, OHCHR, http://www2.ohchr.org/english/bodies/cescr/ (last visited Oct. 15, 2011) for the ICESCR, *supra* note 101; *Committee on Migrant Workers*, OHCHR, http://www2.ohchr.org/english/bodies/cmw/ (last visited Oct. 15, 2011), for the International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families, *opened for signature*, Dec. 18, 1990, 2220 U.N.T.S. 3; *Committee on the Rights of the Child*, OHCHR, http://www2.ohchr.org/english/bodies/crc/ (last visited Oct. 15, 2011), for the Convention on the Rights of the Child, *opened for signature* Nov. 20, 1989, 1577 U.N.T.S. 3.

4. Policy Proposals

Despite the benefits of online access to compliance information, the practices of IOs vary substantially in terms of what data is available on their website, to what extent noncompliance information is present, and how the information is displayed. Most of the organizations surveyed above provide large amounts of unstructured information and leave it to the individual user to find hints of state compliance or noncompliance. Sometimes, the websites are sufficiently interactive and this task is intuitive. It is likely, however, that users may often find it difficult to effectively navigate the website and reach the information they are interested in. Since effective online access to compliance information is important for strengthening the international regulatory regime, this situation is lamentable.

Two policy proposals can be helpful in this respect. The first one is straightforward: state compliance information should be systematically uploaded and maintained on the official websites of IOs. IOs should develop coherent policies of data management and periodically review them as technology evolves. The costs associated with the maintenance of these websites are trivial in comparison to the positive results they may yield.

The second policy proposal concerns *how* compliance information should appear on IOs' websites. The first option is "full transparency"—placing information online "as is" and generating massive databases for each member state. The advantage of this option is that all information is publicly available and searchable online. Anyone who is interested can freely access the website, search the database, and draw independent conclusions based on their own analysis of the available facts. However, the number of individuals who can actually perform these actions is limited. Placing massive datasets on a website is not a guarantee that this information will be sensibly comprehended.[140] Rather, it may generate confusion, distort conclusions, or simply go unnoticed. In this sense, more information does not always produce better knowledge or understanding. Individuals may ignore, misunderstand, or misuse certain aspects of the data, depending on their unique and complex "chains of comprehension, action, and response."[141] Moreover, the overwhelming amounts of information available online may create "attention spans,"[142] which prevent users from going into the depth of all the data available to them and instead lead them to

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140.   ARCHON FUNG, MARY GRAHAM & DAVID WEIL, FULL DISCLOSURE: THE PERILS AND PROMISE OF TRANSPARENCY 53 (2007); Lawrence Lessig, *Against Transparency*, NEW REPUBLIC, Oct. 21, 2009, at 37, 39–40, *available at* http://www.tnr.com/article/books-and-arts/against-transparency.

141.   FUNG, GRAHAM & WEIL, *supra* note 140, at 53 (noting that comprehension of information is inseparable from the interests, resources, cognitive capacities, cultural background, and social contexts of the individuals who consume it).

142.   Lessig, *supra* note 140, at 40.

focus on specific and often out-of-context details. The result, as Lawrence Lessig posits, is a "systemic misunderstanding."[143]

A possible solution to these pitfalls is to ensure that transparency is "targeted"—conveying information in standardized and user-centric ways that allow individuals to readily grasp, compare, and disaggregate it.[144] While this task is not easy in practical terms, it is certainly doable for most types of information.[145] For instance, the website of the Convention on Biological Diversity provides an overview of states' reports and highlights the major implementation steps each state has taken. Although this information relies on self-reports submitted by states and thus cannot be considered fully reliable, it offers an example of how targeted transparency in the context of international environmental regulation could look.

These two approaches have different implications that should be taken into account. Full transparency restricts the discretion of the IO and requires third parties to make the effort of delving into the reports and informing the public. In the absence of such committed third parties, this policy can be problematic. Targeted transparency grants discretion to the IO to decide what information should be placed on the radar and how to frame and structure it. A combination of these two approaches is perhaps the most appealing option for providing effective online access to information. Two types of information should therefore be available on IOs' websites: targeted and user-centric information on state compliance that would be accessible and understandable for wide audiences; and full datasets of information that could be used by sophisticated third parties and also serve as a potential check on the IO's interpretation and presentation of targeted information.

* * *

While online access to information is far from being a settled issue for IOs, it does not raise significant normative concerns. IOs are likely to gradually adopt information technologies as part of their day-to-day operation. The primary challenge in this respect is how to accurately frame and contextualize compliance data.

The next Section and the rest of the Article are dedicated to a more ambitious and problematic use of information technologies for compliance monitoring—a practice in which IOs actively search for compliance data via the internet.

B. *Online Compliance Monitoring*

Improved access to information is not the only possible effect of information technologies on state compliance with international obligations.

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143.   *Id.*

144.   FUNG, GRAHAM & WEIL, *supra* note 140, at 37–38.

145.   For policy suggestions, see *id.* at 170–82.

More ambitious uses of the internet, which are already underway in some international venues, may lead to deep and dramatic changes in the way state compliance is observed and international regulation is made. As of now, the WHO has been the pioneer in this new territory. However, other international regulatory regimes possess the means to join in and begin their own experiments with online compliance monitoring.

1. Health

The core obligations of the WHO member states are to collect and report information about events that may constitute a public health emergency.[146] Compliance with these obligations has proved to be problematic though. Some states are reluctant to disclose potentially harmful information even if they possess it.[147] Other states may lack the capacity to fulfill their obligations and produce the necessary information.[148] Unlike other international regulatory regimes, the WHO has been known for its proactive collection of compliance information from the media and various nongovernmental bodies.[149] Recently, the mandate of the organization to rely on these sources was buttressed by the revised IHR, which authorized the WHO to bypass member states in its compliance monitoring efforts.[150]

The internet has been playing a vital role in the monitoring activities of the WHO, generating a situation in which "the majority of the world's information about infectious disease outbreaks no longer comes from voluntary reporting by countries . . . [but] from real-time electronic communications and the World Wide Web."[151] The following pages survey the mechanisms that are currently employed by the organization and discuss their effects on the detection and analysis of global pandemics.

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146.   *See* discussion *supra* accompanying notes 58–66.

147.   *See* discussion *supra* accompanying notes 70–77.

148.   David P. Fidler & Lawrence O. Gostin, *The New International Health Regulations: An Historic Development for International Law and Public Health*, 34 J.L. MED. & ETHICS 85, 88 (2006).

149.   Reportedly, out of 1315 unverified reports of an infectious disease outbreak that were received by WHO between January 2001 and October 2004, only thirty-nine percent were reported by governmental officials, while the rest came from unofficial sources (such as electronic media and NGOs). *See* David L. Heymann, *SARS and Emerging Infectious Diseases: A Challenge to Place Global Solidarity Above National Sovereignty*, 35 ANNALS ACAD. MED. SING. 350, 350 (2006).

150.   *Revised IHR, supra* note 58, art. 9. Specifically, the revised IHR allowed the organization to "collect information regarding events through its surveillance activities and assess their potential to cause international disease spread and possible interference with international traffic." *Id.* art. 5(4).

151.   Heymann, *supra* note 149, at 350.

a. Technological Advances

i. Networks of Experts

The digital experiments of the WHO began in 1994 with the launch of the Program for Monitoring Emerging Diseases (ProMED)—a moderated electronic mailing list through which subscribers could rapidly share information on public health events.[152] ProMED is currently a publicly available reporting system, with more than 45,000 subscribers in 188 countries.[153] It disseminates "information on outbreaks by e-mailing and posting case reports, including many gleaned from readers, along with expert commentary."[154] In 2006, the functions of the ProMED mailing list were expanded by the development of EpiSPIDER—a visualization supplement that displays the topic intensity of ProMED emails on a map and automatically converts them into RSS feeds.[155]

The most avid users of ProMED are professional health workers who share their experiences with their peers via the mailing list. Ties among these professionals are strengthened by the Global Outbreak Alert & Response Network (GOARN), established by the WHO in 1998.[156] Participation in GOARN is open to "technical institutions, networks and organizations that have the capacity to contribute to the international outbreak alert and response."[157] It currently consists of over 400 health professionals, operating in forty countries and over 120 public health institutions throughout the world.[158] The declared goal of GOARN is to "improve the coordination of international outbreak responses and to provide an operational framework to focus the delivery of support to countries."[159] It aims to assist affected countries with disease control efforts by ensuring appropriate technical support

152.   Stephen S. Morse, *Global Infectious Disease Surveillance and Health Intelligence*, 26 HEALTH AFF. 1069, 1072 (2007). For an overview of the history of ProMED, see generally Lawrence Madoff & John P. Woodall, *The Internet and the Global Monitoring of Emerging Diseases: Lessons from the First 10 Years of ProMED-mail*, 36 ARCHIVES MED. RES. 724 (2005); *see also ProMED-mail*, INT'L SOC'Y FOR INFECTIOUS DISEASES, http:// http://www.promedmail.org/pls/apex/f?p=2400:1000 (last visited Oct. 15, 2011).

153.   John S. Brownstein et al., *Digital Disease Detection—Harnessing the Web for Public Health Surveillance*, 360 NEW ENG. J. MED. 2153, 2153 (2009).

154.   *Id.*

155.   Mikaela Keller et al., *Use of Unstructured Event-Based Reports for Global Infectious Disease Surveillance*, 15 EMERGING INFECTIOUS DISEASES 689, 691–93 (2009). An RSS (Rich Site Summary) feed is a format for delivering regularly changing web content. *See also* EPISPIDER, http://www.epispider.info/ (last visited Oct. 15, 2011).

156.   DAVID P. FIDLER, SARS, GOVERNANCE AND THE GLOBALIZATION OF DISEASE 66 (2004).

157.   *Global Outbreak Alert & Response Network*, WHO, http://www.who.int/csr/ outbreaknetwork/en/ (last visited Oct. 15, 2011).

