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The role of non-state actors in regime formation: Case study on Internet governance.

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Case Study on Internet Governance

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Abstract

Many scholars argue that the Internet is a symbol of globalization and avoidance of state control. The Internet governance negotiations, which aims to establish an international regime for the Internet, is conducted through a multi-stakeholder setting associated with extensive involvement of non-state actors. This has been viewed as an indicator for a 'diminishing state role' in international relations; particularly, formation of international regimes. This study indicates that the role of states does not diminish in regime formation. States, especially great powers, are the main actors that set international principles, norms, rules and decision-making procedures. They create regimes in order to regulate international behaviour as to global sectors, including the Internet. States deliberately enable certain non-state actors to participate in regime formation and governance of some global sectors, based on conscious perception of the utility and usefulness of such participation.

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List of Abbreviations and Acronyms

ACLU	American Civil liberties Union
ARPA	Advanced Research Projects Agency
BBN	Bolt, Beranek and Newman
BITNET	Because It's Time network
CCBI	Coordinating Committee on Business Interlocutors
ccTLD	Country Code Top-Level Domain
CDA	Communications Decency Act
CORE	Council of Registrars
DNS	Domain Name System
EARN	European Academic and Research Network
gTLD	generic Top-Level Domain
gTLD-MoU	generic Top-Level Domain Memorandum of Understanding
IAB	Internet Architecture Board
IANA	Internet Assigned Numbers Authority
IAHC	International Ad-Hoc Committee
ICANN	Internet Corporations for Assigned Names and Numbers
ICB	International Cooperation Board
ICCB	Configuration Control Board
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force
IFWP	Internet Forum on the White Paper
INRIA	National Institute for Research in Computer Science and Control
INWG	International Network Working Group
IRG	Internet Research Group
ISO	International Standardization Organization
ISPs	Internet Service Providers
ITRs	International Telecommunications Regulations
ITU	International Telecommunication Union
MAG	Multi-stakeholder Advisory Group
NRO	Numbers Resource Organization
NSF	National Science Foundation
NSI	Network Solutions Incorporated
OSI	Open Systems Interconnection
RFCs	Request for Comments
RIRs	Regional Internet Registries
SRI-NIC	Stanford Research Institute, Network Information Center
TCP/IP	Transmission Communication Protocol/ Internet Protocol
TLD	Top-Level Domain
UDRP	Uniform Domain Name Dispute Resolution Policy
W3C	World Working Group on Internet Wide Web Consortium
WCIT	World Conference on International Telecommunication
WGIG	Working Group on Internet Governance
WIPO	World Intellectual Property Organization
WSIS	World Summit on Information Society
WTO	World Trade Organization

Chapter 1

The Research Design

I. The research problem

States have been able to establish international regimes with effective verification systems employed to ensure compliance with the agreed rules and norms. International cooperation is manifested throughout various issue-areas such as nuclear non-proliferation, international trade, intellectual property, environment, human rights...etc. While globalization and complex interdependence magnified the need for more global cooperation in order to set rules and norms for the growing global interaction in various sectors, transnational non-state actors have emerged as significant players on the international scene. Does the emergence of these actors lead to a diminishing role of states in setting international rules and norms? In other words, with globalization, does the role of the states in forming international regimes diminish? This study seeks to answer this question.

In this context, this study analyzes the role of states and non-state actors in forming international regimes, through a close examination of the 'Internet regime' case. This case is chosen for a number of reasons. First, the Internet has been rarely addressed from the perspective of international relations, and less so from a theoretical perspective. Second, the Internet regime seems, at the onset, to be a favorable case to the thesis of a 'diminishing state role'. The Internet itself is a symbol of globalization and avoidance of state control, and the Internet regime's negotiations are conducted in what could be called *multi-stakeholder*[1] settings, where non-state actors participate extensively in the formative process of the regime. Understanding the relationship between the role of states and non-state actors in such a configuration could be informative about governance of comparable global sectors. This, in turn, could improve our understanding of the dynamics of global governance. Furthermore, this helps explore the complexities associated with modes of governance that involves both state and non-state actors. Moreover, this study seeks also to reveal certain complexities associated with the Internet, which becomes an increasingly important topic of international relations with its apparent political, economic, social impact across the world.

The Internet began as a project of the United States' government in the 1960s. Currently, much of its governance is de-facto undertaken by the Internet Corporation for Assigned Names and Numbers (ICANN), which has been delegated to operate the Internet through a federal contract with United States' Department of Commerce. ICANN adopts a self-regulation model for formulation of

[1] 'Multi-stakeholderism' refers to involvement of all stakeholders, including state and non-state actors, in regime formation.

the Internet-related policies. With the worldwide spread of the Internet and its increasing importance, the international policy coordination on Internet-related issues has become inevitable. In addition, demands have been made for a more universal governance of the Internet. The appropriate framework for such governance is still a contentious issue on the agenda of the relevant international debate.

Whereas the Internet is de-facto administered by ICANN, demands to form an international regime for the Internet emerged during the United Nations World Summit on Information Society (WSIS)[2]. Throughout WSIS, the United States defended ICANN's status quo and insisted that the Internet has to be out of any governmental control, refusing to address its governance-related issues through intergovernmental negotiations. On the other hand, several countries argued that Internet governance should be addressed through intergovernmental processes under the auspices of United Nations. Many of those countries opposed managing the Internet through ICANN, which is a private non-governmental corporation subject to California state law.

Eventually, a compromise was reached through the summit's decisions to initiate discussions on Internet governance in 'multi-stakeholder' settings that involve both states and non-state representatives. The Internet Governance Forum (IGF) has been established and became the only forum mandated by United Nations to address Internet governance issues in a multi-stakeholder setting that involves states and non-state actors. It is clear that the process of forming the Internet regime is not exclusive to states. Non-state actors are 'formally' accredited to participate directly in the process, and their role is recognized as indispensable in the process of forming the Internet regime. Multi-stakeholderism became the basic principle upon which the international debate on Internet governance is conducted.

There is a lack of clarity on the reasons behind direct involvement of non-state actors in the process of forming an international regime for the Internet. It is not obvious whether such involvement reflects a new transformative trend of 'diminishing state role' in regime formation, or it is a conscious policy of the powerful states to promote their interests. In other words, it is not clear whether such involvement of non-state actors means that states are not anymore the key actors at the international level. In addition, the relationship between state and non-state actors seems complex in such configuration since the key state actors consciously defend participation of non-state actors. It seems ironic that states are deliberately conceding their jurisdiction and authority over setting the international rules. Moreover, it is not even clear why the Internet is de-facto administered by ICANN through a self-regulation model without any direct role for states in such arrangement.

[2] United Nations General Assembly Resolution 56/183 (December 21, 2001) endorsed holding of two phases of WSIS in 2003 and 2005.

Another complexity lies at the lack of clarity about the substantive issues to be addressed under the label of the 'Internet governance' that has been the term used in the literature to refer to the international debate on the Internet issues. The Internet involves many different issue-areas that range from technical administration of the Internet to the civil rights online. It seems difficult to group all these areas under one label. Thus, there is a need for conceptual clarity about substantive elements of what might constitute the 'Internet governance' or the 'Internet regime'.

Additionally, it is not clear whether the multi-stakeholder processes that recently created to address the Internet governance issues will affect the de-facto arrangements of the Internet administration or not. Furthermore, potential challenges associated with modes of governance that is based on 'multi-stakeholderism' seem complex. The multi-stakeholder approach to Internet governance and the discussion of the relevant issues in informal non-negotiating forums obscure the potential outcome of the regime formation process. It is not clear whether this process will lead to establishment of formal regime with legally binding instruments regulating international behavior, or informal one where compliance to the rules and norms is voluntary.

In the case of formal regime, the uncertainty about the entity that will assume the administration and enforcement function of the regime adds to the complexity. It is clear that administration of the upcoming regime by intergovernmental organization is not acceptable for the key actors. On the other hand, administration of the regime by a delegated non-state actor means that states will be subject to a private entity, which raises concerns about the legitimacy of such an arrangement. In the case of informal regime where compliance is voluntary, the sustainability and effectiveness of the regime might be in jeopardy due to the absence of the monitoring and enforcement mechanisms that limit the incidence of free riders. This thesis seeks to address the above-mentioned complexities.

II. Framing the research question

The particular question that this study seeks to answer is the following: is the role of states diminishing in the process of forming an international regime of the Internet? To which extent non-state actors could influence such a process? The following paragraphs seek to deconstruct this question in order to design the research in a coherent manner. Specifically, we will identify the exact issue-area of the Internet that will be addressed as well as the relevant actors to be examined.

The academic scholarship related to the Internet is relatively new, as it has emerged with the establishment of the Internet as a public forum during the 1990s. Most of the literature has used the label of 'Internet governance' to address the issues pertinent to the Internet. The Internet governance has been addressed from cross-sectional and multidisciplinary approaches that emerged from the

fields of communications, law, public administration, political economy, economics, international relations and others.

The parameters and scope of the Internet governance, as a concept, have not yet developed. The extreme decentralized structure of the Internet and its nature as a cross-jurisdictional arena involving many issue-areas makes it difficult to articulate mainstream definition of what could constitute the Internet governance. As we will illustrate in the literature review below, there is a broad spectrum within the literature on how to approach the concept. For instance, many studies have addressed the Internet governance as a regulatory and policy issue focusing on how governments regulate the Internet. Others focus on who has the overall authority and control over the Internet, but even those are different in identifying what exactly will be subject to such authority: the Internet physical infrastructure, its operation, or its content.

While this study focuses on examining the role of state and non-state actors in forming the 'Internet regime', the question that needs firstly to be answered is which regime? In other words, each regime is supposed to address specific issue-area or sector, so could we consider the Internet a stand-alone issue area? Could we consider the 'Internet governance' a synonym for the 'Internet regime'?

We argue that the Internet can not be limited to only one issue-area, and instead involves many issue-areas. This means that the Internet governance can involve many regimes such as electronic commerce, protection of intellectual property rights online, combating cybercrime, human rights on the Internet etc. The deconstruction of the Internet governance into the constituent issue-areas contributes to achieving a better conceptual clarity on what could constitute such concept. In short, the Internet governance is a broad concept that can involve many regimes of various issue-areas.

Thus, addressing the Internet from the 'regime' perspective requires identification of the issue area that will be subject to examination. The focus of this study will be on what we could call the *Internet architecture regime*, which concerns the operation and technical administration of the Internet. The Internet architecture, which we seek to define in chapter 3, lies at the core of the Internet governance since it is responsible for the smooth functioning of the Internet, and thereby affecting all activities performed over the network.

Therefore, this study draws a conceptual distinction between the 'Internet governance', and the 'Internet administration'. The former is a wide-ranging concept that involves all Internet issue-areas, while the latter is related to the management of the Internet architecture. Thus, the focus will be on examining the role of state and non-state actors in forming the Internet architecture regime.

In this context, this study avoids state-centric perspective, focusing instead on comparing the role of state and non-state actors involved in the process of forming that regime. Moreover, the study

takes a complimentary cognitivist approach that avoids rationalization of actors' preferences and interests, and focuses instead on the dynamics leading actors to establish the regime and the struggle among them in the regime-formation process.

Consequently, the study identifies the relevant actors that can influence the process of forming the Internet architecture regime. Reviewing the Internet history indicates that whereas the Internet had initially been an American governmental project, it has actually been developed by a group of researchers and engineers that have constituted an epistemic community, which we call the *Internet epistemic community*. Defining what constitute the Internet epistemic community, this study makes a conceptual distinction between such community and the Internet technical community that has been the label used by many studies to describe the technical groups associated with the Internet technology.

Members of the Internet epistemic community monopolized the administration of the Internet throughout its history by the favor of their knowledge and expertise in developing and maintaining the Internet architecture. It follows that the knowledge could have a significant explanatory power in understanding the dynamics related to the Internet architecture regime. In this vein, this study examines the institutions established by members of the Internet epistemic community; particularly, the Internet Engineering Task Force (IETF) and the Internet Society (ISOC), in order to indicate the extent to which they could influence the Internet administration. Throughout the study, the role of this epistemic community will be examined in the relevant processes related to the Internet governance.

Since the Internet architecture regime had been initially formed through domestic processes within the United States, the latter is the most pertinent state actor that should be examined. Therefore, we will examine the United States' stance towards the Internet governance in general and the Internet architecture regime in particular. We will explore the domestic dynamics that took place within the United States in order to indicate how its preferences and interests have been identified as to the Internet governance as well as how its perception of the Internet has been constructed. In this connection, the study investigates whether the Internet epistemic community has influenced the United States policy regarding the Internet architecture regime, and whether such an influence undermines the role of states in global governance of the Interent.

Moreover, the study examines ICANN as it represents the de-facto institution that administers the Internet architecture. ICANN embodies a new governance model that is based on self-regulation and multi-stakeholderism, as opposed to the traditional intergovernmental governance. Thus, we will explore the dynamics that led to the creation of ICANN as well as its role in governing the

Internet architecture. We also scrutinize the impact of the Internet epistemic community on ICANN's system.

Furthermore, the study investigates the international dynamics that took place over the Internet governance, particularly within the United Nations' intergovernmental processes. This indicates whether the domestic politics of the United States affected its international stance regarding the Internet governance. Moreover, we demonstrate how other state actors, particularly the European Union, view the Internet governance. This also highlights the tension between the traditional intergovernmental governance versus the new multi-stakeholder self-regulatory governance embodied in ICANN.

In summary, the Internet epistemic community, ICANN, and the United States are the actors that are examined along with the relevant intergovernmental processes related to the Internet governance. Hence, we can deconstruct the research question mentioned above into the following sub-questions:

- What is the Internet architecture? Who administer such architecture?
- How do non-state actors influence the process of forming the Internet architecture regime? Is the 'Internet technical community', represented by IETF and ISOC, a transnational epistemic community? What is the role of such community in the Internet governance? What are the values and principles of this community? How these values and principles have been reflected in the Internet architectural design? How could this community influence policy makers in different countries of the world? What are the factors that could lead to the involvement of non-state actors, in particular, the epistemic communities, in regime formation and/or management?
- What is the actual role of ICANN in the Internet governance? Could the self-regulatory system of ICANN sustain as a governance model for the Internet administration? Could such self-regulatory model acquire international legitimacy? How does ICANN deal with national governments of different countries? What is the role of Internet epistemic community in ICANN's system? What is the relationship between ICANN and the American administration? Could we consider ICANN's administration of the Internet an indication for 'diminishing state role' in global governance?
- How did the United States identify its preferences and interests as to the Internet? How does the United States perceive the Internet? Why does the United States support self-regulatory and bottom-up governance of the Internet architecture? Does the Internet epistemic community affect the United States policy regarding formation of Internet architecture regime? Why does the United States push for the direct involvement of non-state actors in the international

processes related to the Internet governance? Is this position a conscious policy to maintain the status quo, a reflection of domestic politics, or the impact of the Internet epistemic community?

- How the Internet governance has been addressed in the official intergovernmental processes? Did the international debate over the Internet focus on the Internet technical administration or extend to other areas of the Internet governance? How the American perception, preferences and interests, which have been constructed domestically, affect its international stance as to the Internet governance? Do non-state actors affect such processes? Could these processes result in intergovernmental arrangements regarding the Internet? What is the impact of such processes on the self-regulatory system of ICANN? What is the future of international cooperation regarding the Internet issues?

III. Hypothesis

Globalization and complex interdependence led to spread of transnational actors that can affect states' perception of their preferences and interests. The proliferation of technology-based sectors, such as the Internet, enabled certain epistemic communities, which own the technical knowledge and knowhow, to affect the relevant international policies related to these sectors as well as policymakers' perception of national interest. The degree of involvement of non-state actors in forming international regimes for global sectors depends on the characteristics of those sectors. Formation of regimes for technology-based and market-oriented sectors, including Internet, is associated with the extensive involvement of non-state actors**.**

However, states are still the overarching authority at the international level. States, especially great powers, are the main actors responsible for setting international principles, norms, rules and decision-making procedures. Their role is essential in forming regimes that regulate international behavior as to global sectors, including the Internet. Involvement of non-state actors in governance of global sectors and formation of the relevant international regimes does not mean a 'diminishing state role' in setting the international rules; it instead reflects states' perception of the utility of non-state actors' involvement. This, in turn, reflects the growing complexity of international relations, which has been associated with globalization and complex interdependence that enabled complex mutual interaction among state and non-state actors at both national and international levels.

In the case of the Internet, the Internet epistemic community has established and developed an international regime for the Internet administration under the patronage of the United States' government. The principles and values of such community as well as the

domestic dynamics contributed to shaping the American perception of the Internet as an open and free medium that should not be subject to governmental regulation and should be administered through multi-stakeholder arrangements. Such perception, which has spread to European states through the Internet epistemic community, is the basis of the American international stance as to the Internet. Thus, the multi-stakeholder administration of the Internet does not mean a 'diminishing state role'; rather, it reflects specific preference of the key states to involve non-state actors in the relevant arrangements, which is based on constructed perception of interests as to the Internet.

IV. Literature Review

As mentioned above, the Internet governance has been examined from cross-sectional and multidisciplinary approaches that emerged from different fields. Since the Internet has been rarely addressed from international relations perspective, this review encompasses scholarly works and studies from various fields.

Many scholars have focused on exploring how the technical aspects could affect the governance of the Internet. Lawrence Lessig (1999 and 2006) insightfully demonstrated that technical decisions on cyberspace have inherent political implications. He argued that cyberspace is governed by the code, which means that the design of the software programs can regulate the behavior on the Internet by the favor of the rules set into the architecture of these programs. Thus, the code is the law in cyberspace and the designers of the code are the authority that set the rules. The Internet users are obliged to comply with the rules set by the code.

Moreover, Lessig (2002) has formulated a conceptual framework that breaks up the Internet into three layers: the physical infrastructure layer (wires, cables, radio frequency spectrum etc.), the 'code' layer (software), and the content layer that is the most visible to the users navigating the Internet. While Lessig's insights have conceptually contributed to unveil certain conceptual ambiguities related to the Internet governance, he neither address politics related to the Internet nor various actors involved in the Internet governance dynamics.

Milton Mueller addresses the Internet governance from a 'regulatory' perspective focusing on how the Internet can be regulated. From this regulatory standpoint, Mueller paid too much attention to ICANN's as transnational regulatory authority of the Internet. Mueller (1999) focuses on the process that led to the creation of ICANN emphasizing the role of the Internet technical community in such process. Moreover, Mueller (2002) focuses on the role of ICANN in the Internet governance, from institutional economics perspectives, indicating the potential impact of its authority over the regulation of the Internet content. In addition, Mueller (2010) addresses the regulatory and legal

issues related the Internet as well as the potential challenges related to the Internet governance. Mueller's regulatory approach to the Internet governance and his focus on ICANN neglects the impact of the other actors on the Internet governance.

In line with Mueller's work, many studies have focused on examining ICANN from various perspectives. Lee (2008) addresses ICANN from the public administration perspective through systemic assessment of the factors and actors that influence ICANN's overall performance. Antonova (2006) considers creation of ICANN a step towards the establishment of a new governance paradigm for the digital environments, which embodies the neoliberal principles of market self-regulation. Pommerening (2004) examines the emergence and implementation of ICANN's two governance principles, which are coordination and representation. Klein (2002) indicates how ICANN can leverage its technical coordination functions to influence the global public policies related to the Internet.

Many studies focus on investigating the technical community that has developed the Internet. Abbate (1994 and 2000) demonstrates how the creators of the Internet have established a community associated with social common values. Abbate also indicates how the technical design of ARPANET, the predecessor of the Internet, has been shaped by the interests and values of such community, arguing that technical choices regarding the design of the network are the result of tradeoffs between competing values. Echoing Lessig's insights, Abbate further argues that the different networking designs can lead to different implications. Likewise, McTaggart (2004) examines such community from institutional perspective focusing on the future of the Internet self-governance institutions in the current hyper-commercial context. Both Abbate and McTaggart did not contextualize the role of the Internet technical community within the global debate on the Internet governance.

Domanski (2013) has developed Lessig's three-layer framework of the Internet into four-layer conceptual model, which breaks up the Internet into the layers of infrastructure, the technical protocols, the software applications, and the content. Approaching the Internet governance from a policy perspective, Domanski employs his conceptual model in order to identify the actors that can influence policies at each layer with a view to provide a comprehensive account for the actual governance arrangements of the Internet. Domanski's objective is to enable policymakers to utilize his model in order to formulate the appropriate Internet policies for each of the distinctive policy arenas conceptualized by his model. In this context, Domanski employed his model in order to investigate the post 9/11 United States' national cyber-security policy through his model. While Domanski highlights the multiplicity of actors involved in the Internet governance, he strictly addresses them from policy perspective. Domanski's policy approach addresses each layer, and

accordingly its policy actors, as stand-alone arena without addressing the dynamics and processes that involve all these actors in the global context of the Internet governance.

While the above-mentioned scholars and researchers have contributed to a better understanding of the Internet complexities, they did not address the Internet from the international relations perspective. They focus exclusively on the technical and regulatory issues of the Internet without paying attention to the international dynamics related to Internet governance. They neglect the intergovernmental processes that addressed the Internet governance internationally such as the United Nations' WSIS. Most of those studies focus their analysis on non-state actors; particularly, the Internet technical community and ICANN, without addressing their interaction and relationship with state actors.

Other studies consider the Internet a manifestation of globalization that challenges the primacy of states. Shah (2009) examines how metaphors of globalization influence the global governance of the Internet arguing that globalization works as a constitutive force that shape the relevant institutions and policies. Simon (2006) examines the Internet governance debates that took place during the mid 1990s, arguing that the rise of the Internet challenges the international system of sovereign states.

On the other hand, many researchers have addressed the Internet from a state-centric perspective asserting the primacy of states regarding the Internet governance. Drezner (2004) explores whether globalization and the Internet undermined the role of states in regulating the global economy arguing that great powers remain the key players in handling political and social issues created by the Internet and globalization. He contends that states could consciously delegate regime management to non-state actors making them acting as "agents of state interests." Drezner presents a model for global governance based on the distribution of state interest and power, examining how this model can explain several regulatory issues of the Internet. He concludes that whenever states agree about regulatory outcomes, great powers prefer delegating management of the regime to non-state actors. Instead of conducting a deep analysis and careful examination of the real dynamics that took place within the context of the Internet governance, Drezner provides an account that rationalizes the state actors' behavior. He presents a rational interpretation of the actors' preferences and interests instead of examining the dynamics that led these actors to identify their preferences and interests. Moreover, his interpretation about great powers' preference to delegate regime management to non-state actors contradict with the fact that most of the international regimes are administered by intergovernmental organizations.

Similarly, Bhuiyan (2010) addresses the Internet governance from a state perspective focusing on the role of postcolonial states of China, India, Brazil, South Africa, Iran, Tunisia and Cuba on global Internet policy issues versus that of the United States. He examines the dynamics that took place during the WSIS. Bhuiyan argues that the global Internet policy making in various issues is a power struggle between the United States and these postcolonial states. He further argues that although influence of non-state actors influence on global communication policymaking has increased, states still hold decision-making power. Bhuiyan's exclusive focus on WSIS neglects other processes and dynamics that significantly shape the global Internet governance.

Focusing on WSIS dynamics as well, Kleinwachter (2004) demonstrates the controversy between those who support managing the Internet by ICAAN, and others who want to delegate this management to an intergovernmental organization. Kleinwachter concludes that the current era is characterized by a transformation from the old governance system, where states have been the sole actors, to a new governance system where there are additional stakeholders and new players other than states. Kleinwachter's work is largely descriptive.

It is worthy to note that WSIS has been addressed from various perspectives. Shtern (2009) examines how the international debate on Internet governance launched within WSIS affects the public interest in communication. Pickard (2007) analyzes continuities and changes in global communication policy during the last four decades comparing UNESCO debates in the 1970s with the recent WSIS in 2005. Pickard argues that changes in the global communication policy are a reflection of changes in the global power relations concluding that global communication system is dominated and structured along neoliberal lines, which favors expansion of transnational corporations over social necessities.

One of the outcomes of WSIS has been the establishment of Internet Governance Forum (IGF). Epstein (2012) analyzes the dynamics that take place within IGF. He argues that IGF reflects the tension between the nation-state-centric and the Internet-community-centric perceptions of authority, indicating how it contributes to establishing specific political and cultural norms regarding the Internet governance.

Some studies have addressed the Internet governance from state-centric perspective but focusing on examining the policies of specific states. Kiggins (2011) examines the American policy as to the Internet focusing on how it succeeded to achieve consensus among major economic powers for making the Internet a duty-free commercial forum. He argues that this policy reflects the embedded liberalism of the United States and its long-term policy of expanding its political ideals and gaining market access overseas. While Kiggins has used the label of Internet governance, his study addresses only the American policy regarding e-commerce on the Internet.

