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OPEN STANDARDS AND GLOBAL POLITICS

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TABLE OF CONTENTS

I.	INTRODUCTION	169
II.	PRONOUNCED EFFECTS OF STANDARDS ON DEVELOPING COUNTRIES	170
A.	<i>Standards-Related IPR Challenges</i>	172
B.	<i>Institutional and Cultural Barriers to Standards-Setting Participation</i>	173
C.	<i>Exclusion from Policy-Making</i>	174
D.	<i>Access to Scarce Resources</i>	175
E.	<i>Later Market Entrants</i>	175
F.	<i>Higher Costs and Lack of Installed Infrastructure Base</i>	175
G.	<i>Network Effects and Conservative Momentum of ICT Standards</i>	176
H.	<i>Global Implications to Trade, Access to Knowledge, and Architecture</i>	176
III.	RECOMMENDATIONS FOR PROMOTING GREATER OPENNESS IN ICT STANDARDS.....	177
A.	<i>Opportunities for Standards-Setting Institutions</i>	177
1.	<i>Participatory Openness</i>	178
2.	<i>Procedural Openness</i>	179
3.	<i>Implementational Openness</i>	179
4.	<i>Institutional Rationales for Openness</i>	180
B.	<i>Opportunities for Governments</i>	180
C.	<i>Opportunities for Corporations</i>	182
IV.	CONCLUSION.....	183
V.	LIST OF ACRONYMS	184

OPEN STANDARDS AND GLOBAL POLITICS

Laura DeNardis*

A central purview of Internet governance is the development of Internet technical protocols, the standards that enable interoperability between diverse technologies and cultures. Standards are a form of technological rulemaking with public interest implications in areas such as public safety, national security, electronic medical records, eGovernment, individual privacy, and political and artistic expression. From an economic standpoint, the openness and intellectual property arrangements of technical standards can determine the extent of competition, trade, and innovation in technology markets. Universal and open technical standards have been identified as a precursor to the affordable and equitable diffusion of information and communication technologies around the globe. However, the institutional processes, technical and legal infrastructures, and underlying intellectual property arrangements of standards do not always create an opening to reflect the interests of developing countries. This paper examines ways in which the degree of openness in standards has pronounced implications for developing countries and beyond and concludes with recommendations for promoting open standards through institutional processes, intellectual property arrangements, and government procurement policies.

I. INTRODUCTION

A central purview of Internet governance is the development and adoption of Internet technical protocols, the standards that enable interoperability between diverse technological architectures. Many protocols, also called information and communication technology (ICT) standards, are widely known (e.g. Bluetooth wireless, “Wi-Fi,”¹ MP3,² and HTTP)³ but the majority are invisible to most end users. These protocols are technical design decisions with significant economic and political implications. From an economic standpoint, they produce externalities such as enabling (or impeding) competition and innovation in product areas based on common standards.⁴ Their underlying intellectual property arrangements can establish policies about the economic competitiveness of certain markets, how innovation should proceed, and what opportunities might exist for developing countries to compete in global technology markets. As traditional barriers to trade have diminished globally, standards have increasingly emerged as alternative global trade barriers. Standards also make political decisions about global knowledge policy, determining the extent of individual privacy online and the degree to which societies can access, produce, or share knowledge.⁵

These blueprints necessary for information production and exchange are examples of what Yochai Benkler calls information-embedded tools, similar to enabling technologies for

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¹ The IEEE 802.11 wireless LAN standards are collectively referred to as “Wi-Fi.”

² MPEG Audio Layer 3 format for encoding and compressing audio files.

³ HyperText Transfer Protocol, the protocol that enables the exchange of information between web browsers and servers.

⁴ Economist Rishab Ghosh suggests that open standards can be defined so as to promote full competition, and therefore innovation, among vendors developing products based on these open specifications. See Rishab Ghosh, *An Economic Basis for Open Standards*, December, 2005, available at <http://flosspols.org/deliverables/FLOSSPOLSD04-openstandards-v6.pdf>.

⁵ See also Laura DeNardis and Eric Tam, *Open Documents and Democracy: A Political Basis for Open Document Standards* (Yale Information Society Project White Paper), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1028073.

medical and agricultural resources.⁶ As Benkler explains, information-embedded tools, such as open (versus proprietary) protocols, are necessary for both enhancing welfare and enabling innovation. Internet standards such as TCP/IP (Transmission Control Protocol/Internet Protocol) and HTML (Hypertext Markup Language) have historically been openly available, enabling citizens and entrepreneurs to contribute to Internet innovation, cultural creativity, and to electronic public spheres. For example, web standards such as HTTP and HTML enable citizens to both create new software applications based on these standards and to contribute actual content to the Internet.

However, these traditional Internet standards are only a small fraction of the information and communication technology standards necessary for exchanging video, audio, images, and text. The thousands of standards underlying the information society actually exist on a continuum between completely open to completely proprietary approaches. The institutional processes and underlying intellectual property arrangements of ICT standards do not always create an opening to reflect the interests of developing countries. Developing country interests often have no voice in standards-setting institutions dominated by private western corporations. Standards-based intellectual property rights (IPR) can impede entrepreneurs in developing countries wishing to compete or innovate in products based on common standards. Furthermore, developing countries often lack the installed base of infrastructure inherent in more developed regions and may be more significantly impacted by intellectual property restrictions and heightened product costs associated with standards necessary to build infrastructure.