158.   *Global Outbreak and Response Network—GOARN: Partnership in Outbreak Response*, WHO, http://www.who.int/csr/outbreaknetwork/goarnenglish.pdf (last visited Oct. 15, 2011) [hereinafter *Partnership in Outbreak Response*]; Heymann, *supra* note 149, at 350–51.

159.   *Partnership in Outbreak Response*, *supra* note 158.

to affected populations, validating disease-related information, investigating events and assessing risks of disease threats, and supporting national outbreak preparedness.[160] As GOARN extensively uses mailing lists such as ProMED for its emergency and nonemergency communications, it provides an unprecedented degree of access and response to public health event information.

ii. Web Crawlers

As part of its compliance monitoring endeavors, the WHO also relies on the Global Public Health Intelligence Network (GPHIN)—a secure early warning internet system that crawls the web, attempting to detect a wide range of information about potential disease outbreaks.[161] The system was developed by the Canadian health authorities, responding to concern that "the speed of health reporting in the news media was undermining the credibility and authority of public health [institutions] to manage [an] outbreak."[162] GPHIN uses extensive search queries to browse a large variety of online news sources. Chiefly, it relies on global news aggregators such as *Factiva*, which compiles over 9000 news sources in twenty-two languages.[163] Information gathered by the system is not public and subscription is restricted to established public health organizations.[164] In order to focus its efforts on the central challenges of international health regulation, GPHIN follows the scope of the revised IHR and concentrates its crawling endeavors on six major areas: infectious diseases, biologics, chemical incidents, environmental incidents, radioactive incidents, and natural disasters.[165]

The selection and management of reports that enter GPHIN are based on both technology and human discretion. The automated scanning system relies on a specific taxonomy of keywords and Boolean search syntaxes to identify potentially relevant reports, filter duplicates, and arrange the reports according to a scale of relevance.[166] Reports with a relevance score above a certain threshold are automatically posted on GHPIN's website, while reports with an even higher score are also sent to GOARN and the WHO as

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160.   *Id.*

161.   Tenth Machine Translation Summit, Phuket, Thailand, Sept. 12–15, 2005, Abla Mawudeku & Michael Blench, Invited Paper, *Global Public Health Intelligence Network (GPHIN)*, at i-7, http://www.mt-archive.info/MTS-2005-Mawudeku.pdf [hereinafter Mawudeku & Blench]; *see also The Global Public Health Intelligence Network (GPHIN)*, PUB. HEALTH AGENCY OF CAN., http://www.phac-aspc.gc.ca/gphin/ (last updated Dec. 6, 2004).

162.   Mykhalovskiy & Weir, *supra* note 1, at 43.

163.   *Id.*; Mawudeku & Blench, *supra* note 161, at i-8.

164.   Mykhalovskiy & Weir, *supra* note 1, at 43.

165.   As of 2006, the estimate was that GPHIN processed between 2000 and 3000 reports daily, one-fourth to one-third of which were discarded as irrelevant or duplicative. Mykhalovskiy & Weir, *supra* note 1, at 43.

166.   *Id.*

urgent email alerts.[167] The automated process is supplemented by professional analysts who decide the fate of reports "whose relevancy lies in the zone between the automatic 'publish' and the automatic 'trash.' "[168] The analysts decide whether to publish such reports and also automatically review the trashed ones to avoid false negatives.[169] As GPHIN lacks tools to validate the information it retrieves, alerts are further analyzed by the WHO and GOARN, tapping into a wide network of collaborators who are equipped to detect early warning signs of diseases. As discussed in the context of SARS and Swine Flu below,[170] this network is vital for the early detection and collaborative analysis of diseases.

GPHIN has been credited with detecting the first hints of forty percent of the average of 200 to 250 disease outbreaks that the WHO further investigated and verified as of 2004.[171] Reportedly, GPHIN has undermined governmental secrecy and control over public health information, providing the WHO with "new forms of leverage in its efforts to encourage member states to confirm and act on outbreaks occurring within their borders."[172] Further, the fact that reports are received in real time allows the WHO to act in a substantially faster manner. As technology improves, GPHIN is likely to become all the more influential.

A different tool that operates outside of the formal WHO framework is HealthMap—a university-based online knowledge management system that has been active since 2006.[173] HealthMap's goal is to "collect and visualize outbreak data according to geography, time, and infectious disease agent."[174] The system aims "to bring structure to an information flow that would otherwise be overwhelming to the user or obscure important and urgent elements."[175] HealthMap is reportedly frequented by users from govern-

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167.   Mawudeku & Blench, *supra* note 161, at i-9. The GPHIN retrieves articles from news aggregators every fifteen minutes.

168.   *Id.* at i-9 to -10.

169.   Reportedly, the analysts "rely on a knowledge of international infectious disease trends as well as the broader political and economic context of the regions where potential outbreaks have been reported." Mykhalovskiy & Weir, *supra* note 1, at 43.

170.   *See infra* notes 187–212 and accompanying text.

171.   Mykhalovskiy & Weir, *supra* note 1, at 44.

172.   *Id.*

173.   HealthMap is a private website that has been developed and operated by researchers at Harvard University. *See* John S. Brownstein & Clark C. Freifeld, *HealthMap: The Development of Automated Real-Time Internet Surveillance for Epidemic Intelligence*, 12 EURO SURVEILLANCE 3322 (2007), *available at* http://eurosurveillance.org/ViewArticle.aspx? ArticleId=3322; *see also* HEALTHMAP, http://healthmap.org/en/ (last updated Oct. 15, 2011, 11:00 AM) (The HealthMap website is updated every hour).

174.   Brownstein & Freifeld, *supra* note 173.

175.   *Id.*

ment-related bodies, such as the WHO, the Centers for Disease Control and Prevention, and the European Center for Disease Prevention and Control.[176]

HealthMap automatically acquires new data in several languages from nearly 20,000 websites every hour (including online news sources, RSS feeds, ProMED email, and validated alerts by the WHO) by tracking key-words related to seventy-five infectious diseases.[177] The "system filters reports to determine relevance, disease, location and duplication clustering by means of automated text processing algorithms."[178] Relevant reports are then aggregated and displayed on a publicly available high-resolution map where users can view the information according to date, disease, location, and source.[179] While aggregation of external sources is an important feature of the website, the site also emphasizes the value of individual participation. Anyone who is willing to share any disease-related experience can post a report on HealthMap.[180] The report is then tagged on the interactive map alongside with notices from other sources. Individual reports are not verified by the system, and hence their credibility may be questionable. However, while one single report from a private individual can hardly be helpful to detect trends of diseases, massive participation may serve as a more accurate (even if problematic) indicator.

Public health institutions are not the only developers of web crawlers. Google has also been part of the game. Recently, it developed a software tool named Google Flu Trends that analyzes individual search queries

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176.   *Id.* (basing this on the system's usage tracking and subscriptions to electronic mailing lists).

177.   Duncan Jefferies, *Information Outbreak*, GUARDIAN (U.K.), May 7, 2009, at 6, *available at* http://www.guardian.co.uk/technology/2009/may/07/information-outbreak-swine-flu.

178.   David M. Hartley et al., *The Landscape of International Event-Based Biosurveillance*, EMERGING HEALTH THREATS J., Feb. 19, 2010, at 4.

179.   *Id.* Other systems that operate on a similar basis include BioCaster, the Division of Integrated BioDefense, EpiSPIDER, Medical Information System (MedISys), and the Wildlife Disease Information Node. *See id.* at 2–5; *see also* BIOCASTER, http://biocaster.nii.ac.jp/ (last updated Oct. 15, 2011, 11:45 AM) (linking to an interactive map of "30 days of news," a page displaying health news by country and region, and an "Ontology Browser"); *Division of Integrated BioDefense*, ISIS CTR., GEORGETOWN UNIV. MED. CTR., http://biodefense.georgetown.edu/ (last visited Oct. 15, 2011) (researching the interaction of outbreaks and community responses); EPISPIDER, *supra* note 155 (displaying an interactive map and filtering information by news source, age of report, and type of disease or natural disaster); *Diseases*, MEDISYS, http://medusa.jrc.it/medisys/categoryedition/diseases/en/diseases.html (last updated Oct. 15, 2011, 11:30 AM) (sorting several news items on diseases by type of disease and country); *Wildlife Disease Information Node*, NAT'L BIO-LOGICAL INFO. INFRASTRUCTURE, http://wildlifedisease.nbii.gov/ (last visited Oct. 15, 2011) (dividing information by type of disease, affected species, and hot topics).

180.   HEALTHMAP, *supra* note 173 (allowing the viewer to add to the map by clicking on a button on the map, which brings up a pop-up for submitting information via online form, e-mail, phone call, text, or smartphone app, allowing the viewer to "[p]rovide an eyewitness report" or "[s]hare a news report").

related to influenza (e.g., "fever" or "sore throat")[181] in order to detect early signs of flu outbreaks.[182] While news reports are currently the major source of information for internet surveillance systems, Google's logic has been that concerns of the general public (as expressed in Google search queries) can also serve as an important source of information.[183] For instance, estimates indicate that thirty-seven to fifty-two percent of Americans seek health related information online every year.[184] Hence, logs of keywords chosen by users, coupled with location information that can be discerned from IP addresses, can be mined and analyzed to reveal disease trends.[185] This approach proved fruitful when the Google Flu Trends software managed to "generate an epidemic curve that closely matched" the results of the "traditional surveillance" methods of flu outbreaks.[186]

b. Information Technologies in Action

The following Subsections put the technological tools discussed above into context and demonstrate their potential in instances where state compliance is urgently required. Specifically, they explain the performance of these tools in the context of two global pandemics: SARS and Swine Flu.

i. SARS

In November 2002, GPHIN detected local Chinese reports on an "unusual respiratory illness" in the Guangdong Province.[187] This was the first information about the disease that crossed the Chinese border, several months before it was officially announced.[188] GPHIN sent an alert to the

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181.   Victor Galaz, *Pandemic 2.0: Can Information Technology Help Save the Planet?*, Environment, Nov./Dec. 2009, at 20, 23.