Likewise, Berleur (2008) reviews certain policy documents of the United States and the European Union regarding the Internet. He indicates that those policies are fundamentally economic and market-oriented lacking social and cultural considerations.

Marcus Franda (2001) addressed the Internet governance from the perspective of regime theory, arguing that governments of the developed countries, particularly the United States and the European Union, and the private sector have developed rules needed for maintaining the smooth operation of the Internet. This led to the emergence an international regime for the Internet, which is reflected through international agreements between governments over a number of Internet issues. Franda argues that international regimes are being established on certain Internet issues such as domain-name registration; taxation and e-commerce; intellectual property; privacy; content regulation; and Internet security. He focused on how coordination took place in many venues by multiple actors both public and private.

Franda does not examine how state actors have constructed their preference and interests as to the Internet governance. Moreover, he focuses on formal processes and institutions ignoring the informal dynamics as well as role of the technical community that developed the Internet. Seeking to present a holistic perspective of the Internet governance, Franda treats all the Internet issue area as one international regime called the 'Internet regime.' However, the multiplicity of the issue-areas related to the Internet and the different configurations of actors influencing theses areas makes it difficult to put all the Internet issues under a label of one regime.

This study addresses the Internet from pluralistic perspective through examination of the influential state and non-state actors and their respective roles as to the de-facto administration of the Internet and the forming regime of its architecture. Moreover, we will examine the relationship among these actors and the impact of each one over the others, and how such dynamics have been reflected in the ongoing international debate related to the Internet governance. This study emphasizes the impact of knowledge in formation and administration of the international regimes.

V. Theoretical framework

The scholarship on international relations was mainly divided between realists and liberals who see the world from different perspective. While realists view conflict as the inevitable norm of international relations due to the anarchy, liberals believe in the possibility of international cooperation and the impact of international institutions and regimes on international behavior. Regime theory, which focuses on international institutions and international cooperation, has originated from the liberal mainstream. Since the Internet represents an international cooperative facility, regime theory is an appropriate

theoretical framework to address the relevant issues. However, regime theory takes state-centric perspective as well as rationalist systemic approach to theory, which may not be sufficient to address the multiplicity of actors, particularly non-state actors, involved in the Internet issues. Moreover, the Internet is a technology-based sector where the technical knowledge could have an explanatory power regarding the dynamics related to the Internet. In this context, the notion of "epistemic communities" and their impact on policymakers is an appropriate supplementary component to regime theory, which can be employed to address the Internet from a holistic theoretical framework. In this connection, the following paragraphs briefly review different approaches to international regimes indicating the reasons behind our choice of regime theory, supplemented by the notion of "epistemic communities", as the theoretical framework of this study.

Stephen Krasner (Krasner 1983) defines regime as "a set of explicit or implicit principles, norms, rules, and decision making procedures around which actor expectations converge in a given issue-area." Krasner introduces a variety of causal variables for the formation and development of regimes. The two most exogenous variables are egoistic self-interest (usually economic), and political power. The third variable includes norms and principles, which can contribute to creation and development of a regime in a specific issue area without being directly related to that issue area. The last two sets of causal variables are usage and custom, and knowledge, which are not considered by Krasner as exogenous variables capable of creating a regime by themselves; rather "they supplement and reinforce pressures associated with egoistic self-interest, political power, and diffuse value."

In an attempt to integrate theories of international regimes, Hasenclever, Mayer, and Rittberger (1997) present exhaustive review of the international regime literature, in which they mention three theoretical approaches to understanding international regimes: *power-based, interest-based,* and *knowledge-based* approaches. The difference among those approaches lie in the explanatory variables that each one emphasizes. In this connection, Hasnclever, Mayer, and Rittberger view three schools of thought within the scholarship of international regimes: realists, who base the analysis on power relationships among actors; neoliberals, who focus on constellations of interests; and cognitivists, who emphasize the role of knowledge dynamics, identities and communication. They argue that the major difference which separates the three schools of thought is the degree of 'institutionalism' that each school tends to adopt. By 'Institutionalism' they mean the degree to which international institutions, such as regimes, matter. They concluded that each of the three theoretical approaches has explanatory power in certain situations and the field of

international regimes would be better off by understanding which approach apply into which kind of cases.

Moreover, they argue that there is a potential progress that could be achieved towards an inter-paradigmatic synthesis of the three theories. In a subsequent article Hasenclever, Mayer and Rittberger explore the possibility to synthesize theories of international regimes. They concluded that realism and neoliberalism could be linked to form "a unified rationalist theory of international regimes." Because neoliberalism and realism consider actors' interests as exogenously given, they suggest 'weak cognitivism' to supplement the gap exist in rationalist theorizing. On the other hand, they are skeptical about the possibility of integrating radical variants of cognitivism into rationalist approaches due to the sharp disagreement between them with regard to both ontology and epistemology (Hasenclever, Mayer and Rittberger 2000, 3-33). In the case of the Internet, the multiplicity of actors involved in the relevant dynamics makes such integrated or synthesized approach, between rationalist theorizing and weak cognitivism, an appropriate theoretical framework for addressing the Internet architecture regime as further elaborated below.

Realists or power-based theories of international regimes question the significance of regimes in the context of international relations due to their focus on the international anarchy that force states to care only about distribution of power in the international system. Realists assume that states are not only interested in absolute gains from international cooperation but also about the relative gains, which made them skeptical about the role of regimes in international affairs.

Neoliberal or interest-based theories of international regimes, *from which 'regime theory' has originated*, highlights the role played by international regimes in helping states to attain common interests. Unlike realists, they adopt an institutional perspective viewing regimes as both resilient and effective. However, neoliberals adopt realist assumptions viewing states as rational egoists who act only to achieve their own absolute gains. Consequently, 'neoliberal institutionalism' is considered by many scholars to be bounded because they apply rational mode of thinking, which treat actors' interests and identities as exogenously given and thus unaffected by institutions.

Within the neo-liberal approach, Robert Keohane authored one of the most elaborate theories of international regimes that is called 'functional' theory of regimes, which sometimes equated with 'regime theory' itself. The label 'neoliberal institutionalism' has been associated with Keohane's theory due its focus on the increasing institutionalization of

international behavior (Keohane 1989, 1-20). Keohane (1984, 1986 and 1989) intentionally approves realist assumptions through acknowledging the centrality of states as key actors in international politics and the impact of international anarchy on inter-state interactions including their ability to cooperate. Moreover, Keohane seems to accept realism's assumption about the basic motivation of states, viewing states as rational egoists who act to promote their own interests. Keohane consciously ignores the potential impact of the units' domestic attributes on the choices of actors adopting instead a systemic approach to theory that focuses on the external structural state of affairs under which governments make foreign policy decisions. However, he emphasizes the significant impact of international regimes on international political context opposing the realist approach in this regard.

Keohane clarifies that his theory of regimes functions under a particular situational precondition: the states that are involved in an issue-area must share common interests, which can only be achieved through cooperation. While he focuses on issues of international political economy and on relations among western countries, he argues that his theory will apply whenever common interests exist among states. Agreeing with Keohane's arguments, Arthur Stein (1983) asserts that "the same forces of autonomously calculated self-interest that lie at the root of the anarchic international system also lay the foundation for international regimes as a form of international order…there are times when rational self-interested calculation leads actors to abandon independent decision making in favor of joint decision making." One implication for Keohane's presupposition of common interests among states active in a specific issue area is that actors' interests are not explained within the theory, but are taken as exogenously given.

Extending the scope of Keohane's theory, Arthur Stein, Duncan Sindal, Kenneth Oye, Michael Zurn, and Lisa Martin adopt a game-theoretic orientation relative to international regimes in so-called situational-structural approach. Those scholars argue that the 'strategic' nature of the situation in which states make their decisions and choices about institutions and cooperation should be considered as key variable. They employ various game-theoretic pay-off structures in order to account for creation and development of international regimes (Hasenclever, Mayer and Rittberger 1997, 45-58).

In this context, neo-liberal approach in general, and regime theory in particular, can account for the emerging need to establish a more globalized governance of the Internet administration, since all states have common interest in preserving its smooth function. Even the United States, which maintains hegemonic status over the Internet administration, has an interest in broadening the international participation regarding the Internet

administration in order to avoid fragmentation of the global network if other states will have decided to create their own 'Internet'. However, regime theory could not account for adoption of multi-stakeholder governance to the Internet administration. With its systemic approach to theory that focuses on the structural forces of the International system, regime theory could not account for formation of a regime for the Internet administration by the non-state actors that developed the Internet throughout its history. The Internet architecture regime was not a product of inter-state interaction; rather, it has been recently dragged into inter-state dynamics. The state-centric view of regime theory makes it difficult for its neo-liberal approach to address the relevant dynamics of this regime. Thus, the gap of rationalist state-centric theorizing needs to be supplemented in order to enable addressing the Internet architecture regime through a more appropriate theoretical context. Knowledge-based theories of regime or cognitivism, particularly weak cognitivism, is helpful in this regard.

Cognitivism tends to adopt institutionalism that is much more emphasized than that found in either realism or neoliberalism. Cognitivist approach to regimes consider that rationalist reasoning lacks the ability to provide convincing accounts for major changes in the history of international relations. Cognitivists focus on states' perception of their interests emphasizing the role of causal as well as ideational and normative forces. Thus, part of cognitivists' contribution might be viewed as complementary to the rationalist neoliberal theory as to regime analysis, through formulation of a theory of preference formation in order to fill a gap in neoliberal theorizing. This strand of knowledge-based theories is sometimes referred to as 'weak cognitivists'. However, some cognitivists, so-called 'strong cognitivists' go deeper suggesting that a sociological perspective is better than rational choice in accounting for the institutionalism and its role at the international level. They criticize the failure of interest-based approaches to take adequate account of the impacts of institutionalized practices on the interests and identities of international actors (Hasenclever, Mayer and Rittberger 1997, 136-210).

Weak cognitivists assert that "between international structure and human volition lies interpretation." (Adler and Haas 1992, 367). Before decisions regarding cooperation can be made, interests and preferences must be identified and circumstances have to be assessed. Consequently, interpretation is assumed to depend on the body of knowledge held by the actors at a given place and time. This knowledge constructs the actors' perception of reality and clarifies linkages between causes and effects for the decision makers. Thus, weak cognitivists reject to see actors' interests as simply given, rather, preferences are to be viewed as contingent on how actors understand and perceive the social world. They attempt

to analyze the process of preferences and interest identification before rational decisions are made. In summary, weak coginitivists share the assumption that "knowledge actors carry in their heads and project in their international encounters significantly shapes their behavior and expectations" (Haas 1990).

Along with the increasingly technical nature of international issues, there is growing need on the part of decision makers for reliable knowledge and scientific information in order to reduce uncertainties about interests and how they can be realized. With the complex interdependence, politicians lack the ability to assess the consequences of their decisions; they need advice of the scientists and other experts in order to crystallize their interests as well as to determine the appropriate course of action. Thus, scientists and experts who have the ability to provide the desired knowledge and the relevant advice can influence the decisions made by politicians (Adler and Haas 1992, and Haas 1992).

Weak cognitivists assert the necessity to integrate scientific knowledge and moral concerns as independent explanatory variables into the theory of international relations. Sometimes new ideas and knowledge resulted in changes of beliefs, which may or may not bring about behavioral change of the actors (Nye 1987, 378-382). If the behavior changes, this process is referred to as learning. Joseph Nye (1987, 380) conceptually differentiates between 'simple' and 'complex' learning: "Simple learning uses new information merely to adapt the means, without altering any deeper goals in the ends-means chain. The actor simply uses a different instrument to attain the same goal. Complex learning, by contrast, involves recognition of conflicts among means and goals in causally complicated situations, and leads to new priorities and trade-offs." The concept of complex learning is particularly important for weak cognitivists because it sheds the light on how states redefine their interests and alter their preferences in reaction to new knowledge and ideas. Therefore, weak cognitivists focus on actors' behavioral change as a result of cognitive change as opposed to the change that takes place as a response to structural dynamics such as the distribution of power and wealth which is emphasized by the rationalist theories.

For knowledge to have an influence on the process of regime formation, it must be widely shared by key decision makers. Building on this view, Peter Haas has focused on the process through which the views of scientists and experts are channeled to, accepted, and acted upon by policymakers. In this context, he employs the concept of *epistemic communities*, which is defined as "networks of professionals with recognized expertise and competence in a particular domain and authoritative claim to policy-relevant knowledge within the domain or issue-area" (Haas 1992, 3). Moreover, Haas argues that epistemic

communities are significant "channels through which new ideas circulate form societies to governments as well as from country to country" (Haas 1992, 27). Hass elaborately discusses the potential impact of those epistemic communities on the process of regime formation and framing of the relevant issues.

In the case of the Internet architecture regime, knowledge can be considered an important aspect that has potential explanatory power in understanding the dynamics of the regime formation. In this context, weak cognitivisim could compensate for shortcomings of the regime theory. It allows exploring domestic attributes of the actors, particularly, the United States, within which the Internet architecture regime has been established and developed. This focus on the domestic dynamics help analyze the process of preferences and interest identification that led the United States to relinquish its authority over administration of the Internet and to adopt multi-stakeholderism as a basis for governing the Internet architecture regime. It also indicates how those identified preferences and interests have been reflected in the American international stance regarding Internet governance. Moreover, weak cognitivism allows focusing on non-state actors; particularly, the Internet epistemic community, and its role in developing principles, norms, and rules of the Internet administration, as well as its transnational impact on promoting multi-stakeholderism as a basis for the Internet administration. The concept of epistemic communities is useful in analyzing the role of the Internet epistemic community taking into consideration the technical nature of the Internet-related issues.

Thus, while insights of the regime theory, which has originated from neo-liberal or interest-based approach to regimes, would be useful in providing an account for the emergence of inter-state cooperation regarding Internet governance, including preservation of the smooth functioning of the Internet, weak cognitivism would be helpful in explaining the extensive involvement of non-state actors in the Internet administration. Therefore, integrating regime theory and weak cognitivism, this study takes a pluralistic approach examining the role of states and non-state actors in forming the Internet architecture regime, which set the principles, norms, rules and decision-making procedures for the Internet technical administration.

VI. Methodology

In addition to secondary sources, which include multidisciplinary academic literature on the Internet-related issues, the empirical basis of this study is material gathered from primary sources. Most of this material is original documents related to the actors that are examined. Specifically, the

technical and policy documents of IETF and ISOC, the relevant policy documents of the United States, and the bylaws and regulations of ICANN are investigated. The analysis of these documents aims at clarifying how each actor has identified its preferences and interests as to the Internet as well as its relationship to the other actors. Moreover, this document analysis indicates the relative impact of each actor on the others. Such analysis is supplemented by analysis of the relevant contextual processes and events, which characterize the evolution of each actor's perception as to the Internet. In addition, the original documents of certain official international events that discussed Internet governance issues are also analyzed in order to indicate how the previously identified preferences of actors have affected their International stance during such events as well as to explore the potential impact of these events on the de-facto Internet architecture regime. The following paragraphs briefly introduce the chapters of this study and elaborate on the documents used in the analysis.

Chapter 2 presents a brief chronological history of the Internet focusing on some milestone events that led to its status as global public facility with a view to_highlight the key actors that have historically participated in the development of the Internet; particularly, the United States and the Internet epistemic community.

Chapter 3 aims at demonstrating how the Internet operates through identifying the core architectural components that guarantee its functionality. The chapter seeks also to conceptualize the Internet epistemic community and to demonstrate how it has developed the Internet architectural components and the relevant administration system. The chapter examines the technical documents issued by IETF, which set the rules and standards for operation of the Internet. Since IETF has been the dominant standards-setting organization for the Internet throughout its history, its documents include all the details related to the design of the Internet's architecture. Moreover, IETF's documents represent the sole archive that documents the evolution of the Internet technical system and its administration since the establishment of the Internet until now.

Chapter 4 aims at further clarifying the role of Internet epistemic community on shaping the overall Internet system and its governance principles with a view to indicate the extent to which technical knowledge can be a powerful instrument employed to impose specific values on the Internet architecture regime. The chapter examines the institutions that represent the Internet epistemic community; namely, IETF and ISOC. In addition to analyzing the relevant IETF's documents, we analyze ISOC's bylaws, policy documents and publications.

Chapter 5 aims at understanding the premises of the United States' stance towards the Internet governance in general and the Internet administration in particular. The chapter seeks to account for the United States international position that opposes governmental control on the Internet and

promotes instead the self-governance model, and to indicate the extent to which the Internet epistemic community has contributed in shaping such position. The chapter examines the domestic dynamics through which the United States' preferences and interests have been identified as to the Internet. The analysis focuses on the dynamics that took place during the 1990s, which witnessed a transition from the informal ad-hoc administration of the Internet monopolized by the epistemic community into a more formal framework with the establishment of ICANN. We analyze the policy documents issued by the Untied States government regarding the Internet. These documents include the "Green Paper", the "White Paper", the "United States Global Framework on Electronic Commerce", and the "Presidential Directive of July 1, 1997." Additionally, we conduct a comparative analysis between the substantive elements of the epistemic community's document - known as "generic Top-Level Domain Memorandum of Understanding (gTLD-MoU)" – and the above-mentioned policy documents of the United States in order to indicate the extent to which the epistemic community has influenced the American policy regarding the Internet. Along with this document analysis, some of the key events that have shaped the United States' perception as to the Internet are highlighted. Since the United States exerted international efforts to establish specific international regimes related to the Internet – which goes beyond its technical administration - in the World Trade Organization (WTO) and the World Intellectual Property Organization (WIPO), we analyze certain relevant documents issued by these organizations. The WTO documents are entitled "The Geneva Ministerial Declaration on Global Electronic Commerce" and "Work Program on Electronic Commerce." The WIPO document is entitled "The Advantages of Adherence to the WIPO Copyright Treaty (WCT) and the WIPO Performances and Phonograms Treaty (WPPT)."

Chapter 6 aims at exploring the governance framework of the new Internet architecture regime through examining ICANN's system and its evolution as well as the relevant key players. The chapter seeks to foresee whether ICANN's self-governance model could be sustained as a model of international governance. We analyze ICANN's bylaws of 1998 and the amended version that is currently in force, as well as other several documents and publications issued by ICANN. We also analyze the consecutive contractual agreements signed between the American government and ICANN, whereby the latter is delegated to administer the Internet. Moreover, we briefly review certain well-established regimes that have been formed and currently administered by both state and non-state actors in order to explore whether ICANN's multi-stakeholderism could sustain as a global governance model.

Chapter 7 aims at demonstrating the intergovernmental dynamics that took place regarding Internet governance and whether the outcomes of such dynamics could lead to establishment of international regimes related to the Internet. The chapter also seeks to indicate the extent to which

such dynamics could affect the self-governance principle of the de-facto Internet architecture regime administered by ICANN. The chapter examines the key international events that have addressed Internet governance; namely, the United Nations WSIS and the World Conference on International Telecommunication (WCIT), which was recently held by the International Telecommunication Union (ITU) in 2014. This will be followed by a brief review of the dynamics and progress made within the two distinct processes created by WSIS to address Internet issues; namely, Internet Governance Forum (IGF) and 'enhanced cooperation'. We analyze variety of WSIS's documents, including outcome documents, as well as written transcripts and online-streamed audio recordings for the meetings held throughout the preparatory process of the two phases of WSIS focusing on statements, comments, proposals, which have been officially delivered and submitted by various actors throughout such process. Moreover, we analyze certain relevant documents of the United Nations Commission for Science and Technology (CSTD)[3], certain documents of IGF. We also provide an account for the discussion that took place within 'enhanced cooperation' track of WSIS on the basis of interviews – which are conducted in Geneva from April 30 to May 2, 2014 - with certain delegations that participated in the relevant meetings. Finally, we analyze the official proposals and archived transcripts of WCIT's sessions as well as the outcome documents of the conference.

[3] CSTD is a subsidiary body of the United Nations Economic and Social Council mandated to follow up the outcomes of WSIS.

Chapter 2

Brief History of the Internet

This chapter presents a brief chronological history of the Internet highlighting the key actors that have historically developed the Internet; particularly, the United States government and the Internet epistemic community. It focuses on some milestone events that led to the current status of the Internet as global public facility associated with dramatic social, economic, and political implications.

The chapter categorizes the Internet history into three phases. The first phase witnessed the creation of the Internet predecessor, ARPANET, by the United States' Advanced Research Projects Agency (ARPA). During this phase, an epistemic community of engineers and researchers - who were recruited, contracted, or financed to work on ARPANET project - had emerged and continued to evolve over the course of Internet history. The work of such community's members on ARPANET project contributed in constructing the American government's perception regarding ARPANET successor, the Internet.

The second phase was associated with a transition from defense-related networking into academic and scientific-related networking. During this stage, the focus of ARPANET project shifted from establishing a military-based network into creation of a broader academic and scientific facility in order to connect universities and research centers across the United States. Several networks have been connected to ARPANET comprising what became known as the Internet. Significantly, the architectural components of the Internet, which currently ensures its functioning, had been established with the invention of the Transmission Communication Protocol/ Internet Protocol (TCP/IP) and the Domain Name System (DNS). Moreover, the epistemic community that has emerged during the initial design of ARPANET began to develop an informal institutional framework for its activities.

The third phase was characterized by spread of public access to the Internet and proliferation of commercial activities over the network. The Internet became an international public facility providing opportunities for content creation by its users as well as profit-making business for start-up companies and big corporations. With invention of social networking, the Internet became a social and political medium for communications and information sharing. The private sector led the evolution of the Internet during this phase. Furthermore, the Internet epistemic community has established formal organizations to promote its views and values about the Internet. Those organizations became the dominant institutions that set the Internet standards and maintain its architecture.

Three phases of the Internet evolution

I. Creation of ARPANET: emergence of an epistemic community from military-sponsored project

The Internet has begun as a government-controlled investment in the national defense of the United States. The Cold War made scientific research a matter of national defense for the United States, especially after success of the Soviet Union to launch the first satellite, Sputnik, in 1957. This advancement of the Soviet in the space race created a robust national commitment to science, leading to creation of the Advanced Research Projects Agency (ARPA)[4] (Keefer and Baiget 2001, 90-95).

After the creation of NASA, the mandate of space exploration was removed from ARPA, forcing the latter to begin exploring development of computer-related technology. The scarcity of ARPA's computer resources, along with its extensive research on connecting computers across long distances, led to the creation of ARPANET, the first multicomputer network. With focus of ARPA on issues that were not strictly defense-related, the institution began in 1960s to establish professional relationships and close ties with researchers of computer science departments at universities across the Untied States. In this context, the idea of a network that would link people at distance emerged (Moschovitis 1999, 34-43).

The creation of ARPANET took almost a decade paving the way for its successor, the Internet. In 1963, Joseph Licklider, head of ARPA's command and control division, began to promote his idea about developing integrated computer network shifting the focus of his division from defense-related information processing into time-sharing systems[5] and computer technology (Kita 2003, 62-77). Licklider's successor, Robert Taylor, focused on a more specific plan to create network of computers that can connect various research centers aiming at bringing researchers together. The plan was implemented from 1966 to 1969 leading finally to establishment of ARPANET (Abbate 2000, 45-46).

In order to implement the plan, ARPA contracted academic institutions as well as private firms in order to accomplish the required tasks needed to build the network. The academic institutions involved in the implementation of the plan hosted the four initial sites to be connected to the network (Federal Communications Commission 2007, 35-64). Thus, while ARPA staff initiated and managed the project, academic and industry contractors undertook the actual research and

[4] In 1972, ARPA was established as a separate defense agency under the Office of the Secretary of Defense and its name was changed to DARPA (Defense Advanced Research Projects Agency). In 1993, DARPA was re-designated as ARPA, most probably to show commitment to scientific research that would benefit both civilian and defense industry. For the sake of consistency, this study uses ARPA throughout this work.

[5] These systems allow many people, on separate terminals, to use a single computer simultaneously.

development (Abbate 1994, 3). This led to emergence of epistemic community that began to acquire knowledge and accumulate experience about networking technology.

Many graduate students from the contracted academic institutions had extensively participated in implementation of the network outline. ARPA provided sustainable funding for those students (Aspray 1989, 19). Those graduates of ARPA-funded programs became a main source of computer science and networking faculty at American universities, thereby expanding ARPA's community into the next generation of computer scientists and researchers (Norberg and O'Neill 1996, 290-291). The participation of those students is even claimed to be an important factor in shaping the anarchic structure of ARPANET and, consequently, of networking communities in general (Moschovitis 1999, 62).

Although the huge financial resources of ARPA has been the driver for attracting many researchers and computer scientists to ARPANET project, managers of ARPA did not conduct their relations with those researchers on a merely contractual, financial basis. Rather, ARPA relied on cooperative arrangements rather than on contractual terms, and technical decisions were usually taken by consensus. Decentralized, informal, and collegial approach characterized the organizational culture of ARPANET project. The network itself enabled coordinating scattered activities and provided a meeting place for the researchers' community. This management style of ARPA helped to create a sense of community among its researchers that began to share common values and goals. Furthermore, ARPA used to recruit most of its directors and project managers from the promising researchers at universities, who subsequently maintained relations with their previous colleagues in order to explore new ideas and to recruit active researchers. Moreover, many project managers who were recruited from ARPA's contractors stayed only few years at ARPA and then returned to academia or private business (Abbate 2000, 54-69).