This paper examines ways in which the degree of openness in technical standards has pronounced implications to developing countries and suggests opportunities for promoting greater openness and interoperability. This paper asks how institutional processes, intellectual property arrangements, and standards adoption policies can provide a greater opening for developing country interests to enter the public policy decisions made in standards development and can encourage more of a level playing field for economic competition and entrepreneurial innovation. Specifically, this paper recommends that the numerous institutions that develop technical standards should establish policies promoting greater openness and transparency in the standards-setting process and encouraging fewer intellectual property restrictions. Finally, this paper describes how developing countries themselves can intervene by establishing government procurement policies that give preference to open technical standards.

II. PRONOUNCED EFFECTS OF STANDARDS ON DEVELOPING COUNTRIES

The declaration of principles from the United Nations World Summit on the Information Society (WSIS), identified standardization as a foundation for the global information society and cited open standards as a precursor to affordable ICT diffusion in the developing world:

Standardization is one of the essential building blocks of the Information Society. There should be particular emphasis on the development and adoption of international standards. The development and use of open, interoperable, non-discriminatory and demand-driven standards that take into account needs of users and consumers is a basic element for the development and greater

⁶ YOCHAI BENKLER, *THE WEALTH OF NETWORKS: HOW SOCIAL PRODUCTION TRANSFORMS MARKETS AND FREEDOM* (New Haven, Yale University Press, 2006)

diffusion of ICTs and more affordable access to them, particularly in developing countries.⁷

This principle makes reference to standards that are “open,” but there are many definitions of open standards.⁸ Openness can refer to the membership policies of standards organizations or refer to the degree of openness, inclusivity, and transparency in the standards design process. Openness can also describe characteristics of a standard once developed such as whether it is openly published, has underlying intellectual property restrictions, and results in technical interoperability, user choice, and competition in products based on the standard. Although most standards would fall somewhere on a continuum of completely open versus completely closed, the following provides a definition of maximal openness in a standard:

1. The standards development process is open to any interested party, involves well-defined and published procedures, and makes drafts, electronic discussions, and meeting minutes publicly available.
2. The standard, once developed, is published and made freely accessible to the public and to those interested in developing products based on the standard.
3. The standard has minimal intellectual property restrictions or should be made available on a royalty-free or reasonable and non-discriminatory basis. IPR holders are prohibited from enforcing patents against the implementation of a standard if the IPR has not been disclosed.
4. The standard allows technical interoperability between heterogeneous products, enables multiple competing implementations, and precludes users from being locked into a single vendor's products.⁹

Conversely, a completely closed, or proprietary, specification is one that is developed by a single company with no avenue for participation by other parties. A proprietary specification is unavailable for other parties to use, even for a fee, to develop interoperable products based on the specification. The specification's developer owns all the IPR and does not license it under any terms. This type of a closed approach prevents the development of competing products and associated innovations and locks users into a single vendor's product. Definitions of openness, whether set forth by standards institutions, governments, or vendors, fall somewhere on a spectrum between maximal openness and a completely closed specification. This section describes ways in which the degree of openness in technical standards can have pronounced effects on developing countries.

⁷ WSIS Declaration of Principles, *Building the Information Society: a Global Challenge in the New Millennium*. Geneva, December, 2003, available at <http://www.itu.int/wsis/docs/geneva/official/dop.html>.

⁸ See, e.g., ITU's definition of open standards available at <http://www.itu.int/ITU-T/othergroups/ipr-adhoc/openstandards.html>; Ken Krechmer, *Open Standards Requirements* (2005) available at <http://www.csrstds.com/openstds.pdf>; Bruce Peren, *Open Standards: Principles and Practice*, available at <http://perens.com/OpenStandards/Definition.html> and Rishab Ghosh, *An Economic Basis for Open Standards*, available at <http://flosspols.org/deliverables/FLOSSPOLS-D04-openstandards-v6.pdf>, (Dec. 2005).

⁹ See Laura DeNardis and Eric Tam, *Open Documents and Democracy: A Political Basis for Open Document Standards* (Yale Information Society Project White Paper, Nov. 2007)

A. Standards-Related IPR Challenges

The Internet has experienced rapid growth and innovation in part because of its open protocols with minimal intellectual property restrictions. The Internet Engineering Task Force (IETF), the standards organization responsible for developing many of the Internet's core protocols, has traditionally adhered to the following IPR approach:

IETF working groups prefer technologies with no known IPR claims or, for technologies with claims against them, an offer of royalty-free licensing. But IETF working groups have the discretion to adopt technology with a commitment of fair and non-discriminatory terms, or even with no licensing commitment, if they feel that this technology is superior enough to alternatives with fewer IPR claims or free licensing to outweigh the potential cost of the licenses.¹⁰

Because of the IETF's approach to standards-based intellectual property, core Internet protocols such as TCP/IP have had minimal intellectual property restrictions. However, TCP/IP and other core networking standards are only a small fraction of the standards required for Internet connectivity. The evolution of the Internet's architecture is allowing for more complicated IPR conditions in two ways. First, the number of standards required for electronic information exchange has dramatically increased as the type of information supported by the Internet has expanded from text to multimedia applications (e.g. video, images, and audio) and as the devices for accessing the Internet have become much more diverse (cell phones, iPhones, Blackberries, laptops, etc.). The standards necessary for communicating extend far beyond traditional TCP/IP and related Internet standards. Information exchange can only occur through the use of many basic building blocks such as image, video, audio, and office application formats. Intellectual property rights are deeply embedded in many of these standard formats.