182.   *See Google Flu Trends: Frequently Asked Questions*, Google.org, http://www.google.org/flutrends/about/faq.html (last visited Oct. 15, 2011) (basing its data on the aggregate of millions of individual searches on Google over time and comparing them to a baseline).

183.   *See* Jeremy Ginsberg et al., *Detecting Influence Epidemics Using Search Engine Query Data*, 457 Nature 1012, 1012 (2009), *available at* http://static.googleusercontent.com/external_content/untrusted_dlcp/research.google.com/en/us/archive/papers/detecting-influenza-epidemics.pdf (using "search queries to detect influenza epidemics in areas with a large population of web search users").

184.   Brownstein et al., *supra* note 153, at 2154.

185.   *Id.*

186.   *Id.* In retrospect, this method could have also been successful for an early detection of H1N1 in Mexico. Arguably, an analysis of Google search queries in the period preceding official reports about the disease demonstrated that early hints of an emerging flu outbreak had already been on the surface. However, at that point, nobody looked for flu-related queries in Veracruz, Mexico. *See* Alexis Madrigal, *Google Could Have Caught Swine Flu Early*, Blog Entry in *Wired Science*, Wired.com (Apr. 29, 2009, 3:40 PM), http://www.wired.com/wiredscience/2009/04/google-could-have-caught-swine-flu-early/.

187.   Keller et al., *supra* note 155, at 691.

188.   *See id.*; Mykhalovskiy & Weir, *supra* note 1, at 44.

WHO but the organization at first disregarded it.[189] In February 2003, an additional alert from GPHIN about a "respiratory disease among health care workers in Guangdong triggered an urgent alert to GOARN members" and was also transmitted to the WHO.[190] At that time, the WHO issued an official request for information from China and, when it refused to cooperate, released a formal notification about a suspicious pneumonia outbreak in China.[191] China was not willing to admit the existence of an epidemic, arguing that the outbreak was under control in Guangdong and had not spread to other parts of the country.[192] As China was uncooperative, the GPHIN alerts remained particularly valuable—despite Chinese efforts to suppress any information about the outbreak, GPHIN and GOARN members that relied on these alerts provided the WHO with timely information to prepare its response strategy.[193]

In March 2003, when the disease reached Hong Kong, Vietnam, Singapore, Canada, and other countries, the WHO issued a "global alert about cases of atypical pneumonia"[194] as well as an "emergency travel advisory."[195] Simultaneously, in an unusual move, the WHO publicly accused the Chinese government of underreporting SARS cases and misleading the public about SARS's spread.[196] These developments forced China to change its

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189.   *See* Mykhalovskiy & Weir, *supra* note 1, at 44. Experts indeed confirmed that the SARS outbreak started in Foshan, Guangdong Province, in mid-November 2002. *See* WHO, Severe Acute Respiratory Syndrome (SARS): Status of the Outbreak and Lessons for the Immediate Future 1 (2003), http://www.who.int/csr/media/sars_wha.pdf; *see also* Paul Arshagouni, *An Introduction to Medical Issues Posed by International Health Threats in a Legal Framework*, 12 Mich. St. J. Int'l L. 199, 202 (2004).

190.   Mykhalovskiy & Weir, *supra* note 1, at 44.

191.   *See* John Pomfret & Peter S. Goodman, *Mysterious Illness Kills 2 in Beijing in Sign of Spread*, Wash. Post, Mar. 22, 2003, at A03; *Global Alert and Response (GAR): Acute Respiratory Syndrome in China*, WHO (Feb. 11, 2003), http://www.who.int/csr/don/2003_02_11/en/.

192.   *See* Pomfret & Goodman, *supra* note 191 (reporting that Chinese state-controlled media were not allowed to report on the outbreak). Moreover, Western news media reported that Chinese officials deliberately hid SARS patients from the WHO personnel investigating SARS in Beijing. *See, e.g.*, Susan Jakes, *Beijing Hoodwinks WHO Inspectors*, Time (Apr. 18, 2003), http://www.time.com/time/asia/news/daily/0,9754,444684,00.html.

193.   *See* Mawudeku & Blench, *supra* note 161, at i-8 to -9.

194.   Press Release, WHO, Acute Respiratory Syndrome in Hong Kong Special Administrative Region of China/Viet Nam (Mar. 12, 2003), http://who.int/csr/don/2003_03_12/en/.

195.   Press Release, WHO, Severe Acute Respiratory Syndrome (SARS)—Multi-Country Outbreak (Mar. 15, 2003), http://www.who.int/csr/don/2003_03_15/en/. Reportedly, the Asian-Pacific region incurred losses of nearly $40 billion in lost travel and trade as a result of this. *See* Tan Ee Lyn, *Economic Costs of a Flu Pandemic*, Reuters, Apr. 25, 2009, *available at* http://www.reuters.com/article/2009/04/25/us-flu-costs-factbox-idUSTRE53O0WO20090425; *see also* Charles Piller, *In SARS Aftermath, WHO's in Charge: The Health Monitor's 'Revolutionary' Use of Travel Warnings to Tame the Outbreak Has Given the Once-Plodding Bureaucracy New Might*, L.A. Times, July 13, 2003, at A1.

196.   John Pomfret, *Underreporting, Secrecy Fuel SARS in Beijing, WHO Says*, Wash. Post, Apr. 17, 2003, at A16.

course of action. It declared "a nationwide war on the SARS virus"[197] and took steps to cooperate with the WHO.[198]

ii. H1N1

H1N1 influenza (also known as Swine Flu) has been defined as "a highly contagious acute respiratory disease of pigs, caused by one of several swine influenza A viruses."[199] According to the WHO, Mexican authorities detected cases of what was later identified as Swine Flu in March 2009.[200] HealthMap revealed the first report about "a 'mysterious' influenza-like illness" in La Gloria, Veracruz, as early as April 1, 2009, when the mainstream media was still "focusing on the threat of avian influenza originating in Asia."[201] The initial report stated that nearly "60% of the 3,000 residents" of La Gloria "had been infected and 2 of them had died since early March."[202] The second report, recorded by the system on April 2, referred to "the possible role of Granjas-Carroll, a U.S. owned pig farm," in the spread of the disease.[203]

The first warning of the unknown disease was sent by GPHIN to the WHO on April 10, 2009, reporting an "acute respiratory illness in Veracruz."[204] The WHO contacted Mexican officials several times in an attempt to verify the report, but the latter replied that the outbreak had been investigated and all cases proved to be regular influenza.[205] On April 22, 2009,

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197.   John Pomfret, *China Orders End to SARS Coverup; Officials Begin Belated Campaign Against Disease*, WASH. POST, Apr. 19, 2003, at A08; *see also* Piller, *supra* note 195; John Pomfret, *Outbreak Gave China's Hu an Opening; President Responded to Pressure Inside and Outside Country on SARS*, WASH. POST, May 13, 2003, at A01.

198.   *See Global Alert and Response (GAR): Update 79—Situation in China*, WHO (June 12, 2003), http://www.who.int/csr/don/2003_06_12/en/.

199.   *Swine Flu Frequently Asked Questions*, WHO (Apr. 26, 2009), http://www.emro.who.int/lebanon/Swine%20Q-A--Influenza-26april.pdf.

200.   *Global Alert and Response (GAR): Influenza-Like Illness in the United States and Mexico*, WHO (Apr. 24, 2009), http://www.who.int/csr/don/2009_04_24/en/index.html. Aside from this, seven confirmed cases were found in the United States (in California and Texas). *Id.*

201.   Brownstein et al., *supra* note 153, at 2156. HealthMap picked up the report from a local Mexican newspaper. Clark Freifeld & John Brownstein, *Projects*, HEALTHMAP, http://www.healthmap.org/projects/ (last visited Oct. 15, 2011); *see also* Andrés Timoteo Morales, *Alerta epidemiológica en Perote por brote de males respiratorios: Reportan deceso de tres menores; lugareños responsabilizan a empresa [Perote Epidemiological Alert for Outbreaks of Respiratory Disease: Reported Deaths of Three Children; Locals Blame Company]*, LA JORNADA (Mex.), Apr. 5, 2009, http://www.jornada.unam.mx/2009/04/05/estados/025n1est (reporting a flu outbreak in La Gloria, Veracruz, as a result of contaminated pig breeding farms).

202.   Brownstein et al., *supra* note 153, at 2156.

203.   *Id.* This incident was reported by a different Mexican newspaper. *See* R. Martinez, *Extraño brote epidemilógico causa la meurte a dos bebés en Veracruz [Strange Epidemic Outbreak Kills Two Babies in Veracruz]*, PROCESO (Mex.), Apr. 3, 2009.

204.   Brownstein et al., *supra* note 153, at 2156.

205.   Galaz, *supra* note 181, at 23.

however, Mexican authorities independently contacted the WHO to report a rapidly increasing rate of pneumonia cases.[206] In response, the WHO Director-General declared that the outbreak constituted a "public health emergency of international concern" and issued a temporary recommendation that "all countries intensify surveillance for unusual outbreaks of influenza-like illness and severe pneumonia."[207] Without the availability of early reports from local Mexican sources, such a recommendation would probably have had to wait for at least several weeks until the receipt of official reports, and thus precious time would have been lost.