This management style of ARPA fostered the expansion of the emerging epistemic community outside ARPANET project. Moreover, the movement of the engineers and researchers from ARPA to academia or industry, and vice versa, helped to sustain a mutual interaction and strong relationship between such community and ARPA management[6].

It is clear that ARPA, in its quest to develop networking technology through ARPANET project, established close ties with the academic community and industry contractors, recruited computer scientists and researchers, hired consultants, contracted companies, funded research and experiments in the research institutions as well as in the corporations. Although the trigger of such interest in computing and networking technology was the national security concerns of the time, the

[6] Appendix I enlists some of the Internet pioneers indicating how they moved from government to academia and industry and vice versa.

approach followed by ARPA led to the emergence of epistemic community of networking engineers whose original members had been either recruited, contracted, or financed by ARPA. This community, which expanded outside ARPA, acquired the knowledge about networking technology and developed specific values and norms. Moreover, it had sustained the relationship and mutual interaction between the government (represented by ARPA), the academia, and the industry within the United States. This has created solid ground for further cross-fertilization of ideas among those actors.

Since members of such community conducted the actual research and development of ARPANET, their views and ideas have largely influenced the perception of the United States' government regarding networking and subsequently its stance as to the Internet. The technical elites; who had been recruited, contracted or financed by government projects of ARPA; were able to diffuse their principles and values within the government agencies that recruited or contracted them. Since the networking concept was nascent, there was broad space for those elites in shaping the perception of the relevant governmental authorities of the United States. This argument can be substantiated by the above-mentioned fact - which continues in the context of today's Internet - of the movement of engineers and researchers from academia or industry to the relevant government agencies, particularly ARPA, and vice versa.

II. Transition from defense-related networking into academic and scientific-based networking

In 1972, ARPANET was publicly presented at the International Computer Communications Conference (ICCC), where the idea of creating much more expansive network emerged. Moreover, the International Network Working Group (INWG), then chaired by Vinton Cerf who later became ARPANET project manager, had been formed, with an objective to create international network of networks. By bringing computer scientists from the United States and Europe together, INWG signaled establishment of growing international networking community (McKenzie 2011, 66-67).

Along with the growing ARPANET, two networks, funded by ARPA as well, were forming simultaneously during the 1970s: ALOHANET and SATNET. While ALOHANET was transmitting packet data through radio frequency, SATNET used satellites to connect computers in the United States with several sites in Europe. Vinton Cerf and Bob Khan were seeking to create an international network of networks since 1971 through connecting the three networks: ARPANET, ALOHANET, and SATNET. The problem they faced was that the three networks employed different modes of transmission: ARPANET sends data over telephone lines, ALOHANET uses radio waves, and SATNET uses satellites. In order to overcome this problem, Cerf and Khan

developed a standard program that allowed interconnectivity among the three networks by serving as a gateway between networks to send and receive data, which is called Transmission Control Protocol (TCP). In 1977, TCP was deployed and the first message was successfully transmitted across the three networks using this protocol. The success of this experiment – which was funded by the US Department of Defense – significantly proved the possibility of cross-network connections. In 1978, Cerf and two other ARPA-funded researchers, Jonathan Postel and Danny Cohen, enhanced TCP by developing the Internet Protocol (IP). The two protocols together, known as TCP/IP, became the standard system used for interconnection among most of the large networks (Russell 2014, 233-234).

With this possibility of connecting independent networks together, several universities' networks were connected to ARPANET broadening access to the network's facilities. Nevertheless, this access was restricted to institutions and universities contracted by the Department of Defense to work on defense-related projects. Such restriction triggered parallel developments in non defense-related networking that was manifested in establishment of independent networks (Mathison et al. 2012, 30). Many universities independently established their own education-related networks, such as USENET and BITNET, which were subsequently connected to their counterparts in Europe and Australia. These independent networks were eventually incorporated into the ARPANET's successor, the Internet (Leug and Fisher 2003, 23-24 and European Organization for Nuclear Research 2014).

In 1979, the US Defense Communications Agency, which then controls ARPANET, split it into a separate network for the American military called MILNET and the 'Internet' for other sites (Google Sites 2011). This paved the way for expanding scope of networks to be connected to ARPANET, especially with the ability of TCP/IP to connect networks with different modes of transmission.

With this potential expansion of ARPANET, Vinton Cerf, then ARPANET program manager, realized the necessity of establishing an organized entities to oversee the network's evolution and to address relevant technical and architectural issues. He created certain entities that provided strong structural support for the network users, which facilitated the smooth growth of the network (Lambert 2005, 67). The creation of those groups provided an institutional framework for the community of networking engineers that has emerged during the design of ARPANET. One of those entities was the IETF, which subsequently became the main independent body that addresses the Internet architectural issues and the dominant organization for setting its standards.

Furthermore, the growth of ARPANET made standardization of networking protocols essential for ensuring the smooth interconnection among independent networks. In 1983, ARPANET, and all

the networks linked to it, adopted the TCP/IP networking protocol. From then on, ARPANET and all affiliated networks that use TCP/IP became to be collectively known as the Internet. (Russell 2006, 50). Today, TCP/IP is the networking protocol that enables communications among all the networks comprising the Internet, and is being maintained and upgraded by IETF.

In addition to establishment of TCP/IP and its standardization, another significant development that contributed to the growth of the Internet was the design of the Domain Name System (DNS) in 1984 by Paul Mockapetris, a software programmer who subsequently served as a program manager for networking at ARPA during the early 1990s. DNS allows the resolution (translation) of IP numbers into words[7] (Mockapetris 1983, 1-3). Like TCP/IP, DNS is a key architectural component that currently ensures the functioning of the Internet**.**

Despite those developments, access to the Internet was still limited to certain government agencies and specific communities of computer scientists and researchers. The independent networks of several universities were denied access to the Internet. In 1985, National Science Foundation (NSF)[8] initiated a networking project aiming at linking educators and scientists nationwide to each other and with their counterparts worldwide. The project created new computer network known as NSFNET, which subsequently connected supercomputing centers and regional networks as well as ARPANET and all the networks linked to it. NSFNET established a 'network of networks' that became the backbone for the Internet evolution. All academic users and researchers throughout the United States had been allowed to have access to such network, which led to an explosion of new Internet sites, mainly universities (US National Science Foundation 2014a). By 1989, the Internet scope became increasingly international. United Kingdom, Germany, Italy, Netherlands, Japan, Australia, New Zealand, Mexico, and Puerto Rico established connections to NSFNET (Moschovitis 1999, 126). In 1990s, ARPANET was decommissioned and its antiquated lines and nodes has been replaced by the faster NSFNET backbone, which laid the foundation for today's Internet (US National Science Foundation 2014a, 12).

While this stage of the Internet history saw some developments regarding the creation of independent networks, the Internet growth was mainly supported by the American government. The contribution of the above-mentioned epistemic community to the Internet growth had been significant with the creation of its architectural pillars, TCP/IP and DNS. Therefore, the key actors at this stage were the Untied States' government and the Internet epistemic community. With the commercialization of the Internet, the private sector has emerged as additional key actor that largely

[7] IP address is a unique sequence of numbers used to identify each computer connected to the Internet. Since IP addresses are not human-friendly and difficult to be memorized, words are being translated into their corresponding IP addresses through DNS. Further elaboration of such mechanism is provided in chapter 3.

[8] NSF is an independent federal agency created in 1950 to promote the progress of science in the United States.

contributed to the evolution of the Internet during the third phase as will be demonstrated in the following paragraphs.

Third phase: The public and commercial Internet

In the early 1990s, several commercial computer networks could not be connected to the government-sponsored Internet due to the National Science Foundation's Act, a 1950 law, which restricted the Internet to the work of bureaucrats, academics, and scientists. This law has been amended in 1992 to give more flexibility for use of the Internet by the private sector opening the door to the commercial Internet (Moschovitis 1999, 155-157). As a result, about 100,000 networks - both public and private - have been established across the United States and connected to the Internet in 1995. In the same year, NSF decommissioned and privatized its backbone. (US National Science Foundation 2014a, 12).

Whereas the amendment of National Science Foundation Act provided the enabling legislative environment for the growth of the Internet, certain technological advancements significantly contributed to its evolution. In 1991, Tim Berners-Lee, a vocal defender for open and free Internet and currently a key member of the Internet epistemic community, introduced the World Wide Web system, which was subsequently incorporated into the Internet revolutionizing its use. The system, consists of hypertext-interlinked documents that could be accessed via the Internet (Berners-Lee and Fischetti 2008). Then, the browsers, which are programs that enable programming-illiterate people to easily navigate the Internet, were invented. After release of several browsers, the first most successful browser, Mosaic, was released free of charge in early 1993. Mosaic, which was developed by two students from the University of Illinois, Marc Andreessen and Eric Bina, enabled incorporation of graphics, sound, and video clips into the World Wide Web (Andreessen 2014).

The technology was then transferred to the private sector, with Marc Andreessen and other Mosaic developers establishing Netscape Communications that released a beta version of its new browser, Netscape Navigator, in 1994. By mid-1995, Netscape dominated the market and began to license the software to more than 100 companies including Microsoft pushing University of Illinois to discontinue its support for Mosaic (National Center for Supercomputing Applications 2013).

In 1994, David Filo and Jerry Yang, then Ph.D. candidates at Stanford University, founded Yahoo search engine. They began simply by collecting and categorizing the links of their favorite sites into one page. Within few years, Yahoo became the most popular search engine on the Web as well as one of its most successful businesses (Santa Clara Valley Historical Association 2008). In the same year, America Online (AOL) launched free downloadable software that allows a simultaneous browsing and editing of Web pages, AOLpress. AOLpress enabled nonprogrammers to create Web

pages without knowledge of the underlying HTML programming code, opening the creation of Web content to the public (Husted 1999). This allowed users to shape the information environment and content of the Internet.

While the investors initially realized the potential of the Internet as a new medium, they were confused about the ways of getting return of their investment where the service is offered free of charge. Netscape, Yahoo, and other start-up companies demonstrated during the early 1990s that the return of the investment could come from innovative business models such as licensing agreements and advertising (Moschovitis 1999, 155). With these successful examples, the Internet became a huge business opportunity not only for the start-up companies, but also for the big corporations such as Microsoft. In 1995, Microsoft began to be interested in the Internet business, which has been emphasized in Bill Gates' internal memo called "The Coming Internet Tidal Wave" (Gates 1995). With the involvement of Microsoft in the Internet business, it became clear how the Internet became a huge industry.

In 1995, a California-based company, Sun Microsystems, released Java, a programming language that allows the addition of audio, animation, and interactive features to the World Wide Web, which was followed by a rapid evolution of Java products (Oracle 2014). Furthermore, the technology of Internet telephony, which is known as Voice over Internet Protocol (VoIP), was established and adopted by the industry allowing the delivery of voice communications and multimedia sessions to be delivered over the Internet (Hurley 1998, 6). This technology has been recently developed into 'unified communications' services that allow all communications –phone calls, voice mail, e-mail, faxes, Web conferences and more– to be delivered via any means and to any handset, including mobile phones, as provided by today's Skype (Callahan 2008).

In 1998, Google has been established by Larry Page and Sergey Brin, then PHD students at Stanford University. Google became a multinational corporation specializing in the Internet-related services and products as well as the most widely used search engine of the Internet (Google 2014a). While the Internet was being used for social communications among computer scientists and researchers at its early stages, the spread of social networking features such as Facebook and Twitter made the Internet a revolutionary forum for social activities and information sharing. Moreover, it became a medium for exchanging political views as well as an instrument for political mobilization, which was clearly demonstrated by the Arab Spring uprisings.

With the above-mentioned technological developments and the spread of the Internet worldwide, the Internet became a significant commercial tool, medium for news delivery and information sharing, and content creation facility. This paved the way for huge profits for Internet-based

business that begin to encompass a spectrum of industry actors such as cable and infrastructure companies, Internet Service Providers (ISPs), content creation and media corporations, software companies, e-commerce and other Internet-based services firms. Moreover, it became a key means of communications for social and political purposes.

Along with such developments, the Internet epistemic community continued its efforts to maintain and upgrade the Internet architecture in order to ensure the smooth functioning and operation of the Internet. Moreover, this community established formal institutional frameworks for their activities.

By 1990, IETF members became concerned about the potential lack of governmental funding that had previously sustained its activities during ARPANET project. They decided to create internationally recognized non-governmental organization in order to mobilize support for IETF's. In 1992, Vinton Cerf and Bob Khan, the inventors of TCP/IP and the prominent IETF's leaders, established ISOC as a global non-governmental organization hosting and supporting IETF (Internet Society 2014). While IETF addresses the Internet architectural issues, ISOC focuses on policy and business issues. Similarly, Tim Berners-Lee, the inventor of the World Wide Web, formed the World Wide Web Consortium (W3C), in 1994, in order to ensure long-term sustainable growth of the Web. The mission of W3C is to develop open standards and guidelines that ensure interoperability over the Web. (W3C 2012).

With the formal establishment of IETF, ISOC, and W3C, the Internet epistemic community began to take a formal international character. As will be illustrated in chapter 4, this community became an influential non-state actor that seeks to promote non-governmental regulation of the Internet. Its role has extended beyond supporting the Internet technical infrastructure to include broader policy issues.

Conclusion

The history of the Internet indicates that it has mainly evolved within the United States' boundaries and under sponsorship of its government. While each stage of the Internet history was characterized by emergence of certain non-state actors – some of them have developed to become transnational actors - that contributed to the Internet evolution, the American government had been the key player in the relevant dynamics. Moreover, the Internet history was characterized by extensive and complex mutual interaction among the United States' government and the Internet related non-state actors, which has been perceived by the former as key to the evolution of the Internet.

Chapter 3

The Internet Architecture

This chapter aims at investigating what the Internet is and how it operates through identifying the architectural components that ensures its functionality and operation. The chapter seeks also to conceptualize the 'Internet epistemic community' and to indicate how it has developed the Internet architecture as well as how it has established an effective system for its management.

In order to achieve these objectives, the chapter conceptualizes the Internet by using Robert Domanski's model that conceptually divides the Internet into four layers: physical infrastructure, technical protocols, software applications, and content. Building upon Domanski's model, we will indicate that the technical protocol layer is the *architectural layer* of the Internet that maintains its functionality and determines its structure. Moreover, the chapter conceptualizes the 'Internet epistemic community' as community of individuals, with technical knowledge, who work voluntarily to preserve the smooth operation of the Internet through maintaining and upgrading its architectural layer.

This chapter further identifies two main components of the Internet architectural layer: the TCP/IP and DNS, which together will be referred to as the Internet architecture. Through examination of the technical documents of IETF, we demonstrate how these components contribute to functionality of the Internet, as well as how they generate its critical resources: IP addresses and domain names.

Furthermore, the chapter indicates how IETF has established a de-facto regime for governing the Internet architecture, which became the basis for current system of the Interne administration conducted by ICANN. The chapter then indicates that the IETF embodies the Internet epistemic community according to this study's conceptualization of such community.

I. Complexity of governing the Internet

The Internet can be defined as "heterogeneous collection of interconnected systems that can be used for communication of many different types between any interested parties connected to it… [It] is a truly global network, reaching into just about every country in the world" (Alvestrand 2004, 1). Thus, the Internet is characterized by a decentralized structure that consists of worldwide independent networks that are interconnected. This decentralized structure seems to challenge any system of governance especially with the existence of different jurisdictions across the world. The borderless cyberspace of the Internet overcome geographical barriers and circumvents states' boundaries. This unique structure raises questions about governability of the Internet and the possibility of regulating such dispersed networks.

The Internet seems to be an anarchical space where control is impossible. It is the "space of no control" (Lessig 2006, 31) and the "modern Hydra" that is able to challenge regulation (Froomkin 1999). Attempts to control the Internet content seems to be unfeasible due to its global nature that lead to different, or even conflicting, jurisdictions of regulation (Andrews 1999). The jurisdiction of regulation of public authorities falls within the geographical boundaries of each state, but the borderless nature of the Internet defies the geographical underpinnings of states (Holitscher 1999, 115-116). The disparity between the Internet as a global network and regulation as a national responsibility undermines several endeavors for regulation (Froomkin 1997).

Moreover, the technological characteristics of the Internet add another barrier to regulation since there is no central channel for communication over the Internet. The messages routed over the Internet are divided into packets, which are subsequently distributed through several independent networks and may follow different routes from sources to destination (Cerf and Kahn 1974, 637).

However, the question of whether the Internet is governable could not be addressed properly without an elaborate investigation about what the Internet is and how it operates. Therefore, the following paragraphs seek to conceptualize the Internet with a view to identify the elements that allows functionality of the Internet over its decentralized structure.

II. Conceptualizing the Internet and the Internet epistemic community

Seeking to understand structural media regulation, Yochai Benkler has formulated a conceptual framework for the communications system, which break up such system into three levels: the physical infrastructure layer (wires, cable, radio frequency spectrum), the logical infrastructure – or the 'code' - layer (software), and the content layer (Benkler 2000, 561-562). Lessig has subsequently applied Benkler's conceptualization of communication systems on the Internet, where he employed the three-layer framework in order to analyze the Internet (Lessig 2002).

In a recent study, Domanski (2013) developed Benkler's and Lessig's framework through modifying the 'code' layer to create a new distinction. He divides the 'code' layer into two distinct layers: the 'technical protocols' and the 'software applications'. While the protocols are the standard common language that enables digital communication among the networks comprising the Internet, the software applications layer is the tool used to develop the software needed to create the applications that the end-user encounters. This distinction is useful since it helps differentiate between the actors who create technical protocols and those who create private, proprietary web applications. Thus, instead of Benkler and Lessig's three-layer framework, Domanski (2013, 13) categorizes the Internet into four layers: the physical infrastructure, the technical protocols, the software applications, and the content.

Using Domanski's conceptual model, this study seeks to identify the most relevant components to the basic operation of the Internet, i.e., the elements that allow the functioning of the Internet over its decentralized structure. We call those components the *architectural* components of the Internet.

Examining the four layers of the Internet, this study argues that the 'technical protocols' layer is the *architectural* layer that is responsible for the operation of Internet as well as determining its structure. The protocols are the common language that enables communications to occur among the independent networks that comprise the Internet**;** they ensure the very functioning of the Internet. Without those protocols, the networks comprising the Internet can not communicate with each other. As will be further demonstrated in Chapter 4, the design of such protocols – namely TCP/IP - dictates the structure of the Internet. In other words, the current decentralized structure of the Internet lies in the very design of the protocols. This stems from the fact that TCP/IP has been created to allow interconnection among networks that use different modes of transmission. This means that TCP/IP makes it possible for any independent network, with any mode of transmission, to be connected to the Internet, which resulted in a proliferation of the networks connected to the Internet. This eventually led to the decentralized structure of the Internet. Any change of the protocols' design could have led to a dramatically different network than the current Internet. Therefore, the protocols represent the underpinnings of the Internet. It follows that the actors that 'govern' the protocols layer have undeniable influence over the Internet's operation.

On the other hand, the infrastructure layer is the physical means (wires, cable, radio frequency spectrum) used to transmit data among the networks comprising the Internet. While this layer is key for data transmission over the Internet, it does not have any impact on the Internet's characteristics nor structure. For instance, the same infrastructure is used to transmit data for both telephone networks, with their centralized structure controlled by telephone companies, as well as for the decentralized networks of the Internet. The infrastructure has nothing to do with the network's operation or functions; it is just a means for data transmission. Thus, the infrastructure is not an architectural component of the Internet.

Furthermore, the other two layers, software applications and content, are the outcomes of the protocols' design. As will be demonstrated in Chapter 4, the protocols are designed in a way that allows functions (such as creating applications and adding content) to be done at end-points of the network (i.e. at the computers or devices connected to the network). If the protocols are designed in a different way, those two layers would not have even existed. To clarify this point, the comparison between telephone networks and the Internet is illustrative. Telephone networks are designed on the basis that all the network's functions are performed by the network itself - which are centrally controlled by telephone companies - not at the end-points. The end-user can not create a program or

add content to a telephone network; the telephone companies centrally perform all those functions. On the contrary, the Internet design - which is dictated by the protocols - allows end-users to do those functions at the end-points, while the network itself stays neutral and performs no functions. This is why end-users can create programs and add content freely at the end-points of the Internet's networks. Thus, the software applications and the content layers do not affect how the Internet operates and functions; they are instead the outcomes of the very design of the protocol layer. Therefore, the two layers can not be considered architectural components of the Internet.

This indicates that the protocols layer is the *architectural layer* of the Internet that determines how it operates. However, this does not mean that we presume any kind of hierarchy among the four layers. Our aim is to identify the essential foundations of the Internet, which if changed, the whole Internet structure and operation would have been dramatically affected.

While the protocols are the standard language that enables communications to occur among the networks of the Internet, they are also responsible for identifying the location, or address, of each host connected to the Internet. This task of addressing is a requirement for the proper functioning of the Internet since it guarantees that the information routed over the Internet is delivered to the right destination. Since the protocols use the machine language, there was a need for a complementary human-friendly system to perform the task of addressing; this system is known as the DNS. Therefore, the DNS is an additional architectural component, along with TCP/IP, which guarantees the functionality and operation of the Internet. Accordingly, the architecture of the Internet that guarantees its operation consists of the TCP/IP and the DNS.

As demonstrated in chapter 2, the epistemic community, which emerged at the early stages of the Internet history, has been the real actor that set up and developed the core architecture of the Internet since ARPANET. Such community, which we call the Internet epistemic community, represents the individuals who work voluntarily to maintain and upgrade the Internet architecture with the goal of preserving the smooth functionality and operation of the Internet. Those individuals have acquired the technical expertise and knowledge necessary to undertake such task. The main distinction between the Internet epistemic community and other technical communities associated with the remaining three layers of the Internet (infrastructure, software applications and content) is the exclusive focus of the former on architectural issues of the Internet and the non-profit interest of preserving its functionality. On the other hand, other technical communities associated with Internet-related technologies of infrastructure, software applications and content are mainly industry-based and business-oriented consortiums. While those consortiums have an interest in the smooth functionality of the Internet for the sake of their businesses, they are not involved in the core architectural work of the Internet.

As we have identified TCP/IP and DNS as the components that comprise the Internet architecture, the following paragraphs provides brief presentation on how those components contribute to the functionality of the Internet, which summarizes a more elaborate account presented in Annex II.

III. How does the Internet operate?

1. Transmission Communication Protocol/ Internet Protocol (TCP/IP)

As mentioned in chapter 2, the growing number of independent networks connected to the predecessor of the Internet, ARPANET, brought about the need to develop a standard routing protocol to serve as a gateway between networks to send and receive data. In 1983, ARPANET and all the networks linked to it, adopted TCP/IP as the standard networking protocols, which were developed in the 1970s by the Internet pioneers and IETF's leaders, Vinton Cerf and Robert Kahn. From then on, ARPANET and all affiliated networks that use TCP/IP became to be collectively known as the Internet. Therefore, the Internet protocols[9], TCP/IP, are the standardized communication language of the Internet that enables interconnectivity among different networks.

TCP/IP consists of two layers. The first layer, TCP, disbands a message (of the sender's computer) into small packets, which are subsequently transmitted over the Internet, and then received by a TCP layer (of the recipient's computer) that reassembles those packets into the original message. The second layer, IP, is responsible for routing those packets into the right destination - where they reassembled by TCP into the original message - through using IP address to route the data packets into the intended destination.

Since each host connected to the Internet is assigned unique IP address, the number of IP addresses determines to which extent the Internet can grow. Without an IP address, the existence over the Internet system is impossible. With their function as identifiers for each host connected to the Internet, IP addresses represent *critical resource* of the Internet. Significantly, the unanticipated, exponential growth of the Internet resulted in depletion of IP addresses, which means that new devices could not connect to the Internet due to such limitation of the addressing space. Interestingly, IETF has designed a new version of IP, called IPV6, in order to compensate for the rapidly diminishing of addressing space, early before the actual exhaustion of IP addresses.

It is clear that the engineers of IETF have played the main role in designing, maintaining, and upgrading the Internet protocols including expanding IP addresses space. In addition, IETF has established a system for administration of IP addresses allocation to the end-users, and assumed the

[9] *Internet protocol* is sometimes used to describe the standardized Internet networking protocols that consist of two elements, Transmission Communication Protocol (TCP) and Internet Protocol (IP). This study uses the plural format, *Internet protocols*, to refer to these two elements in order to avoid confusing them with Internet protocol as only one element.

responsibility of managing such system until the creation of ICANN in 1999. The guidelines for management of IP address space have been formulated in a series of IETF's technical documents[10].