A related complication is that a single device now integrates functionality previously provided by many devices. Cell phones provide mobile voice, web browsing, text messaging, digital imaging, video recording, and other functions and are able to connect to multiple networks like GSM,¹¹ Wi-Fi, or a global positioning system (GPS). These devices can embed hundreds of standards. Vendors wishing to manufacture such devices must determine what IPR involves royalty payments and then deal with numerous separate license agreements. Another complexity is that, as Mark Lemley describes in "Intellectual Property Rights and Standards Setting Organizations," there is an enormous diversity of IPR policies among standards-setting institutions, even those in the same industry.¹² Furthermore, intellectual property rights are not necessarily disclosed until long after a standard is widely entrenched.

These complex circumstances have heightened effects on entrepreneurs in developing countries, who have not necessarily been involved in the development of essential standards and who do not have existing patent portfolios. ICT companies in developing countries are generally smaller businesses and later entrants in the global ICT market than dominant multinational companies. In "It's Time for IPR Equal Opportunity in International Standard Setting," attorney Andrew Updegrave summarizes the IPR advantages of large corporations in developed

¹⁰ Scott Bradner, Editor. RFC 3979, *Intellectual Property Rights in IETF Technology* (Mar. 2005), available at <http://www.ietf.org/rfc/rfc3979.txt>.

¹¹ Global System for Mobile (GSM) communication is a popular cellular networking standard.

¹² Mark A. Lemley, *Intellectual Property Rights and Standard-Setting Organizations*, 90 CALIFORNIA LAW REVIEW 1889 (Apr. 2002), available at <http://ssrn.com/abstract=310122>.

countries. They have extensive research and development capacity; they have large legal staffs to deal with IPR; they regularly engage in cross-licensing agreements with other large companies; they are culturally well-versed in the historical traditions of standards-setting institutions, and they have enormous patent portfolios.¹³ Updegrove describes the accompanying phenomenon of “standards based neocolonialism.”

Royalty bearing patent claims are embedded in the standards for products such as DVD players and cellular phones. If the royalties are high enough, the patent owners can have such products built in emerging countries using cheap local labor, and sell them there and globally under their own brands. Meanwhile, emerging company manufacturers can't afford to build similar products at all.¹⁴

Having to pay royalty payments, as well as face the difficulties of addressing standards-based IPR complexities, discourages new entrepreneurial activity among developing country enterprises.

B. Institutional and Cultural Barriers to Standards-Setting Participation

The degree of openness in standard-setting processes varies considerably by standards institution and developing country interests are often not part of the process. While large multinational corporations have experience with the historical traditions of standards-setting institutions, corporations in developing countries may not. Furthermore, some standards-setting organizations have closed memberships that prohibit new members. The legitimacy of Internet standards development has always derived, in part, from its open institutional approach. Any interested party has been able to participate in the IETF. As the number of standards required to use the Internet has increased, so has the number of organizations that establish these standards - and so has the number of different policies regarding participation in standards institutions.

Even in bodies such as the IETF that have open membership policies, general barriers of money, access, culture, and knowledge can impede the meaningful participation of developing countries. Participation requires funding. Most participants in standards-setting organizations are funded (i.e. receive salaries) by the corporations for which they work. Smaller companies or individual citizens in developing countries do not necessarily have the resources to fund the enormous time commitment required to participate in these activities or to fund travel to in-person meetings. The esoteric knowledge and technological expertise required to participate in working groups also create some inherent barriers to involvement for those joining the process as late entrants. More unquantifiable cultural barriers also exist in standards work. Individuals from some cultures may be unaccustomed to the informal culture (e.g. “t-shirts, jeans (shorts, if weather permits) and sandals.”)¹⁵ of some Internet standards communities or may experience language barriers. Another potential barrier to participation is access, ranging from adequate electronic access, to physical access to industry events, or access to key decision makers in standards processes.

¹³ Andrew Updegrove, *It's Time for IPR Equal Opportunity in International Standards Setting*, Consortium Standards Bulletin Volume VI No. 7, (Aug-Sept. 2007) available at <http://consortiuminfo.org/bulletins>.

¹⁴ Andrew Updegrove, *Government Policy and “Standards-Based Neocolonialism*, Consortium Standards Bulletin Volume VI No. 7, (Aug-Sept. 2007) available at <http://consortiuminfo.org/bulletins>.

¹⁵ Gary Malkin, *The Tao of IETF, A Guide for New Attendees of the Internet Engineering Task Force*, RFC 1718, (Nov.1994).

C. Exclusion from Policy-Making

Standards sometimes establish public policy. As Davidson, Morris, and Courtney describe in “Strangers in a Strange Land: Public Interest Advocacy and Internet Standards,” Internet protocols can set public policy in areas such as property rights, individual privacy, and access to knowledge.¹⁶ The content of standards can determine the extent of individual civil liberties such as user privacy online. For example, in developing the IPv6¹⁷ standard, the IETF faced a design decision directly related to user privacy. IPv6 is an Internet address standard designed to increase the number of devices able to connect to the Internet. Internet engineers assessed whether an Internet address should incorporate a unique physical address such as the number associated with a computer’s network interface card. This linkage between software-defined and physical addresses would ensure that each address was globally unique, but it also would create an environment in which information exchanged over the Internet could potentially be associated with a citizen’s computer and therefore a citizen’s identity and physical location. Internet engineers, rather than elected officials, faced policy questions about location privacy and anonymity. Ultimately, they built privacy options into the standard, but what are the implications of a standards-setting institution establishing policy about the public’s civil liberties?