HealthMap continued to play a central role in the influenza surveillance even after reports were picked up by the WHO and various scientific institutions. Among other things, HealthMap offered an interactive map that tracked the global spread of the influenza,[208] relying on sources both informal (such as news media, mailing lists, and contributions from individual users) and formal (such as announcements of officials from the major health regulatory institutions).[209] The site allowed filtering of reports according to suspected or confirmed cases of infection or death, and tracking of the geographic spread of the disease in various intervals of time.[210] HealthMap reportedly collected over 87,000 reports from informal and official sources between April 1 and December 31, 2009.[211] These reports were also timelier than the official ones: the time span between the appearance of the first suspected cases in each country on the map and the official confirmation of influenza infections had a median of twelve days.[212]

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The examples of SARS and Swine Flu illuminate the extraordinary potential of information technologies to effectively expose and analyze data regarding state compliance with uncomfortable international obligations. The tools described above are far from being exhaustive and they do not necessarily represent the most cutting-edge technology in the field. However, their efficacy stems from a powerful fact: they were adopted by an influential IO as part of its compliance monitoring routine and yielded beneficial results. This fact deserves the attention of other IOs.

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206.   *Id.* By then, over 850 cases of infection and fifty-nine deaths had already occurred in Mexico. *See Global Alert and Response (GAR): Influenza-Like Illness in the United States and Mexico*, WHO (Apr. 24, 2009), http://www.who.int/csr/don/2009_04_24/en/index.html.

207.   *Media Centre: Swine Influenza*, WHO (Apr. 25, 2009), http://www.who.int/mediacentre/news/statements/2009/h1n1_20090425/en/index.html.

208.   HEALTHMAP, *supra* note 173.

209.   John S. Brownstein et al., *Information Technology and Global Surveillance of Cases of 2009 H1N1 Influenza*, 362 NEW. ENG. J. MED. 1731, 1731 (2010).

210.   *Id.*

211.   *Id.*

212.   *Id.* at 1732. The shortest lag times were observed among countries with a high GDP per capita, but "there was a wide variation in lag times among less affluent nations." *Id.*

While the WHO is so far the only major IO that regularly relies on information technologies for compliance monitoring, this should not be the case. Hence, the following Subsections describe online initiatives that can be helpful for the purposes of international environmental and human rights regulation.

2. Environment

As with the international regulation of health, the internet can be used to improve online compliance monitoring in international environmental regulation. Existing information on the global ecosystem—the state of freshwater resources, soil productivity, fisheries, and coral reefs—"tends to be poor and contains serious data gaps."[213] Difficulties of analysis and quantification, lack of expert agreement on which indicators should be monitored, lack of reliable data, and the costs of developing a viable monitoring program all pose major challenges for an international compliance monitoring regime. As described above, the monitoring activities of international environmental organizations are currently limited to reports provided by member states or data that is produced by NGOs.[214]

While international environmental regimes do not yet rely on the internet to buttress their monitoring activities, the potential of information technologies in the context of environmental regulation is promising. The early uses of information technologies, discussed below, for compliance monitoring in domestic settings demonstrate that they can be highly helpful in revealing violations. Three major methods are available in this respect: automated web crawlers, distributed monitoring by experts, and participatory platforms for reports by laypersons.

As in the case of international health regulation, web crawlers can collect data · from a variety of information sources, helping to expose environmental violations and drawing attention to early signs of environmental crises.[215] For instance, "[o]nline statistics about a surge in fish prices in an Asian port . . . might hint at wider problems of over-fishing."[216] Web crawlers may therefore look for data on unexpected changes in prices or investments in particular fields.[217] Along similar lines, the U.S. Department of Agriculture's Animal and Plant Health Inspection Service has been rely-

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213.   Victor Galaz et al., *Can Web Crawlers Revolutionize Ecological Monitoring?*, 8 FRONTIERS ECOLOGY & ENV'T 99, 99 (2010).

214.   *See supra* Part I.B.2.

215.   *See* Galaz et al., *supra* note 213, at 99; *see also* Alexis Madrigal, *Crawling the Web to Foretell Ecosystem Collapse*, Blog Entry for *Wired Science*, WIRED.COM (Mar. 19, 2009, 3:28 PM), http://www.wired.com/wiredscience/2009/03/ecodatamining/ ("By trawling scientific list-serves, Chinese fish market websites, and local news sources, ecologists think they can use human beings as sensors by mining their communications.").

216.   Alister Doyle, *Internet Could Become Environmental Watchdog*, REUTERS, Mar. 19, 2009, *available at* http://www.reuters.com/article/idUSTRE52I04I20090319.

217.   Galaz et al., *supra* note 213, at 102.

ing on a web crawler that searches and reports the sales of prohibited organisms over the internet.[218] Web crawlers may also serve as early warning systems and signal upcoming environmental shifts. Similarly to the way GPHIN is used for disease monitoring, web crawlers that are programmed to search for specific environmental events can bring to the surface potentially helpful information from local newspapers, blogs, discussion groups, and other sources.

Online compliance monitoring by experts is another option opened up by information technologies. A digital tool that is particularly promising in this respect is satellite imagery. Access to high-quality and up-to-date satellite information about particular regions in the world could be highly effective for international environmental regulation. For instance, satellite images provided by NASA scientists who studied the Brazilian Amazonia have already proved helpful when intense forest fires erupted in the region.[219] Relying on real-time satellite imagery coupled with on-the-ground information, the scientists provided daily email briefings to the Brazilian authorities, specifying the location and intensity of fires and helping to coordinate and focus the rescue efforts.[220] While in this case satellite imagery was only employed for rescue purposes, it can be similarly helpful to track deforestation, pollution, or other environmental effects that reflect states' compliance with international environmental obligations.

The Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (REDD) framework provides another recent example of how satellite imagery can overcome difficulties in environmental compliance monitoring. The REDD system offers developing states with rainforests in their territories financial incentives to protect their forests.[221] As many of the targeted states lack either monitoring capacities or proper incentives to submit accurate information, the reliability of their compliance reports is likely to be disputed. Hence, the implementation of such a system requires robust monitoring mechanisms that allow a trustworthy assessment of forests—both by states and IOs. In response to this need, Google presented at the International Climate Change Conference in Copenhagen in 2009 a prototype technology that enables online observation and measurement of changes in forests around the world.[222] The technology relies on satellite imagery available from Google Earth and allows experts (or even

218.   Laura A. Meyerson & Jamie K. Reaser, *Bioinvasions, Bioterrorism, and Biosecurity*, 1 FRONTIERS ECOLOGY & ENV'T 307, 312 (2006).

219.   Emily Boyd, *Navigating Amazonia Under Uncertainty: Past, Present, and Future Environmental Governance*, 363 PHIL. TRANSACTIONS ROYAL SOC'Y B. 1911, 1911 (2008).

220.   *Id.*

221.   For details on the program, see *About the UN-REDD Programme*, UN-REDD PROGRAMME, http://www.un-redd.org/AboutUNREDDProgramme/tabid/583/Default.aspx (last visited Oct. 15, 2011).

222.   Rebecca Moore, *Seeing the Forest Through the Cloud*, OFFICIAL GOOGLE.ORG BLOG (Dec. 10, 2009, 4:59 AM), http://blog.google.org/2009/12/seeing-forest-through-cloud.html.

laypersons) to measure levels of deforestation or regeneration of forests over a period of time.[223] Such a tool can be a valuable addition to the monitoring efforts of the United Nations' REDD Programme.

Observations by laypersons, although not as reliable as expert evaluations, can also be part of the online compliance monitoring game. An early example in this respect is the electronic mailing list that was used to share information and compile field observations with regard to mass coral bleaching during the El Niño storm in 1997–1998.[224] The mailing list allowed a prompt analysis and assessment of the event, with evidence ranging from "detailed accounts with accurate measures of bleaching and mortality, to brief anecdotal reports obtained during a rapid site visit."[225]

Multiple other online monitoring systems have been developed since then. For instance, "Open Italian Forests" is a participatory platform that allows individuals to tag on an interactive Google map reports related to forest fires and preservation in Italy.[226] A Russian participatory platform called "Help Map," operated according to a similar principle, allows individuals to report forest fires and coordinate assistance and rescue operations by volunteers.[227] The "Oil Spill Crisis Map" is a U.S.-based project that was launched after the 2010 British Petroleum oil spill in the Gulf of Mexico with the purpose of allowing the "citizens of the Gulf Coast . . . to speak out in testimony of . . . how the Gulf oil spill is threatening [their] livelihoods."[228] As with the Italian and Russian projects, civil society organizations and individuals may tag on the platform reports and evidence related to the oil spill, the damage it caused, and the progress of the cleaning efforts.

CreekWatch is a different type of participatory platform that relies on reports by laypeople using mobile technology. It is an iPhone application that encourages users to take photos of polluted water sources in their vicinity and asks them basic questions with regard to the pollution level (e.g., what is the amount of trash in the water?).[229] The data is then tagged

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223. *Id.*

224. Linden Wilkinson et al., *Ecological and Socioeconomic Impacts of 1998 Coral Mortality in the Indian Ocean: An ENSO Impact and a Warning of Future Change?*, 28 Ambio 188, 189 (1999).

225. Clive Wilkinson, *The 1997–1998 Mass Bleaching Event Around the World, in* State of Coral Reefs of the World: 1998, at 15, 18 (Clive Wilkinson ed., 1998).

226. Open Foreste (Italy), http://openforesteitaliane.crowdmap.com/ (last visited Oct. 15, 2011).

227. Карта помощи [Help Map] (Russ.), http://www.russian-fires.ru (last visited Oct. 15, 2011).

228. Oil Spill Crisis Map, http://www.oilspill.labucketbrigade.org/page/index/1 (last visited Oct. 15, 2011).

229. CreekWatch, http://creekwatch.researchlabs.ibm.com (last visited Oct. 15, 2011); *see* Kerry A. Dolan, *IBM Launches iPhone App for Crowdsourcing Water Quality*, Forbes (Nov. 4, 2010, 3:20 PM), http://www.forbes.com/sites/kerryadolan/2010/11/04/ibm-launches-iphone-app-for-crowdsourcing-water-quality/.

on a map on the CreekWatch website and sent to the relevant water author-
ities.[230]

While the effectiveness of these experiments varies and none of them is
employed by environmental IOs, they can entail substantial benefits for
monitoring state compliance with environmental obligations. For instance,
satellite imagery can be particularly helpful to track deforestation, pollution,
or other large-scale environmental events. Participatory platforms or net-
works of experts can be valuable in order to unearth smaller-scale
violations, such as trade in endangered species, hazardous wastes, or con-
servation of flora and fauna. IOs should therefore undertake the task and
experiment with the existing tools in order to develop improved models of
online monitoring.