In this context, IETF has created what is known as the Internet Assigned Numbers Authority (IANA), whose main task is the allocation of IP addresses in accordance with the prescribed guidelines. IANA is a "role, not an organization", for managing the top of IP addresses hierarchy (Housley et al. 2013, 4). Such system of IP addresses allocation is based on delegating responsibility to regional sub-administrators, called Regional Internet Registries (RIRs), which have to satisfy specific criteria set by IETF. In 1999, administration of IANA was delegated to the newly created ICANN. Significantly, ICANN's policy regarding IP addresses allocation is based on the same system that has been initially established and administered by IETF.

Whereas IP addresses are the 'numerical' identifiers of each host connected to the Internet, domain names are the corresponding 'alphanumeric' identifiers. DNS combines both identifiers in order to achieve its role as 'naming' and 'addressing' system for the Internet as illustrated below.

2. Domain Name System (DNS)

Since it is difficult to remember IP addresses, it was necessary to develop a more human-friendly readable format to facilitate communications among hosts connected to the Internet. The idea has emerged to register host names that correspond to IP addresses; so that each host can be located by its name through a 'name resolution' process, which converts such name into the corresponding IP address. IETF members wrote several RFCs aiming to establish an effective system for such process. Those efforts resulted in outlining the DNS, which had been elaborated in a group of RFCs documents[11].

DNS is a distributed database that contains IP addresses and the corresponding host names. The database is distributed since one database containing all host names on the Internet can not be efficient. Instead of maintaining all host names and IP addresses in a single overloaded database, DNS divides the job across the Internet. In other words, instead of having a single 'name server'[12] containing one database of all host names and IP addresses, DNS distributes the task over many name servers where each of them has its own database that contains specific category of host names and their corresponding IP addresses. In order to do this, categorization of host names had been required. IETF has conceptualized such categorization through classification of the Internet host

[10] RFC 1466 (Gerich 1993), RFC 2050 (Hubbard et al. 1996), and RFC 7020 (Housley et al. 2013).
[11] RFC 882 (Mockapetris, 1983a), RFC 883 (Mockapetris, 1983b), RFCs 1034 (Mockapetris, 1987a), and RFCs 1035 (Mockapetris, 1987b).
[12] 'Name servers' refer to computers that implement the resolution (converting the names into their corresponding IP addresses).

names into categories called 'domains'[13]. Such classification follows a hierarchical structure where 'Top-Level Domains' (such as .com, .org, .eg) are at top of the hierarchy. Such hierarchical subdivision is known as 'domain name space'.

The domains serve the purpose of dividing the labor regarding management of the Internet name space. They enable delegation of tasks to sub-administrators. IANA assumes responsibility of coordinating the delegation scheme for DNS management, along with its above-mentioned role in allocation of IP addresses. Performing such role, it is responsible for management of the DNS 'root zone'[14] through assigning (selecting) the operators of Top-level Domains. Significantly, IETF – during its administration of IANA - has established the DNS structure as well as delegation system of domain names[15], which continues to be the basis for the current system administered by ICANN.

Interestingly, the domain names management is based on the same principle of IP addresses allocation: the division of labor and delegation of responsibilities. The delegation of Top-Level Domains' management to sub-administrators is similar to the delegation of subsequent IP addresses to Regional Internet Registries (RIRs). It is clear that delegation of responsibilities and division of labor is a distinguishing characteristic of the Internet ecosystem, where IANA is the single authority responsible of formulating the relevant policies. Apparently, the driver behind such principle of 'tasks delegation' is to achieve efficiency and resilience in the administration of the whole Internet system. Thus, technical and administrative efficiency is the value that characterizes IETF's decisions as to the design and administration of the Internet architecture.

Importantly, it is clear that domain names are another *critical resource* of the Internet along with IP addresses. Both domain names and IP addresses are the building blocks that compose the Internet architecture. They are the *unique identifiers* of each host connected to the Internet. In other words, they are manifestation of existence over the Internet.

DNS operates through combination of those unique identifiers in the name space, which lists all hosts connected to the Internet. For a computer to exist on the Internet, it must be registered in the name space. Without such registration (without a domain name and corresponding IP address), a host cannot be found on the Internet. Elimination of a computer from the name space represents an expulsion from the Internet, since this computer disappears from the listing of addressable hosts (Klein 2002, 194-195).

[13] RFC 920 (Postel and Reynolds 1984, 1).
[14] The root refers to the location of the authoritative servers for the DNS Top-Level Domains.
[15] RFC 1591 (Postel 1994).

IETF claims that the domain name space must be unique and must be administered by a single entity. Only one name space includes the definitive listing of all hosts on the Internet should exist. While copies are permitted to coexist, independent name spaces are not allowed since they could end up having different contents. With the existence of several independent name spaces, a given domain name could be translated into different IP addresses based on which name space is used, which could make the communication unreliable. This accordingly requires a global unique 'root', which should be supported by a set of 'root servers' administered by a single authority (Internet Architecture Board 2000, 1-2).

The unique requirement of the name space indicates that the DNS is in fact a centralized system. The single unique root of the DNS is the central point within the system that rests at the top of the name space hierarchy. Thus, while the Internet structure is extremely decentralized, its addressing system, DNS, is centralized.

While the requirement of a unique DNS name space and a single authority to administer the system is a technical necessity, it is also a political arrangement for governing the system. The requirement that one entity should govern the system is inherently a political constraint. Moreover, the governance of the system can be exercised through the unique DNS name space, which determines who exists and who does not exist on the Internet. The control flows down the hierarchy from the root into the remaining elements of the name space. Here, the technical design defines the political parameters of the system.

In this regard, Klein (2002, 196-197) argues that DNS is an effective instrument for governing the Internet and the point through which the Internet can be controlled. He concludes that the entity that controls the database of the name space controls the Internet. While we agree with Klein's argument that DNS is an effective instrument of governance, we argue that such governance is currently limited to the technical administration system of the Internet. The DNS neither regulate nor enforce policies regarding the Internet layers of infrastructure, software applications, and the content. However, this does not undermine the critical indirect role of the DNS in affecting these layers as it relates to the core operation of the Internet, which could affect all activities performed over the network.

IV. Conclusion

The functionality of the Internet depends on two architectural components for communications and addressing: TCP/IP and DNS. The two components give the Internet its global status since the TCP/IP is the common global language that enables communications to occur among independent networks worldwide, and the DNS is the global system of addressing. Any device connected to the

Internet must use TCP/IP and must be registered in the DNS name space. Without those elements, there is no global Internet. Furthermore, TCP/IP and DNS provides the two critical resources of the Internet: IP addresses and domain names. The expansion and growth of the Internet depends on the availability of IP addresses, which subsequently determines the extent to which the name space can be expanded over the global network. Operationally, DNS combines those two critical resources of the Internet. The uniqueness requirement of the domain name space and its policy authority makes the DNS an effective instrument to enforce policies related the Internet overall administration.

The technical efficiency has been the driver behind the design of both TCP/IP and DNS. TCP/IP has been developed in order to allow communications among networks that employ different modes of transmission. TCP/IP design ensured that any independent network can connect to the Internet, which resulted in a global and extremely decentralized structure. The DNS has been designed to facilitate the process of 'name resolution', which had been bottlenecked due to the rapid growth of the Internet. The domains have been created to enable division of labor in the domain name management. The delegation of IP addresses allocation as well as Top-Level Domains' management to sub-administrators has been envisaged to achieve efficiency and resilience in the day-to-day administration of the Internet system.

On the other hand, the technical design of TCP/IP and DNS dictates the governance structure and defines the political parameters of the Internet system. While the design of TCP/IP is permissive to the current decentralized structure of the Internet, the uniqueness of the name space and its regulating authority makes DNS a centralized system that can be used as a mechanism of governance. Thus, TCP/IP and DNS are not only technical systems, but also political arrangements.

It follows that the technical parameters can define the framework of governance and can determine the policy options in technology-based regimes such as the Internet. Therefore, in order to understand the governance of a technology-based regime, a careful examination of the technical design and technological characteristics is needed. In addition, this highlights the significance of the technical knowhow and knowledge, and to which extent it could shape governance structures and determine the range of possible policy options.

Since the United States' government provided an extensive operational autonomy for the community of researchers and engineers who have developed the Internet architectural components, it is necessary to examine the role of the latter in order to clarify whether their knowledge has an impact on the current governance structure of the Internet. As indicated above, IETF has the technical expertise and knowledge that significantly contributed in designing and maintaining the Internet architecture. IETF has designed and developed the two architectural components that

guarantee the smooth functionality of the Internet, TCP/IP and DNS. The Internet resources, IP addresses and domain names, have been created and expanded by the mere design of IETF. Moreover, IETF continues providing technical solutions for the problems that might counter the Internet growth as has been proved by upgrading TCP/IP to overcome the problem of IP addresses' exhaustion. Without this solution, the expansion of the Internet was impossible. IETF remains the principal body responsible for maintaining the Internet architecture and addressing the relevant issues of the Internet operation.

Furthermore, IETF has established the administration systems related to the Internet architecture; particularly, IP addresses allocation and domain names management that are called IANA functions. IETF has administered IANA throughout the Internet history until the establishment of ICANN. Doing so, it has formulated the fundamentals of the policy system of IP addresses allocation as well as the delegation scheme for sub-administrators of the domain names, which is the basis of the current policies of ICANN. Even with the creation of ICANN, IETF still play a significant role in maintaining the Internet ecosystem. In summary, IETF has established a de-facto regime for governing the Internet architecture, which is the basis for the current system of the Internet administration. Considering the parameters of the Internet epistemic community as indicated above, IETF embodies such community. Therefore, the following Chapter will further examine IETF and how it has evolved from a mere technical forum addressing architectural issues of the Internet into a transnational influential non-state actor and key player in the Internet governance dynamics.

Chapter 4

The Internet epistemic community: The power of knowledge

This chapter aims at further clarifying the role of the Internet epistemic community on shaping the overall Internet system and its governance principles with a view to indicate the extent to which knowledge can be an instrument employed to impose specific values on the Internet architecture regime. The chapter indicates how the technical principles of such community have evolved into political values that shape the governance system of the Internet administration and thereby affecting discourse of the Internet governance. In order to achieve these objectives, the chapter examines IETF and its host organization, ISOC, which are the institutions that embody the Internet epistemic community.

The chapter examines four aspects of IETF: institutional structure, principles and values, policymaking model, and its capability to challenge governments through its de-facto authority over the Internet architecture. In this regard, the chapter firstly indicates how IETF represent an informal transnational community that shares common goals rather than being a formal international organization with a structured membership. Secondly, it demonstrates the architectural principles of the Internet design pointing out how they determine the parameters of the whole Internet system including its decentralized structure and its underlying characteristics that resist control and censorship. Moreover, it shows how these architectural principles reflect the values of the Internet epistemic community about how the Internet ought to be and how it should operate. Thirdly, the chapter presents the IETF's policymaking model (i.e. the process through which the Internet standards are formulated) with a view to demonstrate the political values of the Internet epistemic community, which apparently favor self-regulation and bottom-up governance. It provides an account for dominance of IETF over the formal official standards-setting institutions, particularly the International Standardization Organization (ISO), through comparative analysis between policymaking models of both institutions. This comparison reveals the extent to which political values of the Internet epistemic community are embedded in the current system of the Internet administration. The historical rivalry that took place between IETF and ISO over setting the Internet standards relatively exemplifies the ongoing international debate about whether the governance of the Internet should be based on self-regulation or enforced through intergovernmental organization. Fourthly, the chapter demonstrates how IETF is capable to challenge national governments through the design of Internet standards.

The chapter then moves to examine ISOC, which has been established by the Internet epistemic community to mobilize support for IETF's activities and to promote the community's principles and

values. The chapter demonstrates how ISOC has transformed the technical concepts of IETF, which aimed initially to achieve optimal technical efficiency, into set of policy objectives that promote self-regulatory governance and non-governmental control over the administration and content of the Internet. It indicates that whereas IETF seeks to maintain the community's values through the architectural design of the Internet, ISOC promotes them within policy and public circles through its broad outreach to governmental and non-governmental entities across the world.

I. IETF: The technical knowledge shapes the overall Internet system

1. The institutional structure of IETF: Unique form of international organization

IETF is mainly concerned with setting and maintaining the basic technical standards of the Internet protocols, which enable digital communications among the networks of the Internet. It is not the only technical forum related to the Internet with other entities setting standards for transmission hardware, software applications, etc. (Internet Engineering Task Force 2014a). Within Domanski's four-layer conceptual model of the Internet presented in Chapter 3, IETF is the dominant standards-setting organization of the 'technical protocols' layer.

IETF is an open international technical community of network designers, operators, researchers, vendors interested in the evolution of the Internet architecture and smooth operation of the Internet (Internet Engineering Task Force 2014b). Most participants of IETF are engineers with knowledge of networking protocols and software as well as networking hardware, who work together to improve technology of the Internet. IETF depends on voluntary participation; it has no formal membership and no membership fee, and is completely open to any interested individual (Internet Engineering Task Force 2014a). Although IETF members come from different backgrounds (academia, hardware industry, software industry…etc.), they share common interest in developing the core Internet architecture.

The individual-based structure of IETF and its open voluntary participation represent a distinctive institutional system and unique form of international organization. IETF makes this clear throughout its technical documents:

> "Individuals who participate in the process are the fundamental unit of the IETF organization and the IETF's work. The IETF has found that the process works best when focused around people, rather than around organizations, companies, governments or interest groups. That is not to say that these other entities are uninteresting - but they are not what constitutes the IETF" (Alvestrand 2004, 1)
>
> "There is no formal membership in the IETF. Participation is open to all…. Participation is by individual technical contributors, rather than by formal representatives of organizations" (Bradner 1998, 2)

IETF established a dynamic, interactive and flexible working method. It conducts much of its work on daily basis via mailing lists, and its meetings are limited to three times per year (Internet

Engineering Task Force 2014b). The official products of IETF's work are technical documents entitled 'Request For Comments' (RFCs) and published free of charge. These documents include protocol standards, best current practices, and informational documents (Alvestrand 2004, 1).

Clearly, IETF is a transnational technical community that represents a unique form of international organization, which is based on open participation of any interested individual that has the relevant technical knowledge related to the Internet architecture. The very institutional structure of IETF reflects the Internet epistemic community's political preference for informal open governance structures.

2. Values of the Internet epistemic community as reflected in the architectural principles of the Internet design

The Internet design can be traced to the principles adopted by the community of engineers and researchers that undertook its early development. Those principles and the resulting Internet architecture have been codified in a special set of IETF's RFCs documents and research papers that describe the Internet design. The Internet's architectural principles reflect the political and ethical beliefs and embody some value judgments of the community of engineers and researchers who designed the Internet. Those values have been reflected in the architectural design, which is manifested in the voluntary Internet standards set by the dominant setting-standard body, the IETF. The Internet architecture reflects the willingness of such community for as much broad access and use, openness, and sharing of computing and communications resources as possible. This led them to place value on 'connectivity' favoring interconnections over restrictions on such 'connectivity' (National Research Council Staff, and Committee on the Internet in the Evolving Information Infrastructure 2001, 34).

IETF community explicitly indicates that they have specific values and principles, which are embodied in the current design of the Internet. Significantly, IETF made it clear that the current Internet architecture is not technologically deterministic or inevitable; rather it has been consciously and deliberately designed according to those values and principles. The possibility to create alternative Internet architecture existed, but IETF community chose to create the design that reflects its values and principles. In its mission statement, IETF remarkably indicates that

> "The Internet isn't value-neutral, and neither is the IETF. We want the Internet to be useful for communities that share our commitment to openness and fairness. We embrace technical concepts such as decentralized control, edge-user empowerment and sharing of resources, because those concepts resonate with the core values of the IETF community. These concepts have little to do with the technology that's possible, and much to do with the technology that we choose to create" (Alvestrand 2004, 3).

Those values and concepts are embodied by the design philosophy of the Internet that had been initially articulated in 1981 by three experts of ARPA-sponsored networking experiments, Jerome

Saltzer, David Reed, and David Clark. They identified what is called 'end-to-end' principle as the basic design principle of the Internet arguing that it had been applied for many years without explicit recognition. The end-to-end design principle technically means that the network function is limited only to interconnection and data transmission, whereas any other complex functions (such as authentication and processing) should be implemented at the end points - i.e., the devices that connect to the network (Saltzer, Jeromme, David Reed, and David Clark 1984). This end-to-end principle design has been emphasized in IETF's document RFC 1858, which is entitled "Architectural Principles of the Internet", as the fundamental principle of the Internet architectural design. The document offers simplified description of the end-to-end principle as follows: "The network's job is to transmit datagrams as efficiently and flexibly as possible. Everything else should be done at the fringes" (Carpenter 1996, 3).

The neutral 'end-to-end' design of the Internet allows innovative applications to be added at the end-points and to run over "stupid network". This makes the Internet fundamentally different from other communication networks, such as telephone networks, where the network is responsible of performing most of the functions and the end-points (telephones) remain "stupid". Telephone networks have been centrally developed and controlled by certain companies, which has limited what end-users can do. In contrast, the Internet 'end-to-end' design makes the network operations irrelevant and shifts the control to the end-user, which enables applications to be developed and run over the Internet without undertaking any changes within the network itself (Isenberg 1997).

From this 'end-to-end' design philosophy follows decentralized control, both over content of the network traffic and over its functionality (Russell 2006, 50). For instance, the network is not supposed to filter the data transmitted on the basis of their content, nor is it supposed to track them, alter them, or authenticate them (Mayer-Schonberger and Ziewitz. 2007, 202). The 'end-to-end' design principle constitute the core of the "conventional understanding of the “Internet philosophy”: freedom of action, user empowerment, end-user responsibility for actions undertaken, and lack of controls “in” the Net that limit or regulate what users can do" (Blumenthal and Clark 2001, 74).

Thus, the technical protocols that enable communication between independent networks of the Internet were deliberately designed - according to the 'end-to-end' principle - to disregard content of the transmission and to focus instead on efficient routing of data. This was the result of clear policy decision, which makes the content over the Internet proliferate so freely, to such a large degree. For the communication to occur through the basic Internet protocols, TCP/IP, two pieces of information are needed: the IP address of the device that is sending the data, and the IP address of the destination device. The protocol does not disclose much information about the content of the data being sent. Since IP addresses are virtual, TCP/IP does not reveal the identity of who is sending the data nor

where the data is coming from in a geographical sense. The system has been designed to neglect the nature and the purpose of the data being transmitted, and to contain instead the minimum information required to enable the exchange of the data from one device to another (Lessig 2006, 43-44). Thus, the principle is 'end-to-end' and the implementation instrument is TCP/IP.

The question arise about why the Interne architects of IETF chose to design the Internet as an open neutral decentralized network that provides anonymity for its users? Why they did not choose another design with different architectural principle other than 'end-to-end'? Did they envisage the impact of such design on public life?

As indicated in Chapter 3, the technical efficiency has been the driver of the design of both TCP/IP and DNS. As engineers, the Internet architects of IETF are expected to create the design that can achieve the highest technical engineering efficiency. Domanski (2013, 113-114) argues that the optimum technical efficiency is the fundamental value and prevailing ideology of IETF's community. This technical engineering efficiency has been the driver of the Internet protocols' design. Thus, TCP/IP has been designed with a view to achieve the optimal efficient routing of data. Nevertheless, while the design of the protocols focuses on the engineering goal of achieving network efficiency, it led to political, economic, and social consequences. Denardis argues that the Internet protocols are political. They govern the global flow of information and influence civil liberties online, access to knowledge, national security, national economic competitiveness, and innovation policy (Denardis 2009, 6).

The lack of additional information other than those required for efficient routing – as in the case of TCP/IP design - hinders potential forms of censorship and control. For instance, it will be very difficult, if not impossible, to impose regulatory oversight over the content of the Internet due to the anonymity feature of TCP/IP. Similarly, it will be more difficult for governments to determine the human sources responsible for online criminal behavior. Thus, the relative anonymity and openness available on the cyberspace is dictated by the 'code' of the Internet itself, through the architectural design of its protocols. If these protocols were designed and applied, conversely, to constrain that openness, which is a technical possibility, it would have dramatic ramifications on all of the relevant political issues. Therefore, the extent to which the content of the Internet can be regulated or not is basically determined by decisions about the design of the protocols (Domanski 2013, 93-96). This reveals the extent to which the design of the protocols has shaped the entire Internet environment. The protocols can enable and constrain behavior on the Internet, such as enabling openness and anonymity and constraining centralized control and content censorship.

However, during the early stages of the Internet, the Internet architects, who were mainly seeking to achieve the optimal technical efficiency, had not realized the political consequences of their design. As the Internet evolved from the realm of research into the commercial and public life, the impact of the architectural principles of the Internet design became evident. As elaborated below, those principles have evolved from being technical concepts aiming to achieve engineering efficiency into embraced ethical and political values associated with clear policy objectives. The 'end-to-end' design principle has transformed into values such as openness, decentralized control, and anonymity. The sequence has been reversed; the values became the norm and the technical design is the instrument to maintain such norm.

Nevertheless, the environment in which the Internet was developed has reinforced the design values of the Internet. In its early development as research facility, the Internet was isolated from some of the strains and stresses associated with commercial market interactions. Today IETF is obliged to respond to the robust market forces. Whether the traditional design values of the Internet will be maintained is a significant issue regarding the Internet future (National Research Council Staff, and Committee on the Internet in the Evolving Information Infrastructure. 2001, 35).

3. The process of setting Internet standards: Innovative model of policymaking

As indicated above, the decisions regarding how standards and protocols of the Internet are designed and which of them to be adopted are, in themselves, a significant form of policy that enable and constrain behavior on the Internet. The process of setting such standards and protocols is "the Internet version of a policymaking process" (Domanski 2013, 110). IETF community has developed an informal practical policymaking process in order to create the Internet standards. Examining how policies (standards) are formulated by IETF further reveals the political values of the Internet engineers; i.e., how they view decision-making and governance structure of the Internet.

IETF standardization process is referred to as 'rough consensus and running code', which originated from a quote by David Clark, one of the Internet pioneers, at IETF meeting in 1992: " We reject: kings, presidents, and voting. We believe in: rough consensus and running code" (Clark 1992, 543). Domanski (2013, 104-107) indicates that 'rough consensus and running code' has constituted the guiding principle of governance over the course of Internet history, and it has been the de-facto approach of creating norms and standards in an environment, which historically lacks central regulating authority. In this context, standards are made on the basis of the collective engineering judgment of IETF's participants and the experience of implementing and deploying IETF's specifications (Alvestrand 2004, 1).

According to such principle, the standardization process follows a decentralized bottom-up approach where any individual or group, including the newcomers, can introduce a proposal of standard, which will be subject to collective discussion and continuous refinement throughout several phases until it achieves the required consensus. Thus, there is no central authority that prepares standards and proposes them for adoption. This process is considered a "bureaucratic innovation" of the Internet engineers, along with their technical innovations (Russell 2006, 55).

Accordingly, the principle of 'rough consensus and running code' does not only characterize a technical process of standardization, but also the institutional system that governs it. It even reflects the open informal structure of IETF itself. In other words, the principle does not only reflect technical values of the Internet engineers about how standards should be set, but also their political values that are evident in the very political structure of IETF.

Therefore, the informal open decentralized governance structure and the self-regulatory bottom-up process of policymaking characterize the core political values of the Internet epistemic community, which are embodied in the open informal structure of IETF and its policymaking process. Those values shape this community's perspective about governance of the Internet architecture in particular and Internet governance in general. Remarkably, the current system of ICANN mirrors those values. As indicated in chapter 6, the policies related to the administration of the Internet architecture is formulated through a self-regulatory bottom-up process replicating that of IETF.

Significantly, the dominance of IETF's governance model has not been deterministic; it has competitively established its prevalence. Although the formal standards-setting organizations, such as ISO and ITU, are recognized worldwide, IETF has been the dominant standards-setting body of the Internet standards throughout the Internet history. IETF's dominance has been established after fierce competition with these rival organizations, particularly, ISO. The comparison between IETF and ISO regarding Internet standards does not only demonstrate competition between different standards, but also embodies a rivalry between two governance systems, new informal bottom-up decentralized system of IETF versus traditional official top-down centralized system of ISO.

IETF versus ISO: Rivalry between two different systems of governance

ISO is the official organization for setting international standards with membership of 163 countries represented by their national standards bodies (International Standardization Organization 2015a). The institutional structure of ISO is dramatically different from that of IETF. While ISO is a country-based organization whose membership is limited to national authorities of the member countries, IETF is an individual-based organization open to all participants with no requirement of formal membership.