Decisions about encryption standards similarly determine the extent of individual user privacy and whether there are back doors for law enforcement and national security purposes. Electronic health care information standards establish policies about how citizens’ health care records are electronically exchanged. In an even more political sense, technical standards establish public policy when they underlie processes of political authorization and representation, such as standards related to electronic voting machines and electronic voter registration.¹⁸

In these cases, the question of who sets technical standards is highly relevant. Power over these standards is not restricted to market power but the ability to make decisions directly impacting the citizens who use technologies. This form of public policy is not established by democratically representative government mechanisms or with public input, but by private actors. The more open a standards-development process, the greater the legitimacy to be making public interest decisions. If developing country interests are not involved in standards development either because they are later entrants or because of institutional, financial, or cultural barriers to participation, their interests are not directly reflected in this policy making. The private corporations that populate standard-setting organizations can embed policy decisions into standards. If standards make decisions intersecting with the public interest, then the extent of developing country involvement in the standards-development process has significant political implications.

¹⁶ Alan Davidson, John Morris, and Robert Courtney (CDT), *Strangers in a Strange Land: Public Interest Advocacy and Internet Standards* (Telecommunications Policy Research Conference, Alexandria, VA, 2002), available at <http://www.cdt.org/publications/piaais.pdf>.

¹⁷ Internet Protocol version 6.

¹⁸ See, e.g., Rebecca Bolin and Eddan Katz, *Electronic Voting Machines and the Standards-Setting Process*, 8 J. INTERNET L., 3, 2004, available at <http://ssrn.com/abstract=945288>. See also Jason Kitcat, *Government and ICT Standards: An Electronic Voting Case Study* in INFORMATION, COMMUNICATION, AND ETHICS IN SOCIETY (2004), available at http://www.j-dom.org/files/Kitcat-evoting_case.pdf.

D. Access to Scarce Resources

Standards also have economic and distributive justice effects on developing countries when they create and allocate the finite resources required for access to knowledge. Some standards partition and allocate radio frequency spectrum among users (e.g. broadcast standards, Wi-Fi, and cellular standards). Others prioritize the flow of information over a network based on the type of application being transmitted, such as prioritizing voice applications and decelerating peer-to-peer video. Other standards divide up orbital slots in satellite systems. Some assign rights of access to local broadband services. Addressing standards are perhaps the most obvious examples of how standards create finite resources necessary for participation in the global knowledge economy. For example, every connection to the Internet requires a globally unique Internet Protocol (IP) address. The long prevailing standard, IPv4, created approximately 4.3 billion unique binary addresses. An emerging standard, IPv6, expanded this number exponentially. How these (and other) standards create finite resources and how these resources are distributed and controlled have implications to developing countries which might not have historically been allocated these resources.

E. Later Market Entrants

ICT development and entrepreneurship promise to provide economic opportunities in developing countries, as other regions have already experienced. Emerging companies in the developing world have disadvantages that heighten the effects of the IPR and other challenges listed above. They are usually later market entrants who may not have been involved in the development of a standard they plan to implement in their products. Implementation of a standard can require permissions, so the entrepreneur wanting to implement a standard is dependent upon these permissions. Implementation of a standard can require a royalty payment, as mentioned. Finally, any lack of IPR disclosure raises the specter of investing in product development only to face a patent infringement lawsuit at a later time. The implication is that standards-based patents (and lack of patent disclosure) can create impediments to later entrant entrepreneurs in developing countries seeking to compete or innovate in ICT standards.

F. Higher Costs and Lack of Installed Infrastructure Base

Standards-related IPR impacts developing countries' ICT industries as described above but developing countries are not only technology developers, they are also technology users. The costs and restrictions of standards-related IPR are transferred to users. This creates a heightened burden on developing countries which may lack a significant installed base of ICT infrastructures and often must purchase essential products from western companies, even if the products are manufactured in their countries. For example, the international community has placed great emphasis on the promise of broadband wireless technologies like WiMax, Wi-Fi, and GSM to deliver critical infrastructures expeditiously and cost effectively in the developing world. In developed countries, these are often viewed as access technologies, but in developing countries without existing fiber and copper backbone infrastructures, broadband wireless has the potential to serve as both the backbone infrastructure and as access mechanisms. Wi-Fi, WiMax, and GSM are standards. Furthermore, they are standards with deeply embedded IPR, in the form of patents, which can raise the price of these broadband technologies. Those without an installed base of existing products disproportionately bear the marginal cost increases this embedded IPR creates.

G. Network Effects and Conservative Momentum of ICT Standards

The ICT sector is an increasingly large part of the global economy and adoption of global standards is necessary to participate in any global commerce, regardless of industry. In the realm of ICT standards, developing countries do not always have the option of choosing an alternative standard. Developing countries wanting to use or develop technology products that are globally interoperable must use global standards. Once implemented, standards have a conservative momentum, enduring because of network effects, institutional commitments, and user and vendor investments. If these standards are proprietary, they may have the effect of creating vendor lock-in, minimizing user product choice, and minimizing competition and the associated cost reductions of competition. In cases in which a choice exists, the adoption of products based on open standards is beneficial for enabling user choice, promoting economic competition and innovation, and promoting values of participatory openness, transparency, and democratic access to knowledge. But in cases in which this choice is not available, developing countries wanting to participate in global commerce, must adopt globally dominant standards.