3. Human Rights

Web crawlers, networks of experts, participatory platforms, and other
technological advances for online compliance monitoring have not yet
reached human rights IOs. This situation is lamentable, as information tech-
nologies can be as useful in tracking violations of human rights as they are
in the field of health.[231] Before the internet age, IOs simply did not possess
the means to conduct independent inquiries into the compliance or noncom-
pliance practices of various states.[232] Information technologies can help
solve this problem, providing cheap tools for online compliance monitoring.
Moreover, if the goal of human rights IOs is to aggregate information that
will then serve the needs of third-party states, NGOs, and domestic groups,
mechanisms that amplify the amount of available information should be
particularly valuable.[233]

Indeed, some of the existing online initiatives demonstrate the utility of
information technologies for monitoring human rights violations. Currently,
the most famous and successful of these initiatives is a platform dubbed
Ushahidi, meaning "testimony" in Swahili.[234] The original platform was
launched to map incidents of post-election violence in Kenya in the begin-
ning of 2008.[235] It aggregated reports citizens submitted via the web or
mobile phones regarding violations of human rights, and tagged them on a

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230.   CREEKWATCH, *supra* note 229.

231.   *See, e.g.,* Molly Beutz Land, *Peer Producing Human Rights*, 1115 ALTA. L. REV.
(Can.) 46 (2009) (discussing how methods of peer production can be applied to advance fact-
finding by NGOs).

232.   *See* discussion *supra* Part II.C.

233.   Reliance on information technologies for compliance monitoring can also facilitate
the use of quantitative indicators that are currently being developed by U.N. human rights
committees. *See supra* note 106 and accompanying text (referring to recent scholarship that
discusses such indicators).

234.   *About Us*, USHAHIDI, http://www.ushahidi.com/about-us (last visited Oct. 15,
2011).

235.   *FAQ*, USHAHIDI, http://www.ushahidi.com/about-us/faq (last visited Oct. 15,
2011).

publicly available Google map.[236] The platform attracted more than 45,000 users in Kenya and exposed violent events that Kenyan mainstream media did not report and international media sources were not fully aware of.[237] Further, the Kenyan Ushahidi site served as a catalyst for dozens of similar experiments around the world in fields as diverse as election monitoring in countries such as Liberia (2011),[238] Brazil (2010),[239] Kenya (2010),[240] and Mexico (2009);[241] mapping in real time human rights violations during the recent protests in Egypt;[242] mapping violations of human rights in times of war;[243] and more.

Ushahidi-based platforms are only one variation of how information technologies can be used for monitoring human rights abuses. Another recent example includes, among many others, the Cambodian platform Sithi— a human rights portal that aims to create a single map-based database of reports on human rights violations with contributions from human rights activists, organizations, and regular citizens from across the country.[244] Largely similar functions are performed by a platform named ALTSEAN in Burma and a platform titled Kubatana in Zimbabwe.[245] While these experiments are very recent and their degree of effectiveness is at times unclear, they mark a clear path for experimentation by official human rights IOs.

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The online practices discussed above manifest the capacities of information technologies for unearthing and compiling compliance data that

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236.   *Id.*

237.   *Id.*

238.   *Liberia 2011*, USHAHIDI, http://liberia2011.ushahidi.com (last visited Oct. 15, 2011).

239.   ELEITOR 2010 [VOTER 2010] (Braz.), http://eleitor2010.com (last visited Oct. 15, 2011).

240.   UCHAGUZI [ELECTIONS] (Kenya), http://uchaguzi.co.ke (last visited Oct. 15, 2011).

241.   CUIDEMOS EL VOTO [WE CARE FOR THE VOTE] (Mex.), http://www.cuidemoselvoto.org (last visited Oct. 15, 2011).

242.   U-SHAHID, http://www.u-shahid.org/cr (last visited Oct. 15, 2011) (providing links to five different interactive maps for the Egyptian elections).

243.   *War on Gaza*, AL JAZEERA, http://labs.aljazeera.net/warongaza/ (last visited Oct. 15, 2011).

244.   *Cambodian Human Rights Portal*, SITHI.ORG, http://sithi.org/index.php?url= violation.php (last visited Oct. 15, 2011). For a description of the project, see *Sithi*, TECH. FOR TRANSPARENCY NETWORK (Feb. 5, 2010), http://transparency.globalvoicesonline.org/ project/sithi.

245.   ALTSEAN-BURMA, http://www.altsean.org (last visited Oct. 15, 2011); KUBATANA.NET (Zimb.), http://www.kubatana.net (last updated Oct. 13, 2011). For a description of the ALTSEAN-Burma project, see Sopheap Chak, *ALTSEAN-Burma (Alternative ASEAN Network on Burma)*, TECH. FOR TRANSPARENCY NETWORK (Jan. 13, 2011), http:// transparency.globalvoicesonline.org/project/altsean-burma-alternative-asean-network-burma.

would otherwise be unavailable to IOs. However, the use of these tools can also raise difficulties.

The core of these difficulties is that information technologies cannot produce conclusive results on their own. Should IOs adopt information technologies as part of their compliance monitoring efforts, they will have to thoroughly consider their response to the weaknesses of these tools: What information is reliable? How should this information be verified? How to—or even whether to—prioritize reports, even if all of them are reliable? Which noncompliance incidents should be placed on the organization's agenda and acted upon, and which reports should be left aside? Answers to these questions would require IOs to exercise substantial discretion and make uneasy decisions. Although information technologies can bring to the surface otherwise unavailable compliance data, the threat of turning online compliance monitoring into an information junkyard is real. Even advanced professional monitoring systems in developed countries suffer from considerable deficiencies.[246] Online compliance monitoring can "muddy the waters" even further. Moreover, as illustrated by the WHO recommendations concerning Swine Flu in Mexico, compliance recommendations from health-related IOs can entail immense economic and political costs.[247] Stakes can be similarly high in international environmental and human rights regulation.

These concerns should not be taken lightly. Hence, the next Part discusses the broad implications of online compliance monitoring for IOs, states, and the international community.

IV. A GLOBAL PANOPTICON?

The newly available information technologies offer an opportunity for international regulatory regimes: if IOs fully take advantage of it, the amount of easily accessible compliance-related information will grow exponentially.

Assuming that compliance monitoring by IOs indeed helps to strengthen the effectiveness of international regulatory regimes,[248] the value of improved access to already existing information on state compliance, including state and NGO reports and IOs' official documents, is readily apparent.[249] IOs should ensure that their websites are accessible and contain comprehensive and easily graspable information on state compliance. These steps are relatively cheap, and their effect can be highly beneficial.

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246.   *See, e.g.,* Stephen R. Carpenter et al., *Millennium Ecosystem Assessment: Research Needs,* 314 SCIENCE 257, 257–58 (2006) (discussing constraints associated with environmental monitoring).

247.   *See supra* notes 67–69 and accompanying text.

248.   *See* discussion *supra* Part I.B.

249.   *See* discussion *supra* Part III.A.

The case for a proactive collection of information is more challenging. Web crawlers and online participatory platforms of experts and laypersons may open new and appealing opportunities for online compliance monitoring. However, a pervasive and intrusive monitoring practice may also lead to a system akin to a "global panopticon." The "panopticon"—a term first introduced by Jeremy Bentham and later developed by Michel Foucault—is an architectural structure that is used in various spaces (particularly in prisons) as a form of social control and coercion. In its classic design, the panopticon is a round prison, where individual cells are built into the circumference of the building around a central well. A warden observes the cells from an inspection tower that stands in the center, and while the cells are lighted and transparent, the tower is dark. This creates a situation where the warden can closely monitor the activities of multiple prisoners. The prisoners know that they are always visible, but do not know when they are actually being watched.[250] This aspect is central to the panoptic structure: those inside the panopticon "should always feel themselves as if under inspection, at least as standing a great chance of being so."[251] Michel Foucault elaborates this argument, proclaiming that "the major effect of the Panopticon [is] to induce in the inmate a state of conscious and permanent visibility that assures the automatic functioning of power."[252] Comparing the panopticon to dungeon-like prisons, Foucault argues that the former is harsher—"[f]ull lighting and the eye of a supervisor capture better than darkness, which ultimately protect[s]. Visibility is a trap."[253]

An analogy between IOs that employ online compliance monitoring tools and panoptic prisons is of course extreme. But it does help to understand the broad implications of information technologies for compliance monitoring. The primary "panopticon effect" is that the monitoring IO can be seen as a Foucauldian warden—the internet grants it the means to inspect the compliance of states at its convenience, without their consent or knowledge. These newly acquired capabilities considerably—but not necessarily desirably—empower IOs. States are not likely to consent silently to such a panoptic system, and may take problematic countermeasures in order to undermine it.

The following Sections examine in further detail the panopticon effect and discuss its implications.

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250.   *See generally* JEREMY BENTHAM, 4 THE WORKS OF JEREMY BENTHAM (John Bowring ed., 1843).

251.   *Id.* at 44.

252.   MICHEL FOUCAULT, DISCIPLINE AND PUNISH: THE BIRTH OF THE PRISON 201 (Alan Sheridan trans., 1995).

253.   *Id.* at 200.