ISO standards are initially developed by group of experts who subsequently submit draft standards to members for adoption through voting process (International Standardization Organization 2015b). Thus, standards are prepared by a central body (appointed group of experts), which are adopted through official process of voting by the member country representatives. This highly formalized top-down process, which stems from a centralized authority, is incongruent to the decentralized informal bottom-up standardization process of IETF. Moreover, while IETF process guarantees that standards are "the result of intense implementation discussion and testing", ISO process puts forward theoretical model that is difficult to alter or to be fully implemented (Padlipsky 1985, 104).

Significantly, ISO introduced in 1977 the Open Systems Interconnection (OSI), a standard protocol for computer networking then challenging TCP/IP system of IETF. OSI was conceived as European alternative to TCP/IP since European Public Network Operators supported its adoption. Moreover, OSI concepts had permeated the work of ITU (Drake 1993, 643). Due to the strategic position of ISO as an official international standards-setting organization, OSI was endorsed by national governments around the world, including the American Department of Defense that historically sponsored IETF's activities. The rivalry between OSI and TCP/IP turned to a severe 'war' between ISO and IETF. Eventually, users and corporations chose to adopt TCP/IP that proved to be more adaptive to the rapid changes of the Internet technology (Russell 2006, 52-56). Thus, IETF established its dominance as the standards-setting organization for the Internet, and TCP/IP has been recognized as the standard Internet protocol.

If OSI succeeded to prevail over TCP/IP during the 1970s, the Internet would have become much more different from today. The technical design of TCP/IP seeks to avoid central regulation; it fundamentally conceptualizes the Internet as decentralized structure that consists of similar units (networks), which just need common language (protocols) to communicate. On the contrary, OSI viewed the Internet as limited set of closed national centrally-controlled public networks, which need standardized external interface or "gateway translation" to enable communication among those closed hierarchies (Drake 1993, 643-644). Furthermore, if OSI prevailed over TCP/IP, the formal top-down model that stems from a centralized authority would have become the mechanism for setting Internet standards, and the official standards-setting organizations, ISO and ITU, would have consequently assumed responsibility of creating Internet protocols and standards, much as they currently do for other areas. Thus, this does not only demonstrate efficacy of IETF's standards compared to those of ISO, but also effectiveness and resilience of IETF's policymaking model.

Adoption of TCP/IP established IETF's standardization process as the normative decision-making model for the Internet protocols layer. The open informal self-regulatory system became the dominant governance model over setting the rules of Internet architecture, while the traditional

official country-based governance system had been set aside. Hence, political values of the Internet epistemic community have constituted the governance principles of the Internet architecture.

While the result of the rivalry between IETF and ISO settled the competition between two different standards and two governance systems for the Internet protocols layer, such result seems to have broader implications for the Internet governance in general. When the issue of the Internet governance was raised two decades later as a main topic of the WSIS[16], the issue has been relatively framed as there are two competing governance systems: the status quo self-regulatory bottom-up governance through the current ICANN's system versus traditional official governance through intergovernmental organization.

4. The power of IETF as an independent non-state actor in the Internet governance dynamics

It is clear how technical design of the protocols affect the whole system of the Internet. The knowledge of IETF makes it influential behind-the-scene actor in establishing the Internet architecture and setting its rules. A very recent manifestation of such continuous influence has been demonstrated through IETF's plans to protect the Internet users from governmental intelligence agencies after revelations about mass Internet surveillance programs run by the American National Security Agency (NSA).

IETF is working to develop new Internet standard that integrate certain security features - by making the encryption mandatory - into the new version of the Internet protocol Hyper Text Transfer Protocol 2.0. IETF's objective is to enable encryption of the data transmitted over the Internet, which renders surveillance difficult or even impossible (Constantin 2013). When concerns were raised that companies and website operators might ignore the new standard, IETF's chair invoked the power of its standards affirming that they are "very widely applied" (Neagle 2013).

Countering Internet surveillance became one of the most important issues discussed within IETF's community (Internet Engineering Task Force 2013a). In its 88th meeting (3-8 November 2013), IETF began to discuss how to put its plans into action (Internet Engineering Task Force 2013b) and created a working group dedicated to work on security of data transmissions over the Internet (Internet Engineering Task Force 2013c). This example illustrates the extent to which the power of IETF's knowledge enabled it to challenge authority of governments through standards regarding an international public policy issue, which is the encryption of the data over the Internet.

In conclusion, the technical knowledge of IETF community makes it de-facto influential actor in governance of the Internet architecture. It has deliberately designed the Internet according to architectural principles that aims at ensuring openness and limits control over content of the Internet.

[16] Chapter 7 addresses WSIS in detail.

Such design dramatically affects the entire system of the Internet, and makes it an environment shaped by users rather than controlled by centralized authorities. IETF still has the de-facto power to affect basic features of the Internet and to manipulate its functionality through design of the protocols. Moreover, IETF community has established a unique form of international organization embodied by its open individual-based institutional structure. It has also developed an innovative form of policymaking, based on the community's political values that favors self-regulation and bottom-up governance, which eventually became a governance model for the Internet.

While the architectural principles and the governance model of IETF's community aimed initially to achieve optimal technical efficiency, they have evolved over time to become embraced values and ends by themselves. Over the course of Internet evolution, they have materialized into an 'ideology' or 'belief system' about how the Internet ought to be and how it should be governed. The technical concepts turned into political and ethical views about the Internet, its function, and its governance. This evolution is embodied in establishment of ISOC, which was formed by IETF community to promote their principles about the Internet. ISOC represents the shift of IETF principles and values from the technical level into the public and policy domain. It has transformed the Internet epistemic community from behind-the scene actor into a remarkable key player that seeks to promote its own values and model of governance. While IETF is an epistemic community that governs the Internet architecture by the favor of its technical knowledge, ISOC is the political embodiment of IETF's values, as will be illustrated by the following paragraphs.

II. ISOC: The political evolution of the Internet epistemic community

ISOC was established by number of individuals with long-term involvement in IETF's activities. The main rationale of ISOC was to provide institutional host and financial support for the process of creating Internet standards conducted by IETF. In 1990, it seemed that long-term support for standardization activities of IETF - which had been provided primarily by research-supporting agencies of the United States' Government - could not be sustained (Cerf 1995). There was a need for an institutional framework to support IETF's functions and activities on a sustainable basis.

In 1992, the two Internet pioneers that invented TCP/IP, Vinton Cerf and Robert Kahn, formed ISOC as non-profit, non-governmental international organization. Although ISOC emerged out of IETF, it became its organizational host. Since then, IETF's documents are copyrighted by ISOC. ISOC aims at promoting open development, evolution and use of the Internet. It provides leadership in developing Internet standards, protocols, policy, and education (Internet Society 2015a). While IETF is concerned with the architectural issues of the Internet from an engineering perspective, ISOC focuses on policy and business issues (Internet Engineering Task Force 2014a). As Annex III demonstrates, ISOC has established worldwide presence through 100 chapters across the world.

Despite its worldwide membership, ISOC defines itself as a global cause-driven organization (Internet Society. 2015d), not a membership-driven organization. As indicated in Annex III, this distinguishes ISOC from other non-state actors including its profit-oriented members. Such global cause of ISOC is clearly articulated by its values and principles. Examination of these values and principles indicates that ISOC seeks to preserve decentralized structure of the Internet and to maintain its end-to-end architecture opposing any attempts to hinder some Internet users from utilizing the full range of Internet applications of all kinds. It supports freedom of expression over the Internet through private—and, where appropriate, anonymous—means of communication, and will resist efforts to restrict the type or content of information exchanged over the Internet. ISOC aims at preserving the open model of Internet connectivity and standards development opposing governmental and/or nongovernmental restrictions on evolution and use of the Internet technology. It also opposes legislations and technologies that would restrain freedom to develop and use the 'open source' software. It considers both government regulation and economic power of incumbent telecommunication monopolies a barrier for growth of the Internet (Internet Society 2015e).

Clearly, ISOC's values and principles have originated from the values of IETF community. IETF values have evolved and moved from the technical level to the public and political domain through ISOC. The 'end-to-end' principle, decentralized structure, user-empowerment, and the bottom-up policymaking process have crystallized into policy goals such as openness, resistance to governmental control and regulation, freedom of expression, and the self-regulatory governance. The technical concepts that initially aimed at achieving technical efficiency have evolved into political and social values as well as policy goals that address public issues regarding the Internet.

While IETF seeks to maintain those values through the architectural design of the Internet, ISOC promotes them within policy and public circles through its broad outreach to governmental and non-governmental entities across the world. ISOC, with IETF as its affiliate, has emerged as a major non-state actor representing the Internet epistemic community. It aims at limiting governmental control over the Internet, and keeping its de-facto self-regulatory governance.

In conclusion, examination of IETF and ISOC indicates that the Internet epistemic community, represented by both institutions, is an open transnational community that shares the common goal of resisting governmental interference in Internet affairs, and maintaining it as self-regulatory sector. The control of such community over the Internet architecture design enabled it to impose its ethical and political values on the overall Internet system and its governance principles. Moreover, such community has been able to promote its values in policy and decision-making circles through worldwide outreach strategy.

Chapter 5

The United States and the Internet governance

It is difficult to dedicate a chapter on the United States and the Internet since all the dynamics demonstrated in the previous chapters took place within the United States and under patronage of its government. The establishment of the Internet, the emergence of its epistemic community, and evolution of such community's technical concepts into beliefs about the Internet governance occurred within the boundaries of the United States. Thus, while this chapter addresses the United States stance towards the Internet governance, other chapters of this study are also pertinent to the domestic dynamics of the country as well.

This chapter aims specifically at understanding the foundations of the United States' stance towards the Internet governance in general and the Internet administration in particular. The chapter seeks to account for the United States international position that opposes governmental control on the Internet as well as its quest to promote a self-governance model for it, and to indicate the extent to which the Internet epistemic community has contributed in shaping such position.

In order to achieve these objectives, the chapter examines the 1990s domestic dynamics through which the United States' preferences and interests have been identified as to the Internet. This period witnessed transformation of the Internet from an academic research facility into a public commercial medium, which triggered national debate about the Internet. This transformation has been accompanied by a transition from the informal ad-hoc administration of the Internet architecture, which had been monopolized by the Internet epistemic community, into a more formal and international framework that laid down the basis for a new Internet architecture regime with the establishment of ICANN.

In this context, the chapter begins with presentation of the state of affairs as to the administration of the Internet before establishment of ICANN in 1998. This is followed by a demonstration of the unsuccessful unilateral move of Internet epistemic community to form a new regime for the administration of the Internet, which provoked the reaction of the United States' government and pushed it to initiate an overriding process for forming such regime. In this connection, the chapter comparatively analyzes the relevant policy documents issued by both the Internet epistemic community and the American government regarding the new envisaged regime.

The chapter also indicates how the United States government identified the country's interests regarding the Internet, and how it promoted such interests internationally through establishing an international regime for electronic commerce over the Internet in order make the Internet an effective commercial medium.

Furthermore, the chapter investigates the debate that took place over protection of civil liberties on the Internet, which significantly contributed in shaping the American perception of the Internet as a forum for published *content* rather than a telecommunication medium. It will further demonstrate the implications of such perception on the United States' policy concerning the Internet.

I. The informal ad-hoc administration of the Internet

In 1992, Bill Clinton and his running mate Albert Gore won the presidential elections. One important aspect of Clinton's campaign strategy was Gore's project on how to transform the Internet into 'Information Superhighway'. Moreover, Clinton's administration was the first to deal with "a heavily trafficked, civilian-populated Internet" (Moschovitis 1999, 152). The Internet came under the attention of the high-level politicians in Washington.

This political interest in the Internet along with its exponential growth throughout the 1990s pushed the governance issues from the closed circles of the Internet epistemic community into the public scrutiny. At this time, administration of the Internet, which has been known as IANA functions, were mainly performed by the IETF through ad hoc informal arrangements with the American government.

IANA functions refer to central technical coordination of the essential operational elements that guarantees smooth functioning of the Internet. They include management of the global pool of IP addresses and their allocation, management of domain names including the DNS Root, and coordination of the assignment of the Internet Protocol parameters[17]. (Internet Assigned Numbers Authority 2015d). IANA is a "role, not an organization" (Housley et al. 2013, 4), as it describes a function more than entity (US Department of Commerce 1998b). Thus, IANA represent the functions related to administration of the core Internet resources: IP addresses and domain names.

Despite IANA functions had been performed as a government contract, it was not formally organized or constituted. IETF had been given considerable latitude in performing IANA functions (US Department of Commerce 1998b). IANA was originally performed by Jonathan Postel on behalf of IETF community (Cerf 1998). Despite the expansion of IANA functions that accompanied growth of the Internet, IETF continued to rely on Postel's work for implementing these functions, particularly maintaining the authoritative list of the rapidly increasing number of the Internet identifiers (IP addresses and domain names). However, these documentary and

[17] The assignment of the Internet protocol parameters concerns the continuous development and modifications of the Internet protocols, which are performed by IETF. The role of IANA in this regard is to maintain the 'codes' and 'numbers' of the Internet protocols, and to coordinate with IETF to ensure that that any modifications for the Internet protocols will be implemented consistently in order to ensure the universal connectivity of the Internet.

administrative structures performed for and on behalf of IETF were not formally recognized in contractual language (ICANN Security and Stability Advisory Committee 2014, 7).

As indicated in chapter 4, while the United States government was sponsoring IETF activities, IETF was autonomously administering IANA functions. With the establishment of ISOC in 1992, which was initially motivated by securing financial support for IETF activities, IETF became officially independent from the patronage of the American government. As soon as ISOC was established, it formally chartered the Internet Architecture Board (IAB)[18] of IETF with the responsibility of performing IANA functions (Huitema 1994, sections 2(d) and 2.4.). However, Jonathan Postel was still performing the administration of IANA functions on an ad-hoc basis.

This informal fashion of performing IANA functions began to be more formalized in contracts along with exponential growth and commercialization of the Internet during the 1990s (ICANN Security and Stability Advisory Committee 2014, 9). This trend began with decision of the American government in 1993 to privatize the domain names registry[19], INTERNIC, and registration services under cooperative agreement with private company Network Solutions (US National Science Foundation 1993). In 1995, the American government allowed Network Solutions to charge fees for assignment and registration of domain names (Dillon n.d.). It seems that the privatization of registration services was a response to the unprecedented increase in requests for domain names registration.

Several concerns had been raised by the Internet community due to preoccupations that privatization could jeopardize the domain names as public resources (Flash n.d.). Moreover, the monopoly of Network Solutions to domain names registration, as well as its registration policy[20], was widely criticized by various stakeholders of the Internet. Since the contract with Network Solutions was due to expire in 1998, a debate had been initiated about the future of domain name registration (Mathiason 2009, 50). The technical elites of the Internet epistemic community, which was still assuming IANA functions, began to explore establishing a new regime for the administration of DNS.

II. Endeavors of the Internet epistemic community to form new regime for DNS administration.

[18] IAB is a committee that assumes the responsibility of architectural oversight of IETF activities. Since IAB is an organ of IETF's system, we will subsequently use 'IETF 'to cover both IETF and IAB.

[19] Registry refers, in this context, to the entity that will provide registration services for the Internet users.

[20] Network Solution was applying a 'first come, first serve' policy for registration of domain names, whereby any domain name was granted to the first applicant as long as such domain had not already been registered. This policy led to many legal disputes between domain name holders and trademark owners. The problem arises when a trademark is used on the Internet as a domain name without the consent of the trademark holder, which could mislead the consumers about the source of the service or product offered. The trademark holders whose trademarks were registered as domain names without their consent litigated under the claim of intellectual property rights infringements.

The board members of ISOC and then-administrator of IANA, Jonathan Postel, formed what was called the International Ad-Hoc Committee (IAHC) in order to develop a plan for the future administration of DNS (Internet Society 1996). On February 1997, IAHC issued a plan, which was developed under the 'rough consensus' model that had been traditionally used to formulate the Internet standards, with recommendations aiming at enhancing the DNS management. The significant component of this plan is the proposal to establish a self-regulatory framework for DNS policymaking, which was articulated in form of a Memorandum of Understanding, which is known as generic Top-Level Domain Memorandum of Understanding (gTLD-MoU). Both public and private sectors were invited to sign this document at the quarter of ITU (International Ad Hoc Committee 1996 and 1997).

Analysis of the gTLD-MoU

The gTLD-MoU considers the DNS a fundamental component of the Internet's operational infrastructure, which should be administered in a stable, fair and equitable manner. It asserts that the Top-Level Domain name space is a public resource, and its administration and use should be carried out in the interests and service of the public. This characterization of the domain name space addresses the concerns raised - with privatization of registration services - about the risk of converting the Internet public resources (IP addresses and domain names) into tradable commercial private property. In this context, the gTLD-MoU identifies the problems challenging the administration system of the Internet that should be tackled by the proposed new regime, which include equitable allocation of the name resources, market supply and access to DNS registration services, and intellectual property concerns.

The gTLD-MoU presents substantive elements for the new regime of DNS administration, which had been envisaged to address these challenges. Firstly, it proposes creating new generic Top-Level Domains. This proposal reflects the Internet epistemic community view and interest of expanding the Internet resources. More generic Top-Level Domains leads to more growth of the Internet.

Secondly, it proposes practical and market-oriented approach for registration services of the domain names in order enable competition. In this regard, it proposes increasing the number of registries in order to overcome the monopoly of Network Solutions as the sole dominant registry. Moreover, it proposes introduction of a new type of service providers along with registries, which are called 'registrars', in order to diversify the players involved in registration services. Thus, the task of domain name registration will be divided among two categories, 'registries' and 'registrars', with each category assigned specific tasks. The gTLD-MoU establishes the criteria that should be the basis for selection of registries and registrars. Moreover, it proposes establishment of dispute

resolution mechanism that will be managed by WIPO in order to address the problems related to the infringement of intellectual property rights over the Internet. This presents a practical solution to the disputes that arise from the conflict between domain names and trademarks, which helps avoiding costly and time-consuming litigation and judicial proceedings.

Thirdly, the gTLD-MoU proposes a self-regulatory governance structure for formulation of the international policies related to the DNS management. The overarching decision-making authority within this framework is the Policy Oversight Committee, which is responsible for setting relevant policies to DNS management and monitoring their implementation. The Committee is responsible for enforcing the provisions of the gTLD-MoU as well as overseeing the entities that will be created within the new structure. The gTLD-MoU further echoes the epistemic community's approach of self-regulatory and bottom-up policymaking through proposing creation of subsidiary self-regulatory entities that represent specific constituencies such as Council of Registrars (CORE), which is envisaged to represent recognized registrars in the relevant policy formulation processes and to ensure the proper implementation of the prescribed policies over its constituency.

Significantly, the Internet epistemic community secured itself a dominant status in the proposed governance structure with most members of the Policy Oversight Committee appointed by ISOC, IETF, and IANA. Furthermore, it provided itself with a veto power on any potential change of the envisaged regime through requiring that no amendments to the provisions of gTLD-MoU shall enter into force until it has been signed by both ISOC and IANA. Interestingly, the Internet epistemic community legitimized this overriding status by invoking the historical role of its institutions of, IANA, ISOC, and IETF, in the establishment and development of the Internet and administration of the DNS.

On the other hand, the ITU's role was limited to be depository of the gTLD-MoU without real substantive tasks as to the new regime. Although ITU is an intergovernmental organization, the gTLD-MoU does not envisage addressing any issue through its intergovernmental processes. In fact, the governments are excluded altogether from the governance of the proposed self-regulatory regime. Apparently, the Internet epistemic community deliberately involved ITU in order to secure international legitimacy for the new regime, especially that no state actors are involved in the proposed governance system. Significantly, when the Internet governance was later discussed in the United Nations, the Internet epistemic community strongly criticized proposals to give responsibility of the Internet administration to ITU as will be further demonstrated in Chapter 7 This asserts that the ITU's involvement in the governance structure of the gTLD-MoU has been merely to provide legitimacy for the new system.

In conclusion, the gTLD-MoU seeks to establish an international regime for administration of the DNS, whereby the Internet epistemic community will have a dominant role in the governance structure. The governance framework is based on self-regulation without any envisaged role for any state actor neither in policy formulation nor in governance arrangements. Clearly, the gTLD-MoU aggressively challenges the states' authority in formation of the nascent DNS regime.

Interestingly, the gTLD-MoU focuses only on administration of one element of the Internet architecture, the domain name space. It does not address administration of the remaining element of such architecture, IP addresses. However, there was no motivation for the Internet epistemic community to include administration of IP addresses in the gTLD-MoU since IANA, then-dominated by such community, was administering IP addresses allocation. As demonstrated below, the gTLD-MoU had great impact on the subsequent overriding process initiated by the American government to form a new regime for administration of the Internet architecture, which eventually led to the creation of ICANN.

III. The United States government intervenes

The gTLD-MoU was signed, on May 1997, by 215 parties at ITU headquarters with the opposition of the United States government (Mathiason 2009, 52). The American government became concerned with the challenge posed by ISOC and IANA to its authority over the Internet. The unprecedented move of ISOC and IANA, which unilaterally created an international institutional framework to manage the Internet, was bold enough to raise the concerns of high-level governmental officials in Washington.

The US Secretary of State, Madeline Albright, wrote a memo condemning ITU Secretariat for acting "without authorization of member governments" to hold "a global meeting involving an unauthorized expenditure of resources and concluding with a quote international agreement unquote." Moreover, Other executive branches of the American government were instructed to investigate the issue (Mueller 1999, 502). This represented a declaration of the gTLD-MoU demise.

Furthermore, President Clinton issued Presidential Directive[21] in July 1, 1997 that mandated the Secretary of Commerce to "support efforts to make the governance of the domain name system private and competitive and to create a contractually based self-regulatory regime." Remarkably, the Presidential Directive recognized the bottom-up approach to the Internet governance. The Directive puts it as follows: "the Federal Government should recognize the unique qualities of the Internet including its decentralized nature and its tradition of bottom-up governance" (US President 1997a).

[21] The Directive includes Internet-related issues that go beyond DNS management, which are addressed below.

Clearly, while the American government did not accept challenge of ISOC and IANA over authority of the Internet architecture, it explicitly recognized the Internet epistemic community's principles of self-regulation and bottom-up governance Thus, it decided to intervene in shaping the new governance framework without undermining the well-established principles of such community.

In order to formulate a concrete proposal, the American government resorted to the procedure used nationally when regulations are being contemplated, a period of public comment. The purpose of this procedure is to explore whether there is consensus about a proposed policy and to give opportunity for alternative proposals, if any (Mathiason 2009, 53). On July 2, 1997, the Department of Commerce's National Telecommunication and Information Administration (NTIA), which assumes responsibility of telecommunication regulation, issued a Notice requesting public comments on series of enquiries about Internet governance in general and domain names in particular (US Department of Commerce 1997).

While the issuance of such Notice demonstrates that the American government affirms its stewardship of the DNS and the root zone file, it also indicates its willingness to delegate such authority in a manner that involves various stakeholders of the Internet. However, ISOC and the supporters of gTLD-MoU did not welcome that governmental intervention considering it an intrusive interference into a process that was traditionally based on self-governance of the technical community (Mueller 1999, 503-504).

IRA Magaziner, President Clinton's policy adviser, was nominated to lead the American government's discussions on this issue, and to prepare a proposal for administration of the Internet on the basis of the comments that would be received during the public period comment (Mathiason 2009, 54). The only option available for ISOC was to be involved in the process initiated by the American government in order to lobby for maintaining the epistemic community's role and principles in the new regime.

Jonathan Postel attempted to influence the outcome of the process through his authority over IANA. The national debate that took place in this regard turned into a kind of "civil war" as several groups with varying interests and agendas put forward their own proposals (Moschovitis 1999, 227).

The US Department of Commerce finally issued a preliminary proposal, so-called Green Paper. The Green Paper, as a draft policy statement, made the debate more focused. The paper recommends devolution of IANA functions and creation of an international non-profit entity to manage the Internet architecture as a whole, and to oversee the DNS management. Then, the

Department of Commerce submitted the Green Paper for public comments (US Department of Commerce 1998a).

After careful consideration of the comments received on Green Paper, the American government issued its final policy statement on June 1998 in what called the White Paper, which mandated the establishment of a new non-profit corporation to assume coordinating functions related to the Internet (US Department of Commerce 1998b), which eventually led to creation of ICANN.

Significantly, the coalition led by ISOC had been key player in the process, which produced the White Paper, through an intensive lobbying campaign that targeted Magaziner and Department of Commerce officials. It also pushed many of its members to submit comments in the Department of Commerce proceedings. These efforts resulted in convincing the American government that IANA of Jonathan Postel and the gTLD-MoU coalition is a proper vehicle for `private sector leadership.' Interestingly, ISOC welcomed the White Paper with praise. Moreover, the major American Internet corporations, such as IBM, and e-commerce companies supported the White Paper due mainly to the personal influence of Vinton Cerf[22], in addition to the belief that they would be privileged within any `private-sector-led' regime for the Internet governance[23] (Mueller 504-505).