H. Global Implications to Trade, Access to Knowledge, and Architecture

The previous sections have described some pronounced effects that the level of openness in standards can have on developing countries. All of these pronounced effects also have more universal implications. As economists have argued, there is a correlation between open standards and increased economic competition and openness.¹⁹ One negative implication of the escalation of IPR-laden standards is that large emerging countries, such as India, are likely to increasingly respond by defensively filing patents and by developing home-grown standards that may not be completely interoperable with global standards. The WTO's Agreement on Technical Barriers to Trade (TBT) asserts that standards should not create unnecessary obstacles to trade. But standards are increasingly emerging as non-tariff barriers in global ICT markets.²⁰ Intellectual property rights in standards inhibit the adoption of international standards and the development of products based on these standards. A defensive reaction has already come from China, which has encouraged the development of Chinese national standards such as WAPI (Wireless Local Area Network Authentication and Privacy Infrastructure), the Chinese national standard for wireless LAN encryption; UOF (Unified Office Format), China's document format for office applications; and other national standards. Relatively closed standards are emerging as alternative trade barriers in contrast to open Internet standards which have tended to promote competition and free trade. This national balkanization of Internet-related standards and the use of standards as barriers to trade may have much broader implications than the implications to developing countries. It may ultimately impede access to knowledge and the global flow of information. National standards can potentially be used to achieve political results such as restricting access or filtering information. Technically, standards balkanization disrupts the end-to-end architecture principle of the Internet and can, in theory, create a fragmented, non-interoperable information infrastructure.

¹⁹ Rishab Ghosh, *An Economic Basis for Open Standards* (Dec. 2005) available at <http://flosspols.org/deliverables/FLOSSPOLS-D04-openstandards-v6.pdf>.

²⁰ See, e.g., Communication from the People's Republic of China, Background paper for Chinese Submission to WTO (G/TBT/W/251), *Intellectual Property Right (IPR) Issues in Standardization*, (Nov. 2006) available at [http://research.yale.edu/isp/osis/papers/Baisheng %20Position%20Paper1.pdf](http://research.yale.edu/isp/osis/papers/Baisheng%20Position%20Paper1.pdf); see also Christopher Gibson, *Technology Standards—New Technical Barriers to Trade?* in *The Standards Edge: Golden Mean*, (Sherrie Bolin, ed., 2007), available at <http://ssrn.com/abstract=960059>.

Furthermore, inefficiency and inconsistency in the international standards-setting process, overall, creates problems for the large corporations which lead in development and innovation in ICT product markets. Adherence to universal standards improves capacity. As Benkler states, “As a matter of engineering, what has been called “cooperation gain” – the improved quality of the system gained when nodes cooperate—is the most promising source of capacity scaling for distributed..systems.”²¹ Standards balkanization can potentially reduce capacity scaling and markets and create inefficiencies for manufacturers. Corporations experience similar efficiency problems in having to navigate IPR complexities, participate in countless standards institutions, and face an inconsistent, unreliable, and somewhat arbitrary international standards processes.

III. RECOMMENDATIONS FOR PROMOTING GREATER OPENNESS IN ICT STANDARDS

Part II of this paper described the pronounced effects of technical standards on developing countries. This section recommends some concrete actions standards-setting institutions, governments, corporations, and others can take to promote greater openness in standards development, implementation, and adoption. The overall objectives of greater openness are six-fold:

1. To provide a more level playing field for businesses in developing countries (and elsewhere) to compete in global ICT markets;
2. For standards-setting institutions to provide greater openings for developing country interests to enter the political and economic decisions made in standards selection;
3. To promote Internet innovation by sustaining the Internet’s tradition of encouraging royalty-free standards;
4. To create legitimacy in the international standards-setting process;
5. To promote efficiency in standards-setting processes;
6. To promote the global flow of information and access to knowledge by encouraging the Internet’s tradition of using universal standards rather than balkanized standards that vary by nation.

The significant number of institutions that now establish Internet-related standards should consider establishing policies enabling greater participatory openness in the standards-setting process and fewer intellectual property restrictions for standards implementation. An additional recommendation is that governments in emerging markets, and more generally, establish policies to procure ICT products based on open standards that are developed in participatory and transparent institutional processes and that adhere to open IPR policies. These recommendations are described in the following sections.

A. *Opportunities for Standards-Setting Institutions*

The number of institutions setting Internet-related standards has increased as the number of software applications and access mechanisms supported by the global Internet has expanded over the last decade. For example, wireless access, text messaging, Voice over Internet Protocol

²¹ Benkler, *supra* note 6, at 182.

(VoIP), music downloads, and video file sharing technologies have dramatically increased the number of universal standards required to provide global interoperability, security, common formats, and compression of information over the Internet. This expansion of standards has been accompanied by an increase in the number of standards-setting institutions involved in establishing essential technical standards. These institutions have different approaches to membership requirements, IPR, and public availability of specifications. Some standards-development processes are closed to public participation. Some require fees for membership. Others do not make specifications open for public viewing or make them available only for a fee.