A. *The Panopticon Effect: Empowering IOs*

IOs are frequently criticized for their lack of democratic credentials.[254] The decision-making processes of these bodies, as the argument goes, are insufficiently transparent and not open to substantial participation by non-governmental groups and members of civil society.[255] Further, they lack accountability mechanisms. "[E]ven the minimal types of constraints [on power] found in domestic governments are absent [in IOs]."[256] Hence, IOs are said to be dominated by the narrow interests of the most powerful international players, "often resulting in inadequate regulatory protection and economic injustice."[257] The "increased distance from the public . . . and the lack of democratic foundations for international bodies" therefore "create serious legitimacy issues."[258]

The exact degree to which these allegations are true and persistent across IOs is irrelevant for the purposes of this Article. What is important is that a pervasive use of information technologies for compliance monitoring will substantially aggrandize the powers of IOs. As part of the online compliance monitoring routine, IOs ought to make two major decisions: what information to look for, and how the findings should be prioritized. Both of these decisions require the exercise of considerable discretion.

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254.   Jose E. Alvarez, *International Organizations: Then and Now*, 100 AM. J. INT'L L. 324, 341 (2006); *see* ALFRED C. AMAN JR., THE DEMOCRACY DEFICIT 6 (2004); Robert A. Dahl, *Can International Organizations Be Democratic? A Skeptic's View*, *in* DEMOCRACY'S EDGES 19, 19 (Ian Shapiro & Casiano Hacker-Cordon eds., 1999); Eric Stein, *International Integration and Democracy: No Love at First Sight*, 95 AM. J. INT'L L. 489, 401 (2001). *See generally* Paul B. Stephan, *International Governance and American Democracy*, 1 CHI. J. INT'L L. 237 (2000).

255.   Richard B. Stewart, *U.S. Administrative Law: A Model for Global Administrative Law?*, 68 LAW & CONTEMP. PROBS., Summer/Autumn 2005, at 63, 71 (referring to "the secrecy of international and transnational regulatory decisional processes and the lack of adequate opportunity for effective access to information, participation and input in global regulatory decisionmaking").

256.   Ruth W. Grant & Robert O. Keohane, *Accountability and Abuses of Power in World Politics*, 99 AM. POL. SCI. REV. 29, 30 (2005). For this purpose, accountability can be defined as "the ability of one actor to demand an explanation or justification of another actor for its actions and to reward or punish that second actor on the basis of its performance or its explanation." Edward Rubin, *The Myth of Accountability and the Anti-Administrative Impulse*, 103 MICH. L. REV. 2073, 2073 (2005). For a general discussion, see Colin Scott, *Accountability in the Regulatory State*, 27 J.L. & SOC'Y 38 (2000).

257.   Stewart, *supra* note 255, at 71; *see, e.g.*, B.S. Chimni, *Co-Option and Resistance: Two Faces of Global Administrative Law*, 37 N.Y.U. J. INT'L L. & POL. 799, 801 (2005) (arguing that "contemporary international law and institutions have an imperial character: a transnational capitalist class . . . has emerged which shapes international laws and institutions to its advantage"). For the Third World perspective on international organizations, see also B.S. Chimni, *Third World Approaches to International Law: A Manifesto*, *in* THE THIRD WORLD AND INTERNATIONAL ORDER: LAW, POLITICS AND GLOBALIZATION 47–73 (Anthony Anghie et al. eds., 2003).

258.   Daniel C. Esty, *Good Governance at the Supranational Scale: Globalizing Administrative Law*, 115 YALE L.J. 1490, 1503 (2006).

The first requirement is that the IO must decide what information to look for. In the large majority of monitoring exercises, IOs must carefully frame the search in order to receive intelligible data and avoid information junkyards. Such a search can never be neutral; the decision of what key-words to look for inevitably affects the findings.

The second feature is the need for prioritization. The ease of collecting vast amounts of information inevitably forces the regulator—an IO in this case—to decide which information should be dealt with first, which data should be closely inspected, and which reports should be left aside. Information overload, false notices, abundance of details, and other reporting distortions make the task of analysis and prioritization even more crucial. It compels the IO to decide which incidents should be on the public radar and which violations should be left unnoticed.

These two factors carry considerable distributive effects, especially when used by politically influential IOs. In the context of international health regulation, for instance, the WHO can decide that its monitoring efforts should mostly cover diseases that endanger Western countries (e.g., SARS or Swine Flu) and invest fewer resources in monitoring diseases that plague developing countries (e.g., malaria). Even if the selection of issues to be monitored is sensible, the prioritization can be problematic. In the context of global health regulation, systems such as GPHIN and HealthMap routinely unearth large numbers of unverified media sources. The WHO then ought to assess this data and decide according to its best judgment that reports trigger further inquiry. Similarly, international environmental secretariats may include as part of their monitoring agenda issues of fisheries exploitation in developing states, but ignore (or be forced to ignore) oil spills in politically powerful states. Human rights IOs may monitor the human rights record of Iran, but refrain from inspecting reports that flow from Russia.

As such decisions are currently not transparent and there are no publicly available criteria or guidance as to how they should be made, improved monitoring capacities provide IOs a large leeway for independent agenda setting. The manner in which this leeway will be used depends on the character and political circumstances of each IO. The existing power structures among IOs are likely to be reinforced here, exacerbating accountability concerns. Thus, politically powerful and independent IOs will probably attempt to use their newly acquired capabilities according to their own internal (not always transparent and sometimes biased) priorities. The monitoring activities of weak IOs may become captured by interest groups or fueled to serve the interests of the most influential member states.[259]

In sum, the use of information technologies for compliance monitoring purposes is not likely to strengthen by itself the democratic pillars of IOs.

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259.   In some cases, capture of weak IOs by influential member states may prevent them from engaging in online compliance monitoring whatsoever. While this scenario may be plausible under some circumstances, it is beyond the scope of this Article.

Although more compliance-related information may become open and pub-
licly available, and individuals may directly report states' violations,
information technologies empower IOs and may exacerbate concerns re-
garding their internal administration and decision-making procedures.

B. *States' Counterreactions*

Given these potentially transformative effects of online compliance
monitoring, states are not likely to silently consent to such new and intrusive
practices. In fact, they are more likely to try to conceal their compliance
data. This can be done in several ways.

1. Disrupting Access

States that seek to avoid online leaks of data may try to block those who
possess this data from having access to the internet.[260] Certain online plat-
forms (e.g., HealthMap) rely heavily on locals to report their personal
experiences. Online networks of experts also depend on information that
flows from people on the ground. Blocking access to such platforms and
networks from the territory of the affected state is likely to weaken their
effectiveness. Without up-to-date and first-hand information, the value of
online compliance monitoring will be diminished and states will regain, at
least to some degree, control over compliance data.

This strategy is far from being new. States routinely seek to control sen-
sitive information within their borders.[261] Empirical studies demonstrate that
internet filtering is a widespread practice, and blocked websites may cover
topics as diverse as free speech, human rights, minority rights, public health,
pornography, dating, gambling, religious criticism, and file sharing.[262] New

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260.   Robert Faris & Nart Villeneuve, *Measuring Global Internet Filtering, in* ACCESS
DENIED: THE PRACTICE AND POLICY OF GLOBAL INTERNET FILTERING 5, 9 (Ronald Deibert et
al. eds., 2008) [hereinafter ACCESS DENIED] (noting that "[c]laiming control of the Internet has
become an essential element in any government strategy to rein in dissent—the twenty-first
century parallel to taking over television and radio stations").

261.   A recent study of global internet filtering suggests that "[t]he overall trend in Inter-
net filtering is toward more states adopting filtering regimes." Jonathan Zittrain & John
Palfrey, *Internet Filtering: The Politics and Mechanisms of Control, in* ACCESS DENIED, *supra*
note 260, at 29, 41. The states with the most extensive filtering practices are primarily located
in eastern Asia, central Asia, the Middle East, and North Africa. But state-mandated filtering is
not limited to these parts of the world. Filtering occurs in libraries and schools in the United
States, child pornography is filtered in northern Europe, and Nazi paraphernalia and Holocaust
denial sites are blocked in France and Germany. *See id.*

262.   Faris & Villeneuve, *supra* note 260, at 7. In Germany, for instance, websites that
include "propaganda against the democratic constitutional order" are banned. Zittrain & Pal-
frey, *supra* note 261, at 29, 33 (citation omitted).

As described by Faris & Villeneuve, *supra* note 260, at 5, 12–18, there is a wide variety
of filtering techniques—IP blocking, DNS tampering (purposefully disrupting DNS servers,
which resolve domain names into IP addresses), and proxy-based filtering (checking the
HTTP address that is accessed against a list of blocked websites or blocked keywords). In
some states, a notice of a blocked page appears if the user attempts to reach a blocked website.

websites can be added to the filtering systems on an ad hoc basis at any time.[263] Blocking websites that allow users to share unflattering information on state compliance does not present particularly difficult technological problems.[264]

While explicit filtering may be effective against participatory platforms or expert networks, the filters' ability to block web crawlers is limited.[265] As web crawlers operate outside of the state territory, they are not subject to state filtering. They can therefore unearth compliance information that appears in local newspapers, blogs, or social networks (e.g., Twitter). Blocking all these media sources so that compliance data would disappear is hardly possible. However, states possess more subtle techniques to avoid incriminating publications that can be caught by sophisticated web crawlers.[266] For instance, states can oblige website owners to register with local authorities and then revoke their licenses if impermissible information is posted on the website.[267] Distributed denial of service (DDoS) attacks can be conducted without leaving governmental footprints.[268] Furthermore, instead of restricting access to information, the state may compete with potential threats "through effective counter-information campaigns that overwhelm, discredit, or demoralize opponents."[269] These measures may include information campaigns that generate noise,[270] attempting to discredit incriminating reports and making it difficult for web crawlers to distinguish between reliable and unreliable information.

To be sure, such harsh measures are unlikely in mature and functioning democracies. However, international regulatory regimes cannot rely only on information provided by transparent democratic regimes. In fact, the most crucial and urgent compliance data is often possessed by states with extensive filtering policies. The example of SARS is telling in this respect. The Chinese government is known for its "pervasive" filtering of political issues

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Other states attempt to conceal their filtering policies, showing a simple error message if a blocked website is accessed. *See also* Steven J. Murdoch & Ross Anderson, *Tools and Technology of Internet Filtering, in* ACCESS DENIED, *supra* note 260, at 57, 57–72.