On the other hand, several concerns were raised by groups of activists who criticized the decision of handing over the management of the Internet to a commercially oriented corporation with a potential "self-perpetuating board", which might undermine the democratic values, such as free speech and privacy, over the Internet (Miller1998).

The White Paper is the first policy statement of the United States government that presents its perspective about fundamentals of the Internet governance and the framework of its administration regime. It embodies a transition from an informal ad-hoc self-governing regime, which has been traditionally monopolized by the Internet epistemic community, to a more formal regime for administration of the Internet. It is the outcome of a complex process of domestic debate and two rounds of public comments on the relevant proposals.

The following paragraphs analyze the White Paper[24] in order to shed the light on the American policy regarding the Internet governance. Firstly, the analysis aims firstly at clarifying the scope of governance envisaged by the American government in order to identify the parameters of the new regime targeted by the White Paper. Secondly, it seeks to investigate the impact of the Internet epistemic community on the United States' policy towards Internet governance and consequently on

[22] As previously indicated, Vinton Cerf is a founding key member of the Internet epistemic community.
[23] Mueller indicates that many of the then key leaders of IETF had been employees of major American corporations, arguing that theses employees might have contributed in directing their corporations to support the White Paper.
[24] Since the White Paper uses the Green Paper as a reference document, the latter is included in the analysis.

the newly forming regime for its administration, through exploring to which extent principles and views of such community has been incorporated into the White Paper. In this connection, a comparative analysis between the substantive elements of the White Paper vis-à-vis the corresponding elements of the gTLD-MoU is carried out. Thirdly, the analysis seeks to determine the extent to which the new regime is American-centric, through identifying the elements that favors the American hegemonic status as to the Internet.

IV. The White Paper: Formation of a new regime for administration of the Internet architecture.

The White Paper begins with introduction of a brief background on the concept of domain names and the Internet Protocol numbers (IP addresses). The document cites each proposal of the Green Paper submitted for public comment followed by a summary of the corresponding comments received during the public comment period. Subsequently, the document provides responses of the American government to the comments received on each proposal followed by its final decision on the corresponding issues. The White Paper concludes with a revised policy statement and the American government's decision on the way forward.

Scope of the Internet governance

The White Paper indicates that the scope of regulation intended by the United States' government is limited to the technical management of the Internet names and addresses. This is even reflected in the title of the document, "Statement of policy on the Management of Internet Names and Addresses." The document mentions that the government policy does not seek to establish a system of Internet governance. Responding to some public comments that proposed additional principles for the new system, such as protection of human rights and free speech, the document indicates that:.

> "The U.S. Government policy applies only to management of Internet names and addresses and does not set out a system of Internet "governance." Existing human rights and free speech protections will not be disturbed and, therefore, need not be specifically included in the core principles for DNS management. In addition, this policy is not intended to displace other legal regimes (international law, competition law, tax law and principles of international taxation, intellectual property law, etc.) that may already apply."

The United States government doubts that the Internet can be governed by only one entity or even a series of entities. It perceives the Internet as too broad to be governed through specified structures. The only aspect that can be subject to governance is the technical administration of the Internet in order to ensure its smooth functioning. As the White Paper puts it:

> "The policy that follows does not propose a monolithic structure for Internet governance. We doubt that the Internet should be governed by one plan or one body or

> even by a series of plans and bodies. Rather, we seek a stable process to address the narrow issues of management and administration of Internet names and numbers on an ongoing basis."

Clearly, the objective of the American government is to establish a regime for administration of the Internet architecture. The target is the management of the core Internet resources: IP addresses and domain names. Other issue-areas related to the Internet are excluded from the scope of governance targeted by the White Paper. It follows that the Internet governance is not limited to a sole regime; rather, it can include many crosscutting regimes. One of those regimes is the technical administration of the Internet, which is the subject of the White Paper.

Moreover, some of other potential regimes for regulating behavior on the Internet would overlap with the existing regimes that address the same issue-area. For instance, a potential regime for protection of human rights on the Internet would overlap with the existing international human rights regime. This raises questions about whether there is a need for human rights regime tailored specifically for the Internet, and how it could be reconciled with the existing regime. If not, how existing regimes can regulate the behavior on a cross-jurisdictional medium. This example is applicable to other issue-areas such as electronic commerce, competition, intellectual property, cyber-security, and prevention of criminal activities online etc. *Therefore, the international cooperation as to the Internet can vary depending on which issue-area will be subject to such cooperation. In other words, the configuration of actors and channels of cooperation can vary from an issue-area to another. For instance, an international regime for prevention of criminal activities over the Internet might be formed through intergovernmental channels where the state actors are the key players, as opposed to other regimes that might be formed and administered by non-state actors or by both state and non-state actors. This indicates the complexity of the Internet governance and the multiplicity of issue-areas that can be placed under such label. Therefore, it is useful for Internet governance studies to specify the issue-area/s that will be subject to investigation.*

Accordingly, administration of the Internet architecture is a specific regime concerning only one issue-area of the Internet governance, which is management of the core Internet resources: IP addresses and domain names. We can call this regime as the *Internet architecture regime*. Since Internet resources determine the extent to which the Internet can expand and grow, the Internet architecture regime concerns also expansion of the Internet. Therefore, we can define the Internet architecture regime as the regime related to the overall operation, functioning, and expansion of the Internet. Despite the Internet architecture regime concerns only one issue-area of the Internet governance, it is at the core of the Internet governance. The administration of the Internet architecture can have great impact on all activities related to other issue-areas on the Internet. This renders the Internet architecture regime key to understanding the Internet governance issues.

The influence of the Internet epistemic community on the White Paper

The White Paper emphasizes the role and efforts of the Internet technical community in establishment and management of the Internet architecture. Particularly, it highlights the role of Jonathan Postel in administration of IANA functions (on behalf of IETF) as well as the role of IETF in developing the Internet protocols and standards. The document asserts that the role of IETF in development of the Internet technical parameters will be preserved affirming that the functions of the envisaged new corporation will not encompass such role. Thus, IETF has been formally recognized as the main standards-setting organization for the Internet technical parameters.

Likewise, the document illustrates attempts of the Internet technical community to develop DNS management mentioning Postel's proposal to create multiple competing Top-Level Domain registries in 1996, as well as formation of IAHC in order to establish a new framework for DNS administration. Nevertheless, the document mentions that despite support for the IAHC's proposal (the gTLD-MoU), the IAHC process was criticized for being dominated by the Internet engineering community, and for lacking input from business interests and other stakeholders of the Internet community. Hence, whereas the document recognizes all the efforts made by the Internet epistemic community, it indicates that establishing a new framework for governing the Internet architecture can not be monopolized by such community.

However, the document explicitly recognizes that those efforts put a pressure to change the then status quo. This recognition indicates that the bold endeavors of the Internet epistemic community, which is reflected in the gTLD-MoU, forced the American government to undertake the required changes regarding administration of the Internet architecture. The Internet epistemic community set the agenda for the change and forced the government to proceed in this direction.

Interestingly, the Green Paper did mention neither the role nor the efforts of the Internet epistemic community as opposed to the White Paper. The gTLD-MoU led to a tension between the American government and the Internet epistemic community, which seemingly discouraged the former to recognize the role of the latter in the Green Paper. As the process of consultations moved forward with the extensive involvement of ISOC in the relevant proceedings, the relationship between the two parties had apparently improved, which is reflected in the recognition of the White Paper to the epistemic community's role in developing and administering the Internet architecture.

Furthermore, examination of the substantive elements of the White Paper reveals that most of the proposals of the gTLD-MoU have been adopted. The White Paper recognized the need for creating new generic Top-Level Domains, which had been always on the top agenda of the Internet epistemic community and one of the reasons that led to establishment of gTLD-MoU. While the

gTLD-MoU proposed creation of additional specific set of generic Top- Level Domains beyond the existing '.com', '.org' and '.net', the White Paper referred this decision to a self-regulatory process to be later conducted by the new corporation. Thus, the American government recognized the need to expand Internet resources as previously envisaged by the Internet epistemic community. Moreover, the epistemic community would influence this self-regulatory process due to its extensive expertise.

Besides, the White Paper adopts the model of registry/registrar for undertaking registration services of domain names with the same rationale of creating more competitive environment for domain names registration Therefore, the pressure of the epistemic community to end Network Solutions monopoly of registration services successfully led to adoption of its proposal to establish a new competitive model. Additionally, the White Paper mentions that a transparent process should be initiated by WIPO, with participation of trademark holders and other stakeholders, in order to establish a uniform approach to resolving disputes between trademark owners and domain name holders[25]. This is almost the same proposal of the gTLD-MoU, which envisaged dispute resolution mechanism to be managed by WIPO.

Significantly, the White Paper clearly recognizes that the bottom-up governance has characterized the evolution of the Internet and will accordingly continue to be the basis of the new forming regime. The document affirms that bottom-up governance is preferable to government control and more flexible to adapt to the rapidly changing needs of the Internet and Internet users. It even asserts that the nominations of the new corporation's Board of Directors should preserve the tradition of bottom-up governance of the Internet. As previously indicated, the principle of bottom-up governance through self-regulatory framework has historically characterized the decision-making process of setting the rules of the Internet architecture. It has also been the basis for the proposed governance framework of the gTLD-MoU. Therefore, the United States' government recognized and adopted the Internet epistemic community's well-established approach to governance of the Internet architecture: bottom-up governance through self-regulatory framework.

This approach of bottom-up and self-regulatory governance has been affirmed throughout the White Paper. The document mentions that the United States government preferred to issue a general statement of policy, rather than to define or impose a substantive regulatory regime asserting that this policy statement "is not a substantive rule, does not contain mandatory provisions and does not itself have the force and effect of law." This affirmation indicates that the substantive rules and policies of the new regime will be set through a bottom-up self-regulatory process.

[25] The result of this process is demonstrated below.

Likewise, self-regulatory governance has been instituted by the mere fact that the White Paper did not prescribe any direct action to be taken by the United States government regarding the substantive issues of the new regime. All the issues were left to a self-regulation process to be subsequently undertaken by the new corporation. For instance, selection of registries, authorization of new Top-Level Domains, and even composition of the corporation's Board were left to a self-regulatory process.

Furthermore, the White Paper affirms the necessity of maintaining a unique domain name space as well as a single coordinating authority to administer the Internet names and numbers. It refused proposals to create two entities, one for administration of the domain names and the other for IP addresses, deciding to create only one entity to implement all the required functions. Clearly, the document adopts the uniqueness requirement, which has been established by the Internet epistemic community as a technical necessity, and has been constituted in the gTLD-MoU. This goes in line with our argument, presented in chapter 3, that the uniqueness requirement is not only a technical constraint, but also an inherently political arrangement for governing the system. The uniqueness requirement defined the parameters of the new governance structure as it did with its predecessor.

In this context, the White Paper concludes with explicit identification of four principles that should guide the new management system of the Internet: stability, competition, private bottom-up coordination, and representation. The first three principles embody the principles and agenda of the Internet epistemic community. Regarding the principle of 'stability', the document affirms that the new system must not disrupt the current operations of the Internet or causing creation of competing roots. Again, the uniqueness of the domain name space is one of the basic principles for the new system; creation of competing roots is perceived as jeopardy to the universal nature of the Internet, which would lead to its fragmentation. Regarding the principle of 'competition', the White Paper adopted all the Internet epistemic community proposals to create competitive environment as indicated above. The principle of 'private bottom-up coordination' embodies the principle of self-regulation and bottom-up governance of the Internet epistemic community, but under the label of 'private bottom-up coordination.' The governmental oversight is excluded from the new regime, which had been a demand of the epistemic community.

Regarding the principle of 'representation', the White Paper indicates that the diversity of Internet users and their needs should be reflected in the technical management of the Internet, and mechanisms should be set up to enable international input in the decision-making. This principle is the only one that had not been on the agenda of the Internet epistemic community, which was seeking to monopolize the administration of the Internet architecture. However, wider representation in the administration of the new regime is not harmful for the epistemic community

that has been capable of securing itself a significant role by the favor of its knowledge and expertise. Evidently, the four principles of the new forming regime reflect the views, principles, and practices of the Internet epistemic community.

Finally, examination of proposed functions of the new corporation reveals that they are identical to those of IANA. Responding to concerns raised by some comments about the future of the current arrangements within the new regime, the White Paper explicitly indicates that functional responsibilities of the new corporation will not expand beyond those exercised by IANA. This means that IETF will continue its role in creating and developing the Internet standards. Significantly, the White Paper emphasized that IANA staff should be involved in creation of the new corporation recognizing their expertise in the technical management of the Internet. Hence, the American government not only adopted principles and views of the epistemic community, but also ensured that it will have a key role in shaping and administering the new governance framework.

In conclusion, the analysis demonstrates that the Internet epistemic community has been a winner from the process initiated by the United States' government to form a new regime for administration of the Internet architecture. The American government has initially acted due to the pressure exerted by the Internet epistemic community for changing the administration system of Internet architecture. Moreover, it recognized the problems identified by the such community and approved its substantive proposals to address these problems as presented in the gTLD-MoU. Furthermore, the government formally adopted the Internet epistemic community's principles of bottom-up and self-regulatory governance. In addition, the new regime is premised on the existence of a unique name space and single coordinating authority as required by the epistemic community. Besides, the American government maintained the Internet epistemic community supremacy regarding development of the Internet protocols, and secured it significant role in formation and administration of the new regime.

The United States government left the critical decisions of the new regime - such as the nomination of the new corporations' board of directors, the number of new generic Top-Level Domains, and the number of registries – to a self-regulation process. It is logic that the epistemic community can easily influence this process through its knowledge in creation and administration of the Internet architecture. As will be demonstrated below, the Internet epistemic community had great influence on the subsequent proceedings that took place to establish the new corporation.

Apparently, this impact of the Internet epistemic community on the United States' policy as to the Internet governance stems from the success achieved by such community in developing and administering the Internet architecture throughout history of the Internet. While the government was

originally sponsoring the activities of such community, great leeway had been given to such community. This latitude enabled the epistemic community to develop its successful self-regulatory model, which eventually led to the unexpected growth of the Internet. Such success was an important factor in convincing the United States' government that direct governmental intervention in administration of the Internet architecture is not required. Moreover, the impact of the Internet epistemic community's views and values on the American governmental agencies have accumulated throughout the Internet history, especially with the continuous recruitment of such community's members into the government as indicated in chapter 2. This allowed principles of self-regulation and bottom-up governance to be easily accepted by the American officials.

The Internet architecture regime: US-centric international regime

Although the United States government recognizes the need form more international representation in the administration of the Internet, the process that led to the White Paper demonstrates that the government has been dealing with the Internet governance as a national issue. This drives from the fact that the Internet emerged as an American project funded and sponsored originally by the American government, and developed under its patronage. This perception of the Internet as an American product led to US-centric regime, which has subsequently been subject to international criticism.

Throughout such process, the government followed the same national procedures when a new national regulation or policy is to be formulated. The government published the proposed policy about the Internet administration in the Green Paper requesting public comments on such policy. In the light of the comments received, the government revised the proposed policy and issued its final decision in the White Paper.

Although the United States government allowed international inputs to feed in the process[26], it did not enter into the traditional intergovernmental negotiations to form the new regime. The White Paper clearly indicates that the United States' government believes - as do most comments submitted during the public comments proceedings - that "neither national governments acting as sovereigns nor intergovernmental organizations acting as representatives of governments should participate in management of the Internet names and addresses." It explicitly limits the policy authority of national governments over their own country code Top-Level Domains[27]. Therefore, while other governments have been excluded from the process of forming an international regime for the Internet administration, the United States' government was leading such process.

[26] Mathiason (2009, 54) indicated that the comments received from national governments throughout the public comments proceedings accounted only for 1% of the total comments received.

[27] Examples of country code Top-Level Domain is '.eg' for Egypt and '.uk' for United Kingdom.

Throughout the White Paper, the United States' government asserted its historical role and responsibility of the Internet administration, which justified producing US-centric regime. The White paper mentions that the headquarter of the new corporation will be in the United States due to the presence of significant domestic expertise, including IANA staff, affirming that this will preserve stability of the Internet. Therefore, the new corporation, which will administer a global sector, will be subject to the American domestic laws and regulations.

Moreover, the White Paper indicates that United States will continue to have policy oversight function during a transition period to be completed no later than September 30, 2000, with a commitment to eventually allow the private sector to take leadership for DNS management. Hence, the United States government preserved a supervisory role to ensure the stability of the new regime's framework. While the formation of the new regime is decided to be through a self-regulatory process, this oversight function gives the Untied States government an ultimate authority over the proceedings of such process. As will be indicated in Chapter 6, the transition period was extended many times, and the United States government still preserves such oversight function.

Another substantive example that advantages the United States is the establishment of litigation jurisdiction over disputed domain names. The White Paper proposes that at the time of registration of a domain name, the registrants should agree to submit a contested domain name to the jurisdiction of a court where the root server is kept, where the registry is headquartered, where the registry database is located, or where the registrar is domiciled. While determining the jurisdiction in advance is a practical solution to the borderless nature of the Internet, this solution gives preference to the United States' courts over those of other countries, since most of the root servers and registries are located within United States boundaries.

Clearly, since the United States government has been dealing with the Internet as a national regulatory issue, the outcome of the regime formation process advantaged the United States over other countries. As will be demonstrated in Chapter 7, the dominating position of the United States in the administration of the Internet architecture regime led to raising the Internet governance issues within the intergovernmental processes of the United Nations; particularly, the United Nations World Summit on Information Society.

V. Identifying the interests: The United States commercial-oriented policy for the Internet

It is clear that the Internet architecture regime is very specific to the operation of the Internet; however, the Internet is a broad medium that provides lot of opportunities. While the previous analysis sheds the light on the United States policy regarding the administration of the Internet architecture, there is a need to clarify how the Untied States' government identified the country's

interests and preference as to the Internet, which goes beyond the administration of the Internet architecture.

The Internet as a global marketplace: Making the Internet a duty-free trade zone

Examination of the White Paper from a broader perspective than the architectural issues demonstrates that the Untied States adopts pro-market policy towards the Internet. This market-oriented policy features prominently throughout the White Paper. The document recognizes that the Internet has evolved from US-based research vehicle to become an international medium for commerce, communication and education; hence, the traditional means of managing its technical functions need to evolve as well.

In this context, the White Paper identifies six reasons to change of the administration system of the Internet; five of them are market-related concerns. Firstly, there is a widespread discontent about the absence of competition in domain name registration. Secondly, there is a need for practical and less expensive mechanisms to resolve the increasingly frequent conflicts between trademark owners and domain name holders. Thirdly, several commercial interests, whose future depends on the successful and sustainable growth of the Internet, call for a more robust and formal management structure. Fourthly, the commercial value of the domain names is increasing, so the decision to add new Top-Level Domains can not be made on an ad hoc basis, and should instead be taken by an entity that is formally accountable to the Internet stakeholders. Fifthly, it became less appropriate for the Untied States research agencies to fund and manage the technical functions of the Internet as the Internet becomes commercial. The sixth reason for change, which is not market-related concern, is the increasing number of the Internet users outside the United States who seek participation in the coordination activities related to the Internet.

For the Untied States government, it is evident that market-related concerns overwhelm the need to internationalize administration of the Internet. The change aims at establishing an effective system that responds to the market needs. The domain names registration needs to be more competitive, and the interests of trademark holders need to be preserved. A formal entity should be established to maintain the operational stability of the Internet in order to preserve the commercial interests on the Internet, as well as to manage the addition of the commercially valuable generic Top-Level Domains. Clearly, the American government sees the Internet as valuable commercial medium, which should be preserved through establishing a robust formal regime to ensure its smooth operation.

This commercial-oriented approach of the White Paper reflects the view of the United States regarding the Internet, which began to crystallize since the early 1990s. The United Sates'

government realized that the Internet could be a vehicle for boosting national economic growth as well as a forum that presents huge commercial opportunities for the American companies. This was initially reflected in the 1992 amendment of the National Science Foundation's Act to allow commercial activities to take place over the Internet.

With the exponential growth of the commercial activities over the Internet, the commercial significance of the Internet became more apparent for the United States' government leading to formulation of concrete policies in this regard. In 1997, President Clinton approved and released a report entitled "A Framework for Global Electronic Commerce", which articulates his Administration's vision for the emerging digital marketplace. The report outlines a set of principles, presents a series of policies, and establishes an agenda to be pursued internationally in order to facilitate the growth of electronic commerce over the Internet. Examination of this Framework, as will be demonstrated by the following paragraphs, asserts that the United States' government views the Internet as a very promising commercial medium that can achieve unprecedented benefits for the American companies.

The Framework affirms that commerce on the Internet could total billions of dollars by the turn of the century. For this potential to be realized, it asserts that governments must respect the unique qualities of the Internet and its decentralized structure as well as its tradition of bottom-up governance. It invites governments to adopt a non-regulatory, market-oriented approach to electronic commerce. It affirms that the electronic commerce can flourish in a market-driven arena, not in an environment that operates as a regulated industry, and the governments accordingly should encourage industry self-regulation.

Hence, the Framework asserts that governmental involvement should be limited to securing a minimalist legal environment based on a "decentralized, contractual model of law rather than one based on top-down regulation." This non-regulatory market-oriented approach reflects the American long-standing policies of liberal free market. Simultaneously, it indicates that the United States' government considers the Internet as a global market that should not be regulated and instead should remain free and liberal.

Moreover, the Framework affirms that the regulatory frameworks established for traditional telecommunications, radio, and television is not appropriate for the Internet. This clear differentiation between the Internet and traditional means of telecommunications has broad implications on the United States' policy regarding the Internet. The Internet is not a telecommunication means; it is instead a unique medium with different characteristics. The conventional means of telecommunications are traditionally subject to national governmental

regulation, but the Internet is different[28]. This view constitutes the American policy and stance as to the Internet.

Then, the Framework presents clear policies that should be pursued domestically and internationally. The Framework urges national governments across the world to refrain from imposing bureaucratic procedures, new regulations, or taxes and tariffs on commercial activities that take place via the Internet. In this context, the Framework identifies nine areas where international agreements are needed in order to preserve the Internet as a non-regulatory medium. These areas are categorized into three main subgroups: financial issues that includes taxation and electronic payments; legal issues that includes Uniform Commercial Code' for electronic commerce, intellectual property protection, privacy and security; and market access issues that include telecommunications infrastructure and content. Under each issue, policies have been identified to be followed.

Examination of the provisions of each issue as presented by the Framework reaffirms that the United States' government perceives the Internet as a vehicle for economic growth that could be harnessed to boost its domestic market. Besides, the focus on international cooperation is emphasized throughout these provisions. Thus, contrary to its policy in forming the Internet architecture regime, the United States' government seeks cooperation with other governments in order to make the Internet a non-regulated medium for commercial activities. Unlike the Internet architecture that can be administered autonomously, the governmental commitment is needed to ensure that excessive regulations on electronic commerce will be avoided.

In order to operationalize the policies presented by the Framework, President Clinton issued the Presidential Directive of July 1, 1997 (US President 1997a). The Directive instructed heads of executive departments and agencies to implement the policies elaborated in the Framework. It directed all executive departments and agencies to promote efforts domestically and internationally to make the Internet an enabling environment for commerce. It directed the U.S. Trade Representative to work with foreign governments to secure new agreements in order to make electronic commerce a global marketplace. It directed the Secretary of the Treasury to work domestically and with foreign governments to ensure that no discriminatory taxes are imposed against the Internet commerce. It also directed the Secretary of Commerce to work domestically and internationally to support the development of a uniform commercial legal framework that facilitates electronic transactions worldwide.

[28] Chapter 7 will address the international debate that took place over whether the Internet is a telecommunication means.

Implementing instructions of the Presidential Directive, the United States' government launched an international initiative to promote its electronic commerce agenda. The American government intensified efforts with its major economic partners in order to achieve a consensus on an agreement that requires all the WTO members to deal with the Internet as a "duty-free trade zone" (Kiggins 2011, 87-143).

The American efforts have succeeded. In 1998, the WTO members adopted a declaration on global electronic commerce, which stipulates a moratorium on imposing customs duties on electronic commerce. The declaration states that "members will continue their current practice of not imposing customs duties on electronic transmission" (World Trade Organization 1998). This moratorium is renewed each two years by the WTO Ministerial Conference; the last renewal was decided by the Ninth Ministerial Conference in 2013. Besides, the WTO Conference instructed elaboration of a Work Program on Electronic Commerce, which is currently under discussion in the relevant bodies of the organization (World Trade Organization 2013).

Thus, the United States' government succeeded to establish an effective international regime on electronic commerce that makes the Internet a 'duty-free trade zone.' Unlike the Internet architecture regime, the electronic commerce regime has been formed and governed by state actors through an intergovernmental organization, the WTO.