For an Internet governance function like standards selection to have global legitimacy, it must at least provide a certain amount of participatory openness and procedural transparency. Furthermore, this paper has emphasized the importance of open IPR to enable a level playing field for developing countries to compete in ICT markets, to promote global trade, to provide user choice, and to avoiding global standards balkanization. To promote these goals and to maximize institutional legitimacy, the following are recommended voluntary best practices standards-setting institutions can implement.²²

1. Participatory Openness

The legitimacy of Internet standards governance has, in part, depended upon the institutional processes being open to participation by various stakeholders. For example, the IETF has no formal membership, no fees for participating, and is open to any interested party.²³ The United Nations Working Group on Internet Governance (WGIG) was formed to define Internet governance, identify major policy areas, and issue recommendations for Internet governance responsibilities in these areas.²⁴ Without overemphasizing this working group's findings, it is interesting to note that the WGIG agreed upon two requirements for Internet governance legitimacy, both related to developing countries:

There are two overarching prerequisites to enhance the legitimacy of Internet governance processes:

- The effective and meaningful participation of all stakeholders, especially from developing countries.
- The building of sufficient capacity in developing countries, in terms of knowledge and of human, financial and technical resources.²⁵

Standards-setting organizations with open membership policies, despite any barriers, at least allow for the possibility of developing country input into standards policy decisions. In the standards-setting process itself, institutions wishing to have global legitimacy should be open to

²² Eddan Katz and Laura DeNardis, *Best Practices for Internet Standards Governance*, August, 2006, available at <http://www.itu.int/wsis/docs2/tunis/off/6rev1.html> (recommending greater participatory openness, IPR openness, and transparency to promote the possibility of greater multi-stakeholder involvement)

²³ See Paul Hoffman and Susan Harris, RFC 4677, *The Tao of IETF: A Novice's Guide to the Internet Engineering Task Force*, September, 2006, available at <http://www.ietf.org/tao.html>.

²⁴ Kofi Annan established the WGIG in response to recommendations from the 2003 World Summit on the Information Society. The first phase of the World Summit on the Information Society was held in Geneva, Switzerland on December 10-12, 2003.

²⁵ Chateau de Bossey, *Report of the Working Group on Internet Governance*, June 2005, Section V.B.74. available at <http://www.wgig.org/docs/WGIGREPORT.pdf>.

anyone wanting to participate regardless of membership status, institutional affiliation, credentials, or government or corporate backing.

2. *Procedural Openness*

Addressing institutional questions about standard-setting procedures requires deciding whether the institutional process is political. This paper has suggested that the standards-setting process itself is a political process as well as a technical and economic one. Standards make decisions about how citizens can access knowledge (e.g. wireless standards and digital rights management standards), about individual civil liberties (e.g. encryption standards, search privacy standards), and how governments and citizens interact (e.g. electronic voting standards, document format standards). If standards selection is a *political process*, it involves a system of procedures and rules. To provide maximum legitimacy for standards-setting institutions, policies for standards selection should be well established and publicly available. The policy should include well-defined and publicly available procedures for addressing process violations and for appealing decisions. Part of political legitimacy also comes from transparency, with meeting minutes, electronic discussions, and records of appeals, conflicts, and dissent made to be a matter of public record. For maximum transparency, participants in the standards process should also disclose their institutional, corporate, or governmental affiliation.

3. *Implementational Openness*

The success of the Internet and the rapid pace of associated innovation are in part attributable to the tradition of many Internet standards, once developed, being freely and openly available for anyone to access and presumably use to make competing products based on the standard. Internet standards have also favored, where possible, specifications with minimal underlying intellectual property restrictions.²⁶ The promotion of these traditions would help provide more of a level playing for developing countries to compete in global ICT markets (and within their own countries), might reverse the emerging trend of nation-specific ICT standards balkanization, and would enhance the global legitimacy of standards-setting institutions that adhere to these policies.

Therefore, standards should be openly published specifications available to the public and to any business wishing to create competing products based on the standard. Some prominent standards-setting organizations restrict access to specifications to members or charge a fee for document access. It is in the best interest of standards-setting institutions and the companies involved in these institutions to make standards, once developed, publicly available. This will help brand the standards as “open” to comply with government policies making procurement decisions based on openness. It will also provide greater institutional legitimacy by enabling greater transparency and public accountability, especially when the standards design process implicates a core public issue such as privacy, freedom of speech, national security, or public access to government documents.

As described earlier, traditional IPR regimes have become inadequate for complex, fast moving, and globally distributed ICT markets. The following are some recommendations to address IPR problems. Standards-setting institutions should, whenever possible, include design specifications with minimal underlying intellectual property restrictions. In cases in which this is

²⁶ Scott Bradner, *Intellectual Property Rights in IETF Technology*, March, 2005, available at <http://www.ietf.org/rfc/rfc3979.txt>.

not possible, one change in the standards process that would reduce the threat of patent infringement cases against emerging companies in developing countries is a requirement for *ex ante* disclosure of licensing terms. This disclosure could potentially include the price that the owner of a patent would demand for use of the standard. The opening round of the Access to Knowledge (A2K) treaty directly addressed this aspect of open standards issues. The draft treaty recommended disclosure of patents in standards and proposed preventing parties from enforcing a patent underlying an implementation of a standard if the patent holder had failed to disclose relevant patents. In these cases, holders of IPR must make them available for licensing on reasonable and non-discriminating (RAND) terms based on independently defined costs. But again, royalty-free standards development should be encouraged.