263.   Faris & Villeneuve, *supra* note 260, at 18.

264.   For an analysis of the legal frameworks that allow states to engage in filtering activities, see Zittrain & Palfrey, *supra* note 261, at 32–34.

265.   For a discussion of web crawlers in the context of international health regulation, see the text accompanying *supra* notes 161–186.

266.   *See, e.g.,* Ronald Deibert & Rafal Rohozinski, *Control and Subversion in Russian Cyberspace, in* ACCESS CONTROLLED: THE SHAPING OF POWER, RIGHTS, AND RULE IN CYBERSPACE 15, 22–24 (Ronald J. Deibert et al. eds., 2010) [hereinafter ACCESS CONTROLLED].

267.   This practice has been employed in some of the Commonwealth of Independent States. *Id.* at 25–26.

268.   Reportedly, such attacks were carried out by Kyrgyz and Russian governments. *Id.* at 26–27.

269.   *Id.* at 27.

270.   *Id.* at 28.

and "substantial" filtering of social issues.[271] Hence, it was not difficult for the Chinese government to block the publication of reports related to the spread of an infectious disease.[272] Effective filtering of such reports on the local level could prevent international access and successfully hide the existence of the disease. While these measures proved to be insufficient in the case of SARS, where information did flow to the WHO, this may only have been a matter of inadequate technological protections. In other cases, incriminating information might be better hidden and less accessible. Reports related to abuses of human rights can be effectively countered by state-sponsored propaganda campaigns that generate noise and make it impossible for IOs to screen out false and distorted reports.

Data on noncompliance with international obligations can therefore be inaccessible or lost in large masses of irrelevant information. Information junkyards, where everything can be found but nothing makes sense, are a serious deficiency of the internet even if all parties act in good faith and do not purposefully distort the information. If political forces intervene and amplify the natural chaos of the system, its utility for compliance monitoring is likely to be diminished.

2. Hindering the Production of Information

A different defensive measure that states can use to avoid losing control of negative data is to act preemptively and hinder or prevent the production of compliance information. This strategy is known in the context of mandatory disclosure in private law. Regulatory disclosure requirements may oblige firms to reveal certain information they possess about a product's risks. Hence, in order to avoid disclosure of potentially negative information, firms are better off not acquiring information about the product in the first place.[273]

The application of this logic to the context of compliance with international obligations is relatively straightforward. If states can fully control the information that IOs observe, they are likely to invest resources in its

271.   OPENNET INITIATIVE, INTERNET FILTERING IN CHINA 1 (2009), *available at* http://opennet.net/sites/opennet.net/files/ONI_China_2009.pdf.

272.   For an overview of censorship techniques undertaken by China, see Ethan Zuckerman, *Intermediary Censorship*, *in* ACCESS CONTROLLED, *supra* note 266, at 71, 73–74.

273.   A. Mitchell Polinsky & Steven M. Shavell, *Mandatory Versus Voluntary Disclosure of Product Risks* (Nat'l Bureau of Econ. Research, Working Paper No. W12776, 2006); *see, e.g.*, Alexander S. P. Pfaff & Chris William Sanchirico, *Environmental Self-Auditing: Setting the Proper Incentives for Discovery and Correction of Environmental Harm*, 16 J.L. ECON. & ORG. 189, 189 (2000) (showing that firms tend to conduct fewer "environmental audits" when regulators, such as the Environmental Protection Agency, use the information unveiled by the audits as the evidentiary basis for an enforcement action). Along similar lines, Anthony Kronman notes in the context of contracts law that if the possessor of information "is denied the benefits of having and using it, he will have an incentive to reduce (or curtail entirely) his production of such information in the future." Anthony T. Kronman, *Mistake, Disclosure, Information, and the Law of Contracts*, 7 J. LEGAL STUD. 1, 13–14 (1978).

acquisition. Assuming that this information does them no harm and will be used according to their independent discretion, states have an interest in developing comprehensive and accurate data that will allow them to better understand their standing vis-à-vis international norms and standards and better develop appropriate policies. However, if information can reach IOs without any official filtering, the incentives to acquire it (or facilitate its production) will be reduced.

For instance, at the first stages of the Swine Flu outbreak, Mexican authorities insisted that the disease was no more than a normal seasonal flu.[274] The Chinese reaction to the WHO requirements to investigate SARS was similar.[275] Predictably, as the WHO had already started investigating, Mexican and Chinese authorities lacked proper incentives to invest resources in a thorough investigation of the disease. While the rapid spread of the disease outside of Mexico and China left their national authorities no choice but to incur these costs, their first reactions are telling. The fact that a thorough investigation can reveal incriminating information that would be inevitably exposed to the international community can serve as a compelling reason to give up on such investigation. Moreover, if in the past a state could hope that an early investigation would allow it to solve the problem without the involvement of the international community (so as, for example, to stop SARS within the borders of China), the speed of information flow in the internet age changes this reality. States have less time to fix violations without being noticed and thus have fewer incentives to voluntarily acquire information on these violations. These considerations are present in the context of environmental or human rights troubles as well.

Similar to the filtering technique, such strategies are less likely to succeed in mature democracies, where the media and civil society organizations can more easily demand thorough and transparent investigations and hold officials accountable. But the majority of states that take part in international regulatory regimes are not mature democracies. Global infectious diseases largely originate in developing countries.[276] Human rights abuses are more likely in nondemocratic states.[277] Hence, the efforts of civil society in democratic and prosperous states cannot suffice to ensure the production of compliance information in the internet era. Developing or nondemocratic states can resist attempts to impose undesired norms of transparency on themselves by hindering the production and acquisition of information. Ironically, the internet may then reduce the amount of available information, instead of amplifying it.

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274.   Galaz, *supra* note 181, at 23.

275.   *See* discussion *supra* note 192 and accompanying text.

276.   Kate E. Jones et al., *Global Trends in Emerging Infectious Diseases*, 451 NATURE 990, 991–92 (2008) (analyzing factors related to the emergence of 335 infectious diseases between 1940 and 2004, and demonstrating that "emerging disease hotspots" are concentrated in developing countries in Africa, Latin America, and Asia).

277.   *See, e.g.*, Oona Hathaway, *Do Human Rights Treaties Make a Difference?*, 111 YALE L.J. 1935, 1979–80 (2002).

C. *Normative Proposals*

As discussed above, online compliance monitoring may yield substantial benefits by infusing transparency into previously obscure state practices, thereby strengthening compliance with international obligations. It can also reveal crucial information that helps achieve coordinated international solutions, as exemplified by the case of international health regulation. However, along with these benefits, online compliance monitoring can also empower IOs and exacerbate existing concerns regarding their internal administration and democratic nature. States that are not interested in disclosing their compliance status may react adversely, decreasing the amount and the quality of publicly available information.

The present moment—the dawn of the online monitoring era—is therefore crucial. In order to benefit from the potential of information technologies and reduce their adverse effects, concrete measures should be taken by the international community and by IOs. Two strategies can be helpful in this respect. First, the norms and rules of conduct with respect to the uses of information technologies for purposes of compliance monitoring should be negotiated. Second, fragmentation of monitoring bodies should be encouraged in an attempt to hold IOs accountable for their compliance-related policies and decisions. This Section sheds further light on these proposals.

1. Setting Procedures for Online Compliance Monitoring

Due to the "panopticon effect" and its consequences, the contours of international transparency policies and compliance monitoring practices should be negotiated and clearly defined to maximize the advantages and benefits derived from vast amounts of online information. Such procedures should define how information should be collected, who should validate it, and how it should be prioritized.

One can argue that an "over-legalization" of monitoring mechanisms recreates the compliance difficulties that make online compliance monitoring necessary in the first place. Subjecting IOs to legal restrictions developed by self-interested states can return the genie of the internet to the bottle and retain the status quo of weak compliance monitoring. However, as demonstrated above, an absence of legal measures and rules framing the mechanisms of online compliance monitoring may lead to problematic consequences. Nuanced norms of operation that leave enough room for independent decision making but also impose checks and balances on IOs therefore seem to be the optimal solution.

The development of such norms is far from being an easy task. A key component of the monitoring regime is that it operates to the detriment of some states and to the benefit of others at different times. For example, it is plausible to assume that while all unaffected states are interested in the early discovery of an infectious disease, the state where the disease has originated prefers, by and large, to conceal the information and deal with the problem

locally.[278] However, the affected state in that scenario is likely to join the ranks of the other countries when a pandemic originates elsewhere. Similar logic applies to environmental and human rights violations. States are likely to take turns in terms of their interest in or avoidance of online compliance monitoring. However, the fact that most states are not likely to have constant preferences for or against online compliance monitoring does not make them impartial.

In most cases, states are aware of their comparative vulnerabilities in advance. Democracies, where larger amounts of information are released to the public, are more vulnerable to online compliance monitoring than authoritarian regimes. However, the impact of that monitoring is more threatening to politically weak states, since more powerful states are able to oppose the pressure of IOs and the international community. It is easier to monitor developed states with better internet coverage than developing states with poor technological infrastructure and low rates of internet access and connectivity. Since poor, developing states are often incapable of complying with their international obligations even when they want to, monitoring regimes that rely solely on the internet can miss violations in the states where they are more likely to occur.[279]

As states can foresee, at least to some degree, how online compliance monitoring will affect them, an impartial development of standards is not likely in this realm. Negotiations under a "veil of uncertainty" that conceals the distributive effects of online monitoring and suppresses the parties' self-interested behavior are hardly attainable.[280] However, these difficulties do not diminish the need for a normative framework for online compliance monitoring. Without such a framework, the "panopticon effect" is likely to persist—online compliance monitoring will overly empower IOs on the one hand and will be opposed by states on the other hand. The potential of information technologies for strengthening compliance with international law will be unfulfilled.