Protection of intellectual property rights over the Internet

The United States' government has realized that infringement of the intellectual property rights is one of the challenges posed by the Internet, which could undermine the commercial value of those rights. Clinton's Administration established the Working Group on Intellectual Property Rights in order to examine the intellectual property implications of the Internet and to make recommendations on any appropriate changes to the American intellectual property law and policy. In 1995, the group presented extensive report focusing primarily on the protection of copyright on the Internet. The report concluded that the spread of the digital networks connected to the Internet rendered the existing law and policy insufficient to protect copyright. The report recommended amendment of the copyright law as well as policy in order to adapt to the new technology and to enforce stronger protection of copyright over the Internet (US Department of Commerce 1995).

Seeking to promote this agenda at the international level, the United States' government endeavored to establish an international legal framework for protection of copyright over the Internet. In 1996, the members of WIPO adopted two treaties that establish global standards for protection of copyright in the digital environments: WIPO Copyright Treaty and WIPO Performances and Phonograms Treaty, which are known together as WIPO Internet treaties.

(International Bureau of the World Intellectual Property Organization 2015, 2). Similar to the international regime of electronic commerce over the Internet, the regime of copyright protection on the Internet has been formed by state actors and is being managed by intergovernmental organization, the WIPO.

Subsequently, the above-mentioned Framework on Global Electronic Commerce has appraised the WIPO Internet treaties. The Framework considers them a step towards achieving one of its objectives, which is the establishment of international agreements in order to provide clear and effective intellectual property rights protection on the Internet and to prevent piracy and fraud. The Framework required more steps to be taken in that regard.

In line with the Framework, the Digital Millennium Copyright Act, which contains stronger provisions than WIPO treaties, was passed into law in 1998. The law initiated debates over "U.S.-centric approach to an international issue" (Moschovitis 1999, 194).

Another area of the intellectual property rights is the protection of trademarks over the Internet, which has been addressed by the White Paper as presented above. The WIPO-led process, which was initiated by the White Paper, led to adoption of Uniform Domain Name Dispute Resolution Policy (UDRP), which is currently applied by ICANN in order to resolve disputes that arise between trademark owners and domain name holders (Internet Corporation for Assigned Names and Numbers 2014b). WIPO assumes responsibility of administrating dispute cases under this UDRP through its Arbitration and Mediation Center. This provides cost- and time-efficient mechanism to resolve domain name disputes, without a need for court litigation. Under the UDRP, WIPO has processed over 30,000 cases (World Intellectual Property Organization 2015).

Moreover, ICANN subsequently developed mechanism, known as Trademark Clearinghouse, which enables trademark holders to protect their rights in advance during the DNS expansion. The mechanism simply functions by authenticating information submitted by the trademark holders and providing this information to registries and registrars in order to prevent abusive registrations of domains names that infringes on these trademarks (Internet Corporation for Assigned Names and Numbers 2015a).

Evidently, the American policy regarding establishment of effective system to protect trademarks online - as reflected in the White Paper and the Global Framework on Electronic Commerce - has been carried out. Similar to protection of copyright on the Internet, the protection of trademarks has been promoted internationally through an intergovernmental organization, the WIPO.

In conclusion, the United States' government has a broader policy towards the Internet that goes beyond the mere administration of the Internet architecture. It views the Internet as a commercial

medium that can be used to expand and boost the American domestic economy. This has been even reflected by the government's decision to transfer the Internet's responsibility from NSF to the Department of Commerce, which symbolizes transformation of the Internet from a research facility into a public commercial medium.

While the administration of the Internet architecture was left to self-regulation, the Untied States' government exerted efforts through the relevant intergovernmental organizations, particularly the WTO and WIPO, in order to regulate international behavior on the Internet in a manner that protect its perceived economic interests. The governments and intergovernmental organizations have been involved in forming international regimes to make the Internet duty-free trade zone and to ensure legal protection for the intellectual property rights on the Internet. On the other hand, the governments have been excluded from the process of forming the Internet architecture regime, which has been mainly formed by the Internet epistemic community under procedural supervision of the United States' government. This reaffirms that the Internet governance is a broad concept that encompasses many crosscutting regimes of various issue-areas.

VI. Constructing perception for the Internet: The Internet as a medium of published content

With the growth of the Internet in the 1990s, the concerns over networking security has increased. Theses security concerns forced the Untied States' government to seek disciplining the Internet. As a response to the concerns of the corporate sector as well as national security agencies, the government undertook a nationwide crackdown on computer hackers through a major operation known as Operation Sundevil (Sterling 1990, 105).

The arrest of several suspected hackers accused of computer fraud triggered a debate about the protection civil rights over the Internet. Many groups considered such crackdown by the government a violation to the civil liberties, which eventually led to initiation of legal cases against the measures taken by the government (Charles1990).

The debate over the governmental crackdown resulted in establishment of the Electronic Frontier Foundation (EFF) in 1990, as a non-profit organization that aims to protect civil rights, including free expression and privacy, on the Internet (Electronic Frontier Foundation 2015a). EFF was the first to set a precedent by filing a lawsuit against the governmental crackdown, which eventually established that "it is illegal for law enforcement to access and read private electronic mail without a warrant" (Electronic Frontier Foundation 2015b).

This debate concerning protection of civil liberties over the Internet has significant implications for the American perception of the global network. The mere initiation of such debate revealed that the Internet is not perceived as a telecommunication and broadcast medium like radio or television,

which are subject to regulation by the government. Instead, the Internet is perceived as a forum for *content*, like the newspapers content, which is protected against governmental interference in line with the American civil liberties. Nevertheless, such perception was still debatable at that time due to the vague legal status of the Internet.

The perception of the Internet as a forum for content has crystallized and become clearer with the debate that took place over the Communications Decency Act (CDA). In 1996, the CDA, which is part of the larger Telecommunications Reform Act, was passed into law. The Act criminalizes indecent content and transmission - to people less than eighteen years of age - through the Internet of any message "that, in context, depicts, or describes in terms patently offensive as measured by contemporary standards, sexual or excretory activities or organs". Seeking to secure the constitutional rights and civil liberties over the Internet, the EFF and the American Civil liberties Union (ACLU) and other organizations criticized the CDA. Lisa Kamm of ACLU's criticized the law saying that "things which would be protected, were they published in a newspaper, or said over the telephone, were suddenly illegal acts [under the CDA], simply because they occurred over the Internet." The EFF and ACLU and other groups challenged the CDA and filed a lawsuit claiming that it is unconstitutional. Significantly, their claims were upheld by the United States' Supreme Court that found the law unconstitutional (Moschovitis 1999, 207 and Weber 2004, 55).

Therefore, the domestic debate within the United States resulted in stabilizing the perception of the Internet as a forum for published content that should not be subject to governmental interference. This perception reflects the liberal values of the American society. Such perception, along with the view of the Internet as deregulated free marketplace, have constituted the American policy and stance towards the Internet and its governance. This accounts for the American position internationally that resists any governmental control over the Internet, which will be further demonstrated in chapter 7.

VII. Conclusion

The transition of the Internet from a research facility into a commercial global public network triggered national debate within the United States on the status of the Internet and how it should be governed. This led to formulation of a national policy regarding the Internet based on the relevant domestic dynamics that took places. Due to the hegemonic status of the Untied States on both the Internet administration and content, such dynamics has have great impact on the formation of the Internet architecture regime for administration of the Internet as well as the Internet governance as a whole. Examination such dynamics does not only indicate how the United States' policy and stance

regarding the Internet have been constructed, but also reveal certain complexities regarding the Internet governance as a whole.

The United States domestic dynamics revealed that the Internet governance is a broad label that encompasses many issue-areas, which includes, but not limited to, the technical administration of the network. From the perspective of the international regimes, the Internet governance includes many crosscutting regimes of various issue-areas. The international cooperation regarding the Internet can take different forms depending on the issue area of such cooperation. Likewise, the configuration of actors that can influence formation of an international regime related to the Internet can vary from an issue-area to another. The Internet architecture regime, which concerns technical administration of the Internet and its core resources, is one issue-area that falls under the broad label of the Internet governance. The Internet architecture regime is at the core of the Internet governance since it is related to the overall operation, functioning, and expansion of the Internet, which can affect all the activities performed over the network.

The Internet architecture regime has been historically formed and administered by the Internet epistemic community on an informal ad-hoc basis under the patronage of the United States' government. When the United States' government decided unilaterally to form a more formalized regime, its policy has been largely affected by the Internet epistemic community's principles and values. The epistemic community has been the key influential actor in the formative process that led to establishment of the new regime, which has been embodied in creation of ICANN's, by the favor of its accumulated knowledge and historical experience in developing and administering the Internet architecture. The United States' government embraced the epistemic community's principles of self-regulatory bottom-up governance for the Internet administration as well as the opposition of governmental control over the network's resources, which successfully characterized the development of the Internet architecture.

Moreover, the United States' government has developed a conscious policy towards the Internet, which goes beyond the mere administration of the Internet architecture. This policy considers the Internet a valuable commercial medium that can be used as a vehicle to boost and enhance the American economy. In order to achieve this policy, the United States government launched international initiatives through the relevant intergovernmental organizations in order to establish international regimes that promote such policy. This led to establishment of international regime, administered by the WTO, which made the Internet a duty-free trade zone. Similarly, an international regime concerning the protection of intellectual property rights over the Internet has been established and administered by the WIPO. This substantiates our argument that the international cooperation regarding the Internet can take different forms with various configurations

of actors based on the issue-area of such cooperation. While the Internet architecture regime has been formed through United States' national process that was associated with extensive influence of the Internet epistemic community, the international regimes related to electronic commerce and protection of intellectual property rights have been mainly formed by state actors within the relevant intergovernmental organizations. Additionally, this also clarifies that self-regulatory arrangement of the Internet administration is a constructed preference of the United States; it is not an indicator for 'diminishing state role.'

Furthermore, the national debate and the relevant domestic dynamics that took place regarding the legal status of the Internet led to stabilizing the American perception of the Internet as a forum for published content and free expression where civil liberties should be protected. The Internet content, like newspapers content, should not be subject to governmental interference.

In summary, the United States domestic dynamics resulted in transforming the de-facto ad-hoc informal regime for managing the Internet architecture into a formal regime for technical administration of the Internet. The new regime is based on principles and values of the Internet epistemic community, which embrace non-governmental self-regulatory bottom-up governance. Moreover, the Internet has been perceived nationally as a medium that should reflect and promote liberal values of openness and freedom of expression. It is a medium for published content where civil liberties should be protected from governmental interference. The non-governmental control and interference in both administration and content of the Internet has materialized as the preference of the United States regarding the Internet. As we will indicate in chapter 7, such preference shapes the United States international stance towards the Internet governance, which is clearly reflected in its position that seeks to promote the model of non-governmental self-regulation governance for the Internet. While the United States oppose non-governmental interference on the Internet, it has consciously resorted to intergovernmental organizations, as the case in the WTO and WIPO, to establish international regimes in order promote its commercial interests over the Internet. However, those international regimes aim at providing the minimum regulatory environment to keep the Internet a free and credible commercial medium, which does not contradict with the American preference of self-regulatory Internet.

This indicates that states, particularly Untied States, are still the main player in formation of the international regimes related to the Internet. The self-regulatory administration of the Internet by delegated non-state actors has been a preference perceived by states as the most convenient arrangement that ensures the network's smooth operation, which is not the case for other Internet-related regimes such as e-commerce and intellectual property.

Chapter 6

ICANN: From self-regulation to mulistakeholdeirsm

This chapter aims at exploring the governance framework of the new Internet architecture regime with a view to foresee whether it could be sustained as a model of international governance. The chapter analyzes the ICANN's system and its evolution since the inception of ICANN until now.

The chapter provides a brief demonstration of the process that took place after adoption of the White Paper to create ICANN indicating the role of the Internet epistemic community in this regard. It then examines the ICANN's bylaws in order to demonstrate how ICANN's system is functioning through a self-regulatory bottom-up process that replicates the IETF policymaking model. It also examines the role of the national governments in the new regime through investigating the role of ICANN's Governmental Advisory Committee in the governance structure of ICANN. Moreover, the chapter examines the reform process that was undertaken by ICANN in its quest for acquiring broader international legitimacy.

Moreover, the chapter investigates the relationship between ICANN and the United States' government. In this connection, the chapter examines the contractual agreements signed between ICANN and the American government regarding the administration of IANA functions. Furthermore, the chapter foresees the future of ICANN's model in light of the United States' recent decision to relinquish its control over the DNS root.

Finally, the chapter presents a brief review of certain well-established international regimes, particularly 'satellite telecommunication', 'security communications' and 'labor standards', in order to investigate whether ICANN multi-stakeholder format is a unique model of global governance.

I. Establishment of ICANN

As indicated in chapter 5, the White Paper mandated the establishment of new corporation envisaged to administer the Internet architecture. The White Paper requested proposals from the stakeholders regarding the form and structure of this corporation. There were two main proposals came out of two different processes. The first process, which was open discussion organized by what is called the Internet Forum on the White Paper (IFWP), proposed a form of trade association for the new corporation. The second process, which was exclusive for the technical elites led by Jonathan Postel, proposed a form like IETF's model (Mueller 2002, 176-177).

The two alternatives gave different weights to different stakeholders. Although the White Paper recommended a consensus-based approach to determine the shape of the new corporation, the compromise between competing interests of the two alternatives was not possible. Eventually, the

United States government decided to accept the proposal of Postel's group (Mathiason 2009, 73). On October 2, 1998, Postel sent draft of the bylaws of the new corporation to the Untied States' Secretary of Commerce suggesting the name for the new corporation to be the Internet Corporation for Assigned Names and Numbers (ICANN) (Sonbuchner 2008, 192). Clearly, the name of ICANN reflects its responsibility of managing the dual components of Internet resources, IP addresses and domain names.

Postel's proposal was faced by criticism from various groups over variety of issues including the accountability of ICANN, the unbalanced representation of the Internet users in the ICANN's board of directors, the absence of civil liberties questions in the proposal. Due to this criticism, Magaziner and the officials from United States' Department of Commerce revised the proposal aiming to create greater accountability and openness through requiring ICANN to cooperate with the Department of Commerce. Nevertheless, the concerns remain that ICANN "is simply entrenching the preexisting Internet elite" (Moschovitis 1999, 229).

Significantly, the first CEO of ICANN was Mike Roberts, who was the first director of ISOC and fierce supporter for the gTLD-MoU (Mueller 1999, 499). Since its inception, ICANN was viewed as dominated by the technical engineering community. This reaffirms the influence of the Internet epistemic community on the formation of the new Internet architecture regime as well as its dominance over the relevant governance structure.

II. The evolution of ICANN: Multistakeholderism as a model for global governance

Examination of ICANN's 1998 bylaws (Internet Corporation for Assigned Names and Numbers 1998) demonstrates that ICANN's policymaking process replicates IETF's model of setting Internet standards. ICANN's policies are developed through a bottom-up process, which is initiated and led by what is called Supporting Organizations and Advisory Committees. The Supporting Organizations are responsible for developing and recommending substantive policies and procedures regarding issues that fall within their individual scope. Those policies and procedures shall be adopted upon approval by ICANN's Board.

The bylaws stipulate that there shall be at least three Supporting Organizations; each of which is entitled to nominate three directors to the Board. Firstly, the Address Supporting Organization shall be composed of representatives from Regional Internet Registries. It shall establish the Address Council with a mandate to make relevant recommendations to the Board regarding the operation, management and assignment of Internet IP addresses. Notably, IETF has maintained its influential role in formulating policies relevant to IP addresses. As indicated in chapter 3, despite delegation of IANA functions to ICANN, IETF still a key player in the current system of IP addresses

administration. The creation of IPV6, which expanded the depleted pool of IP addresses, is a clear example of IETF's ongoing influence in this regard.

Secondly, the Domain Name Supporting Organization shall be composed of representatives from domain name registries and registrars of Top-Level Domains in addition to businesses and any other entities that are users of the Internet. It shall establish the Names Council with a mandate to make relevant recommendations regarding Top-Level Domains, including operation, assignment and management of DNS. Significantly, IETF still assumes the responsibility of the technical maintenance and development of DNS.

Thirdly, the Protocol Supporting Organization shall be composed of representatives from the Internet protocol organizations. The Protocol Supporting Organization shall create a Protocol Council to make recommendations regarding the operation, management and assignment of protocol parameters. Significantly, the Protocol Supporting Organization is largely influenced by IETF due to its dominant status in setting the Internet protocols and standards.

Apparently, the three supporting organizations correspond to the three major IANA functions; each supporting organization addresses the relevant issues related to one of these functions. Address Supporting Organization addresses policies related to allocation of IP addresses, and thus Regional Internet Registries represent the main constituency of this organization. Domain Name Supporting Organization addresses the issues of Top-Level Domains and domain names registration; therefore, registries and registrars of domain names represent the principal constituency of this organization. Protocol Supporting Organization addresses the issues related to the Internet standards and protocols; hence, IETF is the key constituency due its de-facto status as dominant standards-setting organization for the Internet. Evidently, the provisions of ICANN's bylaws regarding the Supporting Organizations provides a more formal framework for already-existing constituencies, such as Regional Internet Registries and IETF, as well as new constituencies that has been created such as new domain names registries and registrars.

It is clear that despite delegation of IANA functions to ICANN, the Internet epistemic community, represented by IETF, has maintained a significant influential role in ICANN's system by the favor of its knowledge of the Internet architecture. Nevertheless, ICANN's system provides for wider representation of other Internet stakeholders.

In addition to the Supporting Organizations, ICANN's bylaws created Advisory Committees whose role is to provide advices to the board. Significantly, one of those committees is the Governmental Advisory Committee. Members of such Committee shall be representatives of national governments, intergovernmental organizations and treaty organizations, each of which

could appoint one representative to the Committee. The Governmental Advisory Committee embodies the role of the national governments in ICANN's system. The Committee should consider and provide the relevant advices on ICANN's activities as they relate to governments' concerns, particularly regarding issues where there may be an overlap between ICANN's policies and the international agreements. The creation of the Governmental Advisory Committee adds national governments to the spectrum of the Internet stakeholders represented in ICANN's system. Ironically, the role of governments in this system is limited to an advisory role, since the advices of the Governmental Advisory Committee might be approved or rejected by the Board.

Clearly, the governance structure of ICANN follows a bottom-up pattern, whereby policies are mainly developed through the Supporting Organizations to be submitted to the Board whose directors represent the spectrum of the Internet stakeholders. The role of national governments is limited to providing advices on specific issues, which emphasize the self-regulatory nature of ICANN's system. Furthermore, the United States' government does not directly intervene in the policy formulation process of ICANN despite its oversight function over the system. Obviously, ICANN embodies the governance model and the principles that have been developed by the Internet epistemic community throughout the Internet history.

Nevertheless, ICANN was subject to severe criticism since its inception. It was viewed as being dominated by the American government, technical elites, and multinational communications companies (Mueller 2002). It was accused of lacking democracy and accountability (Goldsmith and Wu 2006, 170). ICANN has been considered as institutionalizing a tension between "private technical management and public communication governance" (Shtern 2009, 82).

Seeking to acquire broader legitimacy, ICANN conducted a review process[29] in order to undertake the reform needed to enhance its legitimacy. On November 2001, ICANN established a committee entitled Committee on ICANN Evolution and Reform[30]. Such committee was originally created as a response to the debate that took place during that time within the Internet community regarding possible changes for ICANN's structure, including possible new Supporting Organizations and revised or new mechanisms for selecting ICANN's board. After reviewing the performance of the existing structure and processes of ICANN in relation to its mission, the committee concluded, on February 2002, that the existing structure and processes are not sufficient to achieve ICANN's mission recommending considerable evolutionary reforms. After extensive discussion of these recommendations, the committee was instructed to recommend a reformed

[29] Links to all the archival documents related to such review process are compiled on the following website of ICANN: https://archive.icann.org/en/committees/evol-reform/links.htm
[30] This committee was initially entitled Committee on Restructuring

framework for the structure and functioning of ICANN (Internet Corporation of Assigned Names and Numbers 2002a).

On May 2002, the Committee on ICANN Evolution and Reform issued extensive recommendations for a new structure and functioning of ICANN. The committee recognized that ICANN has a global policy function, which should be limited to policy areas related to its technical functions. The committee proposed several structural changes that aim at broadening the scope of representation and enhancing governmental involvement without undermining the private-sector nature of ICANN (Committee on ICANN Evolution and Reform 2002). Subsequently, new structure of ICANN has been approved and new bylaws has been accordingly adopted. The new bylaws became effective on December 2002 (Committee on ICANN Evolution and Reform 2003).

The 2002 bylaws (Internet Corporation for Assigned Names and Numbers 2002b) clearly provided the governments a more enhanced role in the new structure of ICANN through strengthening the institutional status of the Governmental Advisory Committee. The Governmental Advisory Committee became entitled to appoint one non-voting liaison to ICANN's Board as well as one delegate to the ICANN's Nominating Committee. Moreover, the Governmental Advisory Committee can designate a non-voting liaison to each of the Supporting Organization Councils as well as the Advisory Committees.

Notably, the current ICANN bylaws further strengthened the role of the Governmental Advisory Committee. The advice of the shall be 'duly' taken into account, both in formulation and adoption of the policies. If the ICANN's Board determines to take an action that is not consistent with the advice of the Governmental Advisory Committee, it shall so inform the committee and cites the reasons for its decision to refuse that advice. In such case, the committee and the Board will then try to find a mutually acceptable solution through a mediation process. Moreover, The Governmental Advisory Committee can recommend actions, development of new policy, or revision of existing policies directly to the Board (Internet Corporation for Assigned Names and Numbers 2014a).

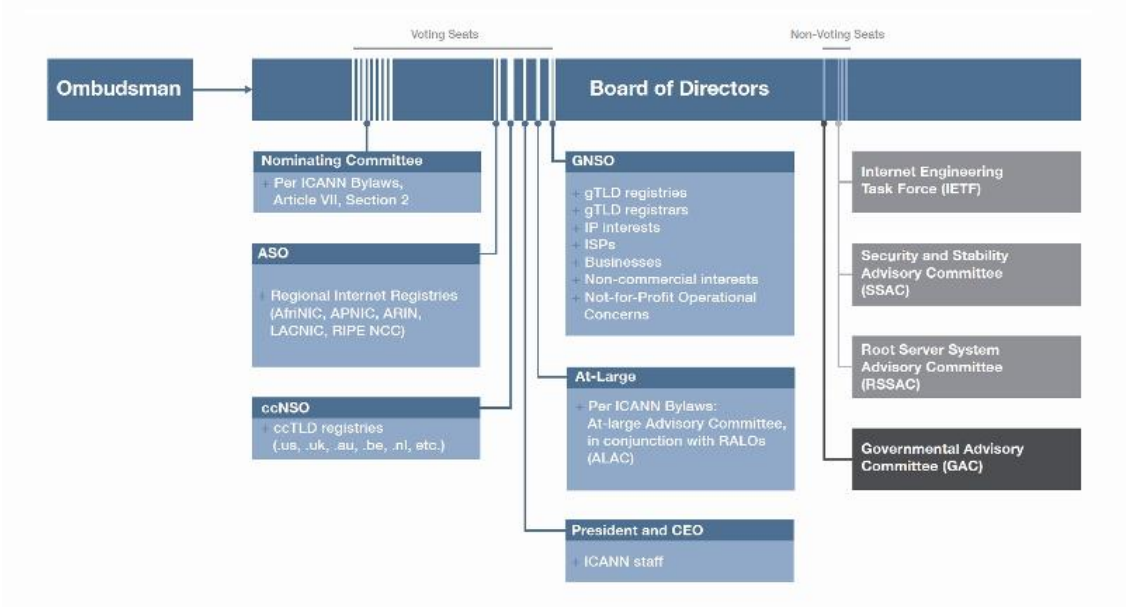
Interestingly, the Governmental Advisory Committee submits its advices to the Board based on consensus among its membership, where consensus is understood to mean the practice of adopting decisions by general agreement in the absence of any formal objection. If consensus is not possible, the Chair of the committee shall convey the full spectrum of views expressed by members to ICANN's Board (Governmental Advisory Committee 2011). Therefore, any collective advice issued by the Governmental Advisory Committee will be a compromised outcome that came out of deliberations and negotiations among its members. Thus, if there is a wide divergence among the members regarding any issue, submission of advice to the Board will not be possible.

Furthermore, the current ICANN bylaws have created two Supporting Organizations to replace the Domain Names Supporting Organization: Country Code Names Supporting Organizations and Generic Names Supporting Organization. Since the country code Top-Level Domains are managed by the respective national authorities designated by the countries' national governments, creation of specific Supporting Organization strengthens the governments' role in the policy development process regarding the country code Top-Level Domains. Clearly, strengthening the governmental role has been an instrument to enhance the international legitimacy of ICANN's system.