4. Institutional Rationales for Openness

Companies involved in ICT standards setting have several other motivations for considering these policies, in addition to the issues of institutional legitimacy already mentioned. One economic motivation for greater openness is to ensure that a company's products are based on standards that comply with emerging government procurement policies that require open standards compliance. Another economic motivation is that open standards availability could fend off nationalized standards responses such as China's increasing development of its own information and communication technology standards with associated IPR and access restrictions. These emerging national standards policies have the potential to significantly reduce the markets in which ICT companies can sell.

B. Opportunities for Governments

Open standards align with the interests of governments in all countries, not just in the developing world. The effects of standards and their underlying intellectual property arrangements should be of concern to all national governments, but this paper has described the heightened effects the degree of openness in standards can have on the developing world. Governments in emerging markets have three options for standards intervention: (1) *development* - they can become directly involved in standards development or fund or encourage indigenous companies to become more involved in standards setting; (2) *regulation* - they can regulate which ICT standards, and how ICT standards, must be used within ICT products employed within their jurisdictions; (3) *procurement* - they can promote the development and adoption of certain standards by using their influence as large purchasers of ICT products. This paper recommends option three, procurement policies, as a potential lever for developing countries to influence the proliferation and success of open standards that are presumably in their best economic and political interest. Of the three options, this mechanism provides the lowest level of government intervention because it does not mandate that private industry adopt standards and does not intervene in standards development. However, governments in developing countries are increasingly large purchasers of ICT products and, as such, have the ability to encourage open standards accordingly.

In response to increased recognition of the economic, technical, and political implications of openness in ICT standards, some governments have already established technical procurement strategies based on open standards. There have also been a number of government announcements that all digital information exchanged among governmental agencies or between governments and citizens be based on open standards. Often called government interoperability

frameworks,²⁷ open standards policies have been introduced in countries such as Australia, Bangladesh, Belgium, Brazil, China, Croatia, Denmark, France, Hong Kong, India, Italy, Malaysia, New Zealand, Sri Lanka, Thailand.

As evident by this list, open standards policies are a phenomenon in both the developed and the developing world. While definitions of what constitutes an open standard differ, the overarching purpose of these government policies is interoperability, the ability of government agencies to exchange information with each other and with citizens, with open standards cited as the primary method for achieving this interoperability.

For example, the Brazilian federal government issued an interoperability policy establishing the adoption of open standards for technology used within the executive branch of the federal government. The Brazilian model is representative of many open standards policies. The Brazilian framework is limited to internal government communications and information exchanges with citizens and specifically states that the policies cannot be imposed upon the private sector, citizens, or on government agencies outside of the federal government, although it does request voluntary adherence to the standards specifications. Additionally, the federal standards policies apply to new purchases and upgrades to existing systems rather than mandating a complete cut over to new products. Like other open standards policies, Brazil cites a combination of technical, political, and economic justifications. Most policies express public service rationales such as improving services to citizens and avoidance of locking users into a single vendor's products; technical goals of interoperability and seamless information exchange among agencies; and economic goals of lowering costs, promoting economic competition and innovation, and competing in global markets and exchanging information with global trading partners.

Brazil's definition of interoperability primarily addresses a standard's *effects*. Does it enable multiple, competing technologies? Does it create the ability to exchange information among heterogeneous ICT environments? Does it provide users with a product choice or result in single vendor lock-in? Principles of openness, choice, and heterogeneity underlie this interoperability definition. Other principles underlying Brazil's interoperability framework include compliance with dominant Internet standards, compliance with XML (eXtensible Markup Language), scalability, and status as internationally accepted standards. The Brazilian framework also seems to self-reflexively embrace principles of transparency and participatory openness by stating that interoperability policy documentation should be open to public review with mechanisms for feedback. The underlying policy specifies the preference of open standards adoption within the federal government.²⁸

Brazil's interoperability framework makes specific recommendations for standards that meet its requirements for openness and interoperability. Among the numerous pages of recommended standards are well established Internet protocols such as HTTP/1.1, SMTP/MIME, and TCP and UDP, popular document formats such as RTF and PDF, and also newer and less entrenched open standards such as Open Document Format (ODF).

²⁷ See UNDP note "Government Interoperability Frameworks in an Open Standards Environment: A Comparative Review." APDIP e-Note 20 (2007) available at <http://www.apdip.net/apdipenote/20.pdf>.

²⁸ Brazilian Government Executive Committee on Electronic Government, *e-PING Standards of Interoperability for Electronic Government, Reference Document Version 2.0.1* (Dec. 5, 2006) at 9, (translated by the Brazilian government), available at http://www.governoeletronico.gov.br/governoeletronico/publicacao/down_anexo.wsp?tmp.arquivo=E15677e-PING_v2.0.1_05_12_06_english.pdf.

Other government interoperability frameworks have similar elements. For example, the objectives of Malaysia's interoperability framework²⁹ is a response to the need for different government systems (both hardware and software) to be able to exchange information more expeditiously and cost effectively using open standards "that are vendor and product neutral" over "proprietary alternatives."³⁰

In late 2008, India released for public comment a draft policy on open standards for eGovernance. India's open standards policy cited an array of technical, economic, and political objectives: to promote interoperability among the technologies used by multiple agencies within the Indian government; to provide greater technological choices; to ensure that public documents are accessible in the long term; to promote local innovation and entrepreneurship; and to minimize the potential for the government to become locked into using a single vendor for critical public services.³¹ India's policy stipulated that any new standard it adopted must be free to implement on a royalty-free basis and must have been developed in a transparent and open process, among other requirements.