A potential solution to this gridlock is to focus on the legal *procedures* for online compliance monitoring, rather than on its *substance*. Any substantive decision—what information to look for, what data should be prioritized, and what the IO should put on its public agenda—is likely to be biased and

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278.   *See* discussion *supra* Part II.A.

279.   For this reason, the internet should not be, at least until access becomes globally widespread, the only monitoring measure. Also, further attention should be given to creative uses of information technologies in order to take into account the specifics of each state. For example, in a country with a large coverage of mobile telephone networks (e.g., Kenya) using mobile phones to convey information can be an effective monitoring strategy. *See* TECH. FOR TRANSPARENCY NETWORK, TECHNOLOGY FOR TRANSPARENCY: THE ROLE OF TECHNOLOGY AND CITIZEN MEDIA IN PROMOTING TRANSPARENCY, ACCOUNTABILITY AND CIVIC PARTICIPATION 18 (2010), *available at* http://globalvoicesonline.org/wp-content/uploads/2010/05/Technology_for_Transparency.pdf.

280.   On the advantages of a "veil of ignorance" for legislative purposes, see, for example, ADRIAN VERMEULE, MECHANISMS OF DEMOCRACY 31 (2007).

polarizing. However, decisions related to the procedure—how information should be collected, and what rules should apply to its prioritization and interpretation—are more likely to be balanced and consensual.

The aim of these procedures should be to increase the accountability of IOs to member states and domestic constituencies.[281] Clearly, the focus on procedures cannot fully obviate the influence (or even dominance) of powerful states and the likely battles of conflicting interests. However, given the inherent power imbalance in international relations, this seems to be the best available measure. Two guiding concepts should be helpful in this respect.[282]

a. Transparent Policymaking

The majority of IOs do not yet rely on information technologies for purposes of compliance monitoring, and even pioneer organizations that do employ these tools lack sound policies with regard to their use. The WHO, for instance, collects potentially important notices through systems such as GPHIN and then acts on some of them. It is not known publicly how the organization decides what information to look for and how it prioritizes the reports it receives. This opacity may raise concerns of accountability and trigger negative reactions. The development of transparent policies and guidelines that specify how online compliance monitoring should be conducted can help to cure this deficiency.

Transparency is crucial in this respect. First, the flow of the decision-making process should be clear. Situations in which no one knows why the WHO reacts to some notices that are picked up by its web crawlers but not to others should be minimized. Further, the policy and—to the extent possible—the practice of online compliance monitoring should be documented, publicly available, and open for comments and revisions.[283] In developing this framework, member states are not the only ones that should be invited to weigh in on the monitoring policies. Participation by NGOs and civil society should also be encouraged. Further, in order to ensure the effectiveness of ongoing monitoring policies, periodic auditing and reviews by independent third parties (e.g., NGOs or research institutions) should be conducted.

The aim of transparent policy making is akin to the goals of access to information described above.[284] Transparency in itself will not immunize IOs from undue influences by member states, NGOs, corporations,

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281.   *See* Esty, *supra* note 258, at 1521 (noting that "[w]hen good governance procedures are employed the decisions that emerge will enjoy a degree of inherent legitimacy"). For examples of such procedures, see, for example, Benedict Kingsbury, Nico Krisch & Richard B. Stewart, *The Emergence of Global Administrative Law*, LAW & CONTEMP. PROBS., Summer/Autumn 2005, at 15, 34–35.

282.   These suggestions loosely follow the principles developed in Esty, *supra* note 258, at 1524–37.

283.   *Id.* at 1527–28 (noting that a procedure of notice and comment provides "a structured opportunity to gauge rationality, efficacy, clarity, legality, fairness, and efficiency").

284.   *See* discussion *supra* Part III.A.

lobbyists, interest groups, and others. However, as sunlight is known to be the best "disinfectant,"[285] transparent decision-making procedures may gradually weaken these influences.

b. Due Process

As online compliance monitoring dismantles the states' traditional control of information and grants substantial discretion to IOs, these IOs should follow basic rules of due process when they decide to act upon this information. In the cases of SARS and Swine Flu, the WHO first approached China and Mexico, respectively, and allowed them to explain the data. This should indeed be the norm for all endeavors of online compliance monitoring.

Aside from basic fairness, such a structured "right of first hearing" in the context of online compliance monitoring has several practical advantages. It can moderate states' adverse reactions to the intrusiveness of online compliance monitoring, thereby fostering cooperative and nonadversarial relations between states and IOs. It can also help to achieve efficient local solutions without costly involvement by the international community. On the other hand, lack of cooperation on the part of the violating state might give the IO carte blanche to bring the incriminating information to the world's attention.

Similar to transparent policy making, procedures related to the right of due process should be thoroughly considered and framed. Importantly, these procedures should be individually tailored to different scenarios of online compliance monitoring. While emergencies such as SARS, Swine Flu, or environmental disasters should require prompt state reactions to IOs' inquiries, nonemergency reports can be handled differently.

2. Encouraging Fragmentation

A side effect of the rapid development of international regulatory regimes has been the increase of "overlapping jurisdiction and ambiguous boundaries."[286] The views of legal scholars on this phenomenon differ. Some view fragmentation as "either an unavoidable minor problem in a rapidly transforming international system, or even a rather positive demonstration of the responsiveness of legal imagination to social change."[287] Others argue that fragmentation "operates to sabotage the evolution of a more democratic

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285.   LOUIS D. BRANDEIS, OTHER PEOPLE'S MONEY AND HOW THE BANKERS USE IT 92 (Augustus M. Kelley ed., 1986).

286.   Eyal Benvenisti & George W. Downs, *The Empire's New Clothes: Political Economy and the Fragmentation of International Law*, 60 STAN. L. REV. 595, 595 (2007).

287.   Martti Koskenniemi & Paivi Leino, *Fragmentation of International Law? Postmodern Anxieties*, 15 LEIDEN J. INT'L L. (Neth.) 553, 575 (2002); *see also* Jonathan I. Charney, *The Impact on the International Legal System of the Growth of International Courts and Tribunals*, 31 N.Y.U. J. INT'L L. & POL. 697 (1999); Tullio Treves, *Conflicts Between the International Tribunal for the Law of the Sea and the International Court of Justice*, 31 N.Y.U. J. INT'L L. & POL. 809 (1999).

and egalitarian international regulatory system and to undermine the norma-
tive integrity of international law."[288]

In the context of online compliance monitoring, fragmentation plays a
positive role, as it helps to alleviate IOs' accountability concerns. Online
compliance monitoring requires an exercise of discretion as to what infor-
mation should be looked for, how results should be prioritized and analyzed,
and which reports should trigger action on the part of IOs. Division of the
decision-making authority should be welcomed in this respect. Since differ-
ent institutions will answer these questions in distinct manners, the amount
of information and the different angles through which it can be analyzed
will grow. In the case of environmental compliance, for instance, the official
environmental IO may focus its monitoring efforts on forestry, but nonoffi-
cial NGOs may invest resources in monitoring pollution, hazardous wastes,
and other things. In the context of international health regulation, the WHO
might be captured by specific pharmaceutical companies and hence direct its
monitoring resources to malaria in Africa, for example. The existence of
NGOs that would also use information technologies to demonstrate that
HIV is more prevalent and problematic than malaria in African countries
would not only expose additional useful information but also help to hold
the WHO itself accountable. Currently, the overlapping functions of GPHIN
(the official web crawler used by the WHO), HealthMap (a web crawler de-
veloped by a private research institution) and Google Trends (a private
company that takes advantage of its huge market share to expose unfolding
trends of diseases) generate a seemingly positive balance. Reports that
might have been overlooked, skewed, or deliberately left aside by the WHO
can be exposed by HealthMap or Google Trends, and hence it is easier to
hold the WHO accountable for its decisions and actions.

As the combination of official and nonofficial monitoring bodies both
alleviates the pressure on IOs and helps to hold them accountable, this strat-
egy may function "as a check on self-dealing, analytical errors, and special
interest manipulation of the policy process."[289] While fragmentation of mon-
itoring efforts already exists today, the availability of information
technologies allows even more NGOs and domestic groups to engage in
online compliance monitoring activities, supplementing or challenging the
information provided by the official bodies. Clearly, reports produced by
NGOs should be scrutinized and validated as rigorously as the reports that
are produced by official IOs. But when IOs and NGOs both engage in online
compliance monitoring efforts they will both share and constrain the role of
the warden in this new Foucauldian "panopticon."

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288.   Benvenisti & Downs, *supra* note 286, at 597.

289.   Esty, *supra* note 258, at 1534.

CONCLUSION

The departure point of this Article is that "weak" IOs, which lack independent and stringent enforcement mechanisms, act in the international arena as information clearinghouses. In this role, they collect data on state compliance, process it, and disseminate to international and domestic actors who can then use it for their own needs. While this clearinghouse function is prevalent among IOs, many of them fail to perform it due to a variety of financial and political constraints. This Article argues that information technologies change this reality.

Focusing on the international regulation of health, environment, and human rights, and examining numerous online initiatives, this Article demonstrates that online compliance monitoring reflects a deep conceptual shift with regard to state compliance with international law. Moving from policies of information access to proactive compliance monitoring by IOs, the Article demonstrates the immense potential of the internet to enhance the effectiveness of international regulatory regimes. It explains how information technologies allowed the WHO to detect, closely follow, and analyze two global pandemics—SARS and Swine Flu.

Along with celebrating the substantial benefits of online compliance monitoring, this Article also recognizes the adverse consequences they may generate. In particular, it argues that online compliance monitoring may create a "global panopticon" where states lose control over information and can always be watched by unaccountable IOs or NGOs. The Article concludes with suggestions of how to mitigate the negative aspects of the "panopticon" while preserving its beneficial effects. While these changes are neither simple nor easy, the benefits to be gained from online compliance monitoring make them worth the effort.