Where government policies differ is in their definitions of open standards. The European Union's "European Interoperability Framework for Pan-European eGovernment Services" was established to promote pan-European electronic interoperability among public administrators, citizens, and corporations. The definition of open standards in the European framework describes an open standard as meeting the following minimum requirements: it must be developed in an open decision-making process; the standard must be published and available either freely or at minimal cost; *and* the intellectual property (e.g. patents) "of (parts of) the standard is made irrevocably available on a royalty-free basis."³² Some open standards policies do not require that standards-based intellectual property be made irrevocably available on a royalty-free basis but may give preference to royalty-free standards where possible. Regardless of their definition of open standards, these procurement policies are one lever that governments in developing countries have to exert influence over openness in Internet standards.

C. Opportunities for Corporations

Many corporations have recognized the economic benefits of open technical standards to providing a level playing field for competition and to maximizing opportunities for product innovations based on common technical standards. Corporations also increasingly understand the societal importance of open technical standards, including health care services, financial systems, electronic commerce, and the ability of governments to provide essential disaster response, national security, efficient eGovernment services, and other functions.

Whether large multinational corporations or entrepreneurs in emerging markets, companies with an interest in advancing open technical standards can take concrete actions. IBM's corporate standards policy provides a prime example. In 2008, IBM instituted a new standards policy that includes a commitment to make its involvement in standards institutions contingent on the openness of their standards processes, intellectual property norms, and

²⁹ *Malaysian Government Interoperability Framework (MyGIF) Version 1.0* (August, 2003), available at <http://www.mampu.gov.my/mampu/bm/program/ICT/ISPlan/ispdoc/Interoperability%20Framework.pdf>

³⁰ *Id.*, at 7.

³¹ See *India's Draft Policy on Open Standards for e-Governance*, effective July 2008, available at <http://www.mit.gov.in/download/Policyonopensandards.pdf>.

³² IDABC Working Document, *European Interoperability Framework for Pan-European eGovernment Services*, Version 4.2.9 (Jan. 2004), available at <http://ec.europa.eu/idabc/servlets/Doc?id=1674>.

membership rules.³³ IBM also announced that it would work within standards institutions to promote greater openness in procedures, intellectual property rules, and to ensure that standards are made freely available and implementable. IBM's policy also included a commitment to encourage local involvement in standards development and implementation in countries in which it does business to help create openings for developing country interests to enter technological rulemaking.

Corporations with a business or public interest in advancing open standards have at least four options: they can adopt open standards in the products they develop; they can open up any existing standards-based intellectual property rights; they can make their involvement in standards-setting institutions contingent upon the institutions meeting certain minimal criteria of openness; and they can work to encourage governments, local interests, other corporations, and clients to promote greater standards openness.

IV. CONCLUSION

The degree of openness in technical standards generally has public policy implications, but has additional pronounced effects on developing countries. The institutional processes and underlying intellectual property arrangements of standards do not always create an opening to reflect the interests of developing countries. Businesses in developing countries are quite different from western multinational companies in relation to standards experience and advantages: they have not historically been involved in standards setting; they do not have enormous patent portfolios; they do not have large legal teams dedicated solely to IPR issues; they do not have extensive cross-licensing agreements with other large companies. These companies are later entrants in ICT product development, an enterprise that increasingly requires having to deal with, in some cases, hundreds of standards embedded within a single device. As ICT users, developing countries have less of an installed infrastructural base and, as such, disproportionately bear the marginal cost increases engendered by this escalation of embedded IPR. Developing countries also face unique institutional and cultural barriers to participation in the standard-setting process, a process that establishes public policy and has economic implications. These implications do not only affect developing countries, but have more universal implications, especially as countries potentially respond to non-open standards regimes with national standards strategies that balkanize the Internet's global architecture.

Standards-setting institutions, developing countries, and the continuity and universality of the Internet's global architecture could benefit from the modest recommendations this paper sets forth to promote greater openness in ICT standards. In the standards-setting process itself, institutions should procedurally allow for participatory and democratic openness and informational transparency. Economically and legally, the intellectual property rights underlying standards should not be structured to hamper economic openness and should be available on a royalty-free or at least RAND basis. Finally, to promote and encourage access to knowledge, create efficiencies, and possibly enable greater competition and innovation, government technology procurement policies and corporate standards policies should favor open technical standards when possible.

³³ For example, see IBM's policy on open standards, announced in September of 2008, available at <http://www.marketwire.com/press-release/Ibm-NYSE-IBM-902622.html>

V. LIST OF ACRONYMS

A2K	Access to Knowledge
FTP	File Transfer Protocol
GPS	Global Positioning System
HTTP	Hypertext Transfer Protocol
ICT	Information and Communication Technologies
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force
IPR	Intellectual Property Rights
IPv6	Internet Protocol version 6
JPEG	Joint Photographic Experts Group
LAN	Local Area Network
MP3	MPEG Audio Layer 3
MPEG	Motion Picture Experts Group
NTB	Non-Tariff Barriers
RAND	Reasonable and Non-Discriminatory
UOF	Unified Office Format
SMTP	Simple Mail Transport Protocol
SSOs	Standards-Setting Organizations
TBT	Technical Barriers to Trade
VoIP	Voice of Internet Protocol
WAPI	Wireless Authentication and Privacy Infrastructure
W3C	World Wide Web Consortium
Wi-Fi	Wireless Fidelity
WSIS	World Summit on the Information Society
WTO	World Trade Organization