Moreover, the reform process of ICANN aimed at broadening the representation of the Internet stakeholders. The current ICANN bylaws created what is called At-Large Advisory Committee, which is the primary institutional host within ICANN for individual Internet users. Its role is to provide advice on ICANN's activities, insofar as they relate to the interests of individual Internet users. In addition, the bylaws created what is called Regional At-Large Organizations. Each Regional At-Large Organization serves as the coordination point and the main forum for public input to ICANN in its geographic region. According to ICANN (2015b), At-Large community includes more than 180 groups in 75 countries and regions. Obviously, ICANN was seeking to broaden the scope of representation to all the Internet stakeholders.

Furthermore, members of the Board are nominated by the Supporting Organizations, Advisory Committees, and IETF in order to achieve the most balanced representation for the Internet stakeholders. The following diagram presents ICANN's organizational chart[31].

Figure 2: ICANN organizational chart.



[31] This chart is available at the following ICANN's website: https://www.icann.org/resources/pages/chart-2012-02-11-en

In conclusion, ICANN embodies the epistemic community's values and principles of self-regulation and bottom-up governance. The policymaking model of ICANN replicates that of IETF's process of setting the Internet standards. ICANN has sought to acquire international legitimacy through enhancing the institutional role of national governments within its system as well as enlarging the representation scope for other Internet stakeholders including organizations representing the Internet users. The multi-stakeholder governance of ICANN became a model for global governance whose legitimacy is based on the participation of all the Internet stakeholders in the policymaking process. Nevertheless, the relationship between ICANN and the American government still undermines credibility of ICANN as illustrated by the following paragraphs.

III. The relationship between ICANN and the United States' government

The relationship between ICANN and the American government is reflected in the contractual documents signed between the two parties. ICANN had been initially established through a Memorandum of Understanding between ICANN and the United States' Department of Commerce (US Department of Commerce and Internet Corporation for Assigned Names and Numbers 1998). Examination of this Memorandum of Understanding indicates that it was envisaged to guide the transition of the Internet architecture administration to the private sector. Its objective is to ensure that the private sector, represented by ICANN, has the resources and capability to assume the responsibilities related to the technical management of the DNS. This assurance has to be guaranteed before complete transition of the DNS management to the private sector.

In this context, the Memorandum of Understanding requires collaboration on what is called 'DNS Project'. This project aims at designing and developing the mechanisms and procedures that should be established before transitioning the administration responsibility of DNS functions[32] that was then performed by, or on behalf of, the United States' government to the private sector. Once these mechanisms and procedures are successfully established, the DNS functions will be completely transitioned to the private sector.

Since then, ICANN has performed the functions of IANA, which involves three interdependent technical coordinating functions for the Internet domain names and addressing system. These functions include, administration of certain responsibilities associated with the DNS root zone management, allocation of IP addresses, and coordination of the assignment of technical protocol parameters (US Department of Commerce 2006a).

[32] Although the Memorandum of Understanding did not provide clear definition the DNS functions, they are understood to encompass IANA functions, in addition to any other functions related to the DNS management such as addition of new generic Top-Level Domains and creation of multilingual Top-Level Domains.

Although the transition was envisaged in the White Paper to conclude before 2000, the process continued without termination until now. The United States' government did not hand over the full DNS functions to the private sector. Throughout this period, the contractual relationship between the American government and ICANN has continued to be the basis of ICANN's mandate regarding administration of the Internet architecture. The Memorandum of Understanding between the Department of Commerce and ICANN was extended many times and became to be known as Joint Project Agreement (JPA), whereby ICANN has been contracted to continue performing the DNS functions. With each extension, the United States' government followed the same procedure that led to formulation of the White Paper: issuance of notice of inquiry seeking public comments on the extension of its contract with ICANN[33].

The last contract between the United States' government and ICANN was signed on September 30, 2009, entitled "Affirmation of Commitments." The document cites the commitments of both the American government and ICANN regarding administration of the DNS and formulation of the relevant policies. Remarkably, the United States' government reaffirmed its commitment to a multi-stakeholder, private sector led, bottom-up policy development model for the DNS management (US Department of Commerce and Internet Corporation for Assigned Names and Numbers 2009).

Examination of the contractual documents, JPA and Affirmation of Commitments, indicates that the transition process was guided by the same principles of the White Paper. The documents represent the framework that guides the policy formulation, in accordance with the White Paper's principles, without detailing these policies that have been actually formulated and developed through a bottom-up and self-regulatory process conducted by ICANN. The role of the American government has been limited to be a facilitator for this process without direct intervention.

Nevertheless, the United States government maintained its authority over the DNS root, whereby any change or modification of the root requires authorization of the government. Controlling the root gives the United States extensive influence over the Internet. It enables the United States' government to be the ultimate authority that can exercise veto power over ICANN’s decisions. For instance, the American government vetoed ICANN’s decision to create a new generic Top-Level Domain for adult websites (.xxx). The governments worldwide were concerned about the American veto power to approve or reject ICANN's decision of creating a new domain. The national debate on the issue of .xxx domain indicated that the United States’ domestic politics have greater impact

[33] This account is based on review and examination of the documents archived by the US National Telecommunication and Information Agency (NTIA), which contain the proceedings conducted by the United States' government as well as its consecutive contractual agreements with ICANN. Theses archived documents are available at the following NTIA's official website: http://www.ntia.doc.gov/page/docicann-agreements

over the DNS root's related policies than the international input. Moreover, the lack of transparency regarding communications between the United States' government and ICANN makes it difficult to determine the level of influence exerted by the former over the latter, which further contributed to the concerns regarding such influence (Sonbuchner 2008, 199-200).

With the accelerating growth and internationalization of the Internet, the governments worldwide became more concerned about the United States' rejection to relinquish its authority over the root. The contractual relationship between ICANN and the United States' government was subject to increasing international criticism, which eventually pushed the Internet governance as key issue on the agenda of the United Nation's WSIS. Apparently, such International pressure eventually pushed the United States' government to announce its decision to relinquish control over the root, which will be addressed by the following paragraphs.

IV. Legitimizing ICANN: Decision of the American government to relinquish control over the Internet

In a recent significant development, the United States' government declared its intention to relinquish control over the Internet. On March 14, 2014, the Department of Commerce's NTIA announced its decision to transition the DNS functions completely to the private sector The announcement mentions that this transition marks the final stage of the DNS privatization as previously outlined by the Untied States government in 1997 **(**US National Telecommunications and Information Administration 2014**)**.

The announcement of NTIA identifies responsibilities of the American government in the DNS management, which will be transferred to the global multi-stakeholder community. Those responsibilities include the procedural role of administering changes to the authoritative root zone file[34] and serving as the historic steward of the DNS. The announcement mentions that the United States' government currently contracts with ICANN to carry out the IANA functions, and has a cooperative agreement with VeriSign (successor of the Network Solutions) under which the latter implement the functions related to the root zone management. This is a clear identification of the responsibilities that should be transferred to the multi-stakeholder community. Thus, the transition process will focus on how to replace the United States' oversight function with new arrangements.

Furthermore, NTIA's announcement recognizes that ICANN has matured as an organization and taken steps recently to improve its transparency and accountability as well as its technical competence. It affirms that ICANN is the appropriate entity to lead the process of transition

[34] According to NTIA's announcement, the root zone file is the database that contains the lists of the names and addresses of all Top-Level Domains

highlighting its unique position as both the current contractor of IANA functions and the global coordinator of the DNS. This indicates that ICANN will be the candidate institution to host the new arrangements that will result from the transition process.

The announcement mandates ICANN to convene a global multi-stakeholder process in order to develop a transition plan. It instructs ICANN to develop this plan in collaboration with the directly affected parties, including IETF, ISOC, Regional Internet Registries, Top-Level Domain Name Operators, VeriSign, and other interested global stakeholders. During the transition process, the role of the United States' government will remain unchanged taking into consideration that current IANA functions contract expires on September 30, 2015. Clearly, the Internet epistemic community is indispensible to the process envisaged to establish new arrangements regarding administration of the Internet architecture.

Significantly, NTIA's announcement asserts the support of the United States to the multi-stakeholder model of the Internet governance. It affirms that the United States' government will not accept any proposal that replaces its role with a government-led or an intergovernmental organization solution. Obviously, the United States' government defines the parameters of the potential outcome from the transition process; the ICANN's multi-stakeholder model will continue as a model of the Internet administration. The traditional intergovernmental governance through intergovernmental organization is no option.

Additionally, the announcement provides the framework that should guide the transition proposal. It indicates that the transition proposal must enjoy broad community support and address the following four principles: enhance and support the multi-stakeholder model; maintain the openness of the Internet; maintain the stability of the DNS; and meet the needs and expectations of the relevant stakeholders.

Evidently, the American decision to relinquish its oversight function over ICANN strengthens legitimacy and credibility of the latter as a global governance organization. The decision generally addresses the international skepticism about the neutrality and transparency of ICANN. Moreover, it specifically addresses the concerns of the state actors that supports the self-regulatory governance of ICANN but are simultaneously concerned with the American hegemony over the Internet such as the European Union. In summary, the American decision has contributed to stabilizing its self-regulatory and multi-stakeholder system of ICANN as a model of global governance.

V. The Future of ICANN

Based on the NTIA's announcement, ICANN launched a process whereby the Internet stakeholders will introduce their proposals about the arrangements required for transitioning the

DNS functions to the multi-stakeholder community. The Stakeholders have organized two major tracks in order to develop the overall plan. One track focuses on IANA stewardship transition and the second focuses on enhancing the ICANN's accountability to the global community of the Internet stakeholders in the absence of its contractual relationship with the United States government (US National Telecommunications and Information Administration 2015b and Internet Corporation for Assigned Names and Numbers 2015c).

While ICANN's process has not yet finished, the above-mentioned proceedings of formulating a transition proposal clearly follows the same bottom-up approach employed in ICANN's model. Moreover, it is evident that the multi-stakeholder approach, which is based on self-regulation and bottom-up policymaking, will remain as a model of governing the Internet architecture. Obviously, ICANN will continue as the institution responsible for the administration of the Internet architecture. The expected outcome from the ongoing transition process may come up with a new arrangement but within ICANN's multi-stakeholder model.

In conclusion, the self-regulation and bottom-up policymaking as well as multi-stakeholder governance, embodied by ICANN's system are expected to continue characterizing the parameters of the Internet architecture regime. As will be indicated in Chapter 7, which addresses the tension between self-regulation versus intergovernmental governance, multi-stakeholder approach to the Internet governance has been legitimized by the United Nations' intergovernmental processes.

VI. Is ICANN a unique model of global governance?

Moreover, review of certain well-established international regimes, particularly 'satellite telecommunication', and 'security communications' and 'labor standards', indicates that ICANN's is not the first multi-stakeholder model to be adopted as a global governance framework for an international regime. Without prejudice to the peculiarities of each of these regimes, they have been historically developed and currently managed by both states and non-state actors.

The regime of 'satellite communication' was formed through the International Telecommunications Satellite Organization (INTELSAT), which was originally established as an intergovernmental consortium owning and managing a constellation of communications satellites. In 2001, the organization has been privatized and converted into a service provider company (Intelsat 2015). Accordingly, the management of the regime has been completely shifted to the private sector.

The regime of 'security communication' services was established through the International Mobile Satellite Organization (IMSO), which is an intergovernmental organization that oversees certain public satellite safety and security communication services. The organization has a form of public-

private partnership contract with Inmarsat Ltd company through a Public Services Agreement, which sets out the obligations of Inmarsat Ltd in respect of the relevant public services, as well as defining the oversight mechanism that exists between Inmarsat and IMSO (International Mobile Satellite Organization 2015). Here, the regime is managed through a partnership between state and non-state actors.

Remarkably, both 'satellite communication' and 'security communication' systems are technologically based regimes. Simultaneously, they are common in delegating the operational management of their respective regimes to the private sector. This indicates a preference to delegate the management of technology-based regimes to non-state actors, which could be applicable as well to the Internet architecture regime.

Furthermore, the 'labor' regime is administered by the International Labor Organization (ILO), which was created in 1919. ILO, which became the first specialized agency of the United Nations in 1946, is composed of tripartite membership that represents the three parties related to labor: governments, employers, employees. Those three parties, through ILO, are collectively responsible of setting the international labor standards as well as monitoring the compliance with those standards (International Labor Organization. 2015). Clearly, the labor regime, which is one of the oldest international regimes, is premised, developed, and managed by both state and non-state actors.

Therefore, the multi-stakeholder model is not a unique example in global governance. There are well-established international regimes that are based on similar models. This indicates that ICANN's system is not an anomaly, and can sustain as global governance model for the Internet administration, where non-state actors are indispensable players.

Moreover, it is clear that multi-stakeholder approach to global governance, including the Internet administration, is a conscious preference of states, rather than an indication of a 'diminishing state role' in formation and administration of international regimes.

Chapter 7

The International debate on Internet governance

This chapter aims at investigating the intergovernmental dynamics that took place on the Internet governance and whether the outcomes of such dynamics could lead to formation of international regimes related to the Internet. The chapter seeks also to indicate the extent to which such dynamics could affect the self-governance model of the Internet architecture regime administered by ICANN. Moreover, the chapter indicates how the interests and preferences of the United States, which have been identified domestically as indicated in chapter 5, were reflected in the intergovernmental negotiations conducted over Internet governance. Furthermore, it demonstrates the stance of other state actors, in particular the European Union, as to the Internet governance. Additionally, the chapter seeks to indicate how the international debate on Internet governance has evolved and how the relevant issues have been framed.

In order to achieve these objectives, the chapter examines the key international events that addressed the Internet governance; namely, the United Nations' WSIS, which was held on two phases in 2003 and 2005, and the World Conference on International Telecommunication (WCIT), which was recently held by the ITU in 2014. The chapter also provides a brief review of the dynamics and progress made within the two processes created by WSIS to address Internet issues; namely, Internet Governance Forum (IGF) and 'enhanced cooperation.'

WSIS is the first United Nations' summit that addressed Internet governance issues, and its outcome documents -which were adopted by consensus - represent the possible international concurrence that could be achieved in this regard. IGF and 'enhanced cooperation', which are created by WSIS, are the only forums that currently discuss the Internet issues within the United Nations' machinery. In addition, WSIS adopted a pluralistic approach that ensured a remarkable effective participation of non-state actors. On the other hand, WCIT is the most recent international conference that addressed Internet-related issues, where the consensus on the outcome document was not possible due to divergent views over the Internet. Moreover, the divergence over the Internet throughout WCIT led certain states, particularly western states, to refrain from signing the outcome document. Examination of the dynamics that led to such failure of achieving consensus reveals the controversial issues that continue to plague the international debate on the Internet governance. Moreover, WCIT is very relevant to the Internet technical administration, rather than Internet governance, due to its technical nature.

Thus, while examination of WSIS demonstrates the scope of international consensus over the Internet governance, investigation of WCIT clarifies the controversial issues that have not yet settled. Moreover, while WSIS is a *politically* driven United Nation's summit, WCIT is a *technically* driven conference of a United Nations' specialized agency, the ITU. Therefore, examination of both WSIS and WCIT demonstrates how the Internet governance has been addressed politically and technically at the international level.

The methodology of examining WSIS follows two-tiered approach. Firstly, we analyze the dynamics and interactions that took place among the involved actors during the process that eventually resulted in the outcome documents approved by the summit. This will be achieved through analyzing variety of documents as well as written transcripts and online streamed audio recordings for each meeting held throughout the preparatory process of the two phases of the summit. This analysis demonstrates various stances of the main actors and the rationale provided in defending their positions. It also reveals how the international debate on the Internet governance has evolved within an interactive process of negotiations that took place on the outcome documents. Secondly, we analyze the outcome documents approved by the two phases of WSIS with a view to indicate the level of the collective agreements reached among the relevant actors, which will guide the future international debate on the Internet governance.

The same methodology of examining WSIS is applied to examination of WCIT, but with a reversed order. Firstly, we analyze the outcome documents of WCIT in order to identify the Internet-related issues throughout the text. Secondly, we investigate the dynamics of the negotiations that led to this outcome document through analyzing of the official proposals and archived transcripts of the conference's sessions.

I. World Summit on Information Society (WSIS)

The ITU, in its Plenipotentiary Conference held in Minneapolis, Minnesota 1998, launched the idea of holding an international summit on information society sponsored by the United Nations (International Telecommunication Union 1998). The United Nations General Assembly endorsed holding of the WSIS in two phases (UN General Assembly 2002). The first phase took place in Geneva from 10 to 12 December 2003, hereinafter referred to as 'Geneva summit', and the second phase took place in Tunis, from 16 to 18 November 2005, hereinafter referred to as 'Tunis summit'.

The objective of the first phase was to develop a statement of political will that could lead to concrete steps in order to set up the foundations for "an Information Society for all". Geneva summit adopted the Geneva Declaration of Principles and Geneva Plane of Action on December 12, 2003 (International Telecommunication Union 2006a).

The objective of the second phase was to review and evaluate the progress of Geneva's Plan of Action as well as to find solutions for the issues of Internet governance, financing mechanisms needed to establish the Information Society, and follow-up and implementation of WSIS's decisions. Tunis summit adopted the Tunis Commitment and Tunis Agenda for the Information Society on November 18, 2005 (International Telecommunication Union 2006).

WSIS pluralistic approach

The organizer of the Summit, the United Nations and ITU, built upon recent practices of involving non-governmental stakeholders in various meetings of the United Nations. They adopted a pluralistic approach where intergovernmental organizations, civil society and non-governmental organizations, and the private sector entities were invited to participate and provide their inputs and views on the relevant issues of WSIS. Procedures for participation and modalities for receiving inputs of these entities have been developed throughout the WSIS preparatory process (World Summit on the Information Society, Geneva Phase 2002d).

Senior officials from 175 states as well as high-level representatives from international organizations, civil society, and private sector attended the two phases of WSIS (World Summit on the Information Society, Geneva Phase 2004). Approximately half of 11000 participants attending Geneva summit were official delegates from 175 states, about 1000 participants represented 87 United Nations bodies and agencies, 200 represented 50 international organizations, 3000 represented 481 non-governmental organizations, 500 represented 98 business entities and 1000 from 631 media entities (World Summit on the Information Society, Geneva Phase 2005). Two years later, the participants had nearly doubled in Tunis summit reaching nearly 20000 individuals. Of those participants, about 6000 officials represented 175 countries, 1500 represented 92 international organizations, 6000 represented 606 NGOs and civil society entities, and 5000 represented 226 business entities (World Summit on the Information Society, Tunis Phase 2006a).

Servaes and Carpentier (2006, 39) analyzed participation of non-state actors in WSIS concluding that the summit has produced new or perpetuated "inter-actor relationships, patterns of behavior and discourses on participation." Putting WSIS in an historical context, they also indicated that the summit has made substantial progress, related to the participation of non-state actors, as compared to other United Nations' summits. Similarly, Numminen (2005, 65) argues that non-state actors involvement in WSIS activities was remarkable and unprecedented in United Nations summits.

This indicates a growing tendency to involve non-state stakeholders into intergovernmental processes of the United Nations. While involvement of non-state stakeholders in the United Nations' conferences and summits had preceded WSIS, the summit established a precedent by enabling these

stakeholders to provide their inputs into the intergovernmental negotiations that took place over the outcome documents of the summit. Moreover, the extensive participation of those non-state actors has been remarkable compared to previous United Nations' summits.

As indicated below, the Coordinating Committee on Business Interlocutors (CCBI) was established to represent the private sector businesses. ISOC represented the Internet technical communities. This indicates how those non-state actors have been able to organize and lobby at the international level.

Geneva Summit, 2003: Unanticipated emergence of the Internet governance issues

The preparatory process leading to the Geneva phase of WSIS was long and complicated. It began by establishing Preparatory Committee (PrepCom) consists of all member states of the United Nations as well as all invited entities, as observers, from United Nations organs and specialized agencies, intergovernmental organizations, non-governmental and civil society organizations, and business sector entities (World Summit on the Information Society, Geneva Phase 2002a).

The PrepCom held three meetings and intersessional meeting throughout 2002 and 2003 in order to prepare the draft document to be adopted by Geneva summit. Regional conferences and other events related to the summit were held in order to provide inputs for the work of the PrepCom (World Summit on the Information Society, Geneva Phase 2006).

The Internet governance did not feature prominently in the initial agenda of the summit, which was prepared by the ITU (International Telecommunication Union 2007). The ambiguity of the 'information society' concept, the chaotic process of identifying the relevant issues, and involvement of magnitude of stakeholders with different interests and views contributed to the emergence of unanticipated issues, particularly the Internet governance. The concerns related to obstacles faced by the developing countries regarding exercising their sovereign rights over Internet resources pushed the Internet governance agenda into the front. The debate initially focused on the unilateral control of the United States and ICANN over the administration and management of DNS and then broadened to include other issues such as cybersecurity, cybercrime, Internet multilingualism, and developmental aspects of the Internet (Shtern 2009, 67-81).

The concerns around the lack of transparency and accountability of ICANN that were being raised before convening the WSIS made the WSIS "a logical venue to raise the issue of Internet governance" (Shtern 2009, 84). During the first meeting of the PrepCom, the delegation of Brazil expressed its concern about administration of the Internet by non-state actors as follows:

> "Democratic and representative governments should not be replaced by arbitrary groupings of private business and non-governmental institutions in decisions regarding

> the economic space brewing within powerful digital networks, such as the Internet. Organizing this new environment to the satisfaction of all, and ensuring the beneficial participation of developing countries and their societies is central to our work" (World Summit on the Information Society, Geneva Phase 2002b, 2)

In the same meeting, the European Union explicitly called the WSIS

> "to indicate a set of common principles underlying future actions and initiatives [regarding] participation and new mechanisms for governance at global and national levels encompassing issues related to … electronic communications regulatory frameworks, data protection, network security and cyber-security, legal aspects of e-commerce and Internet governance " (World Summit on the Information Society, Geneva Phase 2002c: 13)

The issue of the Internet governance was also raised through several declarations issued by regional WSIS preparatory meetings held between the first and second meeting of the PrepCom (Kleinwachter 2004, 31). For example, the declaration of the Pan-European regional conference for WSIS[35] (Bucharest, 7-9 November 2002) mentions that "management of domain names" is among the issues that "should be addressed with the active participation of all stakeholders" (World Summit on the Information Society, Geneva Phase 2003a: 4). Clearly, the European countries are specifically concerned with the administration of the Interne architecture.

Since the PrepCom II meeting (Geneva, February 2003), administration of DNS and ICANN related-issues were controversially raised between delegations calling for reforming the existing governance structure through replacing ICANN with a more traditional intergovernmental organization, namely the ITU, and others supporting the existing non-governmental institutional framework of ICANN.

During the intersessional PrepCom meeting (Paris, 15-18 July 2003), Brazilian and Cuban delegations proposed that intergovernmental organization, particularly ITU, should administer and manage DNS instead of ICANN. While the developed country delegations, the private sector, and the Internet technical community supported the status quo, their responses were varied. Certain delegations such Australia, Canada, Japan proposed general terms –such as 'broad', 'suitable', 'international' organization – instead of referencing 'intergovernmental' or any specific institutional label. Other comments were more rigid and restrictive. The United States, the Internet technical community represented by ISOC, and the private sector represented by CCBI rejected any intergovernmental oversight over the Internet (World Summit on the Information Society, Geneva Phase 2003b). The controversy was framed as a competition between two models of governance: governance through intergovernmental organization versus non-governmental self-regulation governance; more specifically, the ITU versus ICANN.

[35] Regional conferences were held to provide regional inputs for WSIS preparatory process.

The interventions and comments of the United States and ISOC emphasized that the calls for reforming the existing governance structures neglect the extent to which the Internet technology characteristics constrain the spectrum of policy alternatives (Shtern 2009, 89). The United States delegation commented as follows:

> "the management of the Internet domain name and address system should take place via a public-private partnership that operates in an open and transparent manner to preserve and enhance the necessary global interoperability and coordination of the Internet's unique identifier system while recognizing its technical limitations and requirements" (World Summit on the Information Society, Geneva Phase 2003c, 4)

ISOC expressed deep concern by:

> "…statements in the draft documents that imply the need for new, intergovernmental organizations to "manage" the Internet. In particular, proposals to replace ICANN and create a new mechanism for managing root servers, domain names and IP addresses is unnecessary, will lead to significant disruption, and is unlikely to succeed. The unprecedented growth and innovation that we have seen in the Internet sector is due in large part to the lack of regulation and constraints on technology development. In addition, the processes employed have been open, democratic and inclusive and it's hard to see how these could be improved by a new intergovernmental body…we should continue to support the decentralized, bottom-up innovation that has made the Internet the powerful tool it is today. Non-governmental organizations such as the Internet Engineering Task Force, ICANN, and the World Wide Web Consortium, have proven very flexible and nimble and have enabled the global Internet community to quickly find consensus on how best to adopt and use new Internet technologies. Individual governments can and should support such organizations and ensure the full participation of their citizens in their activities" (World Summit on the Information Society, Geneva Phase 2003d, 3).

The private sector has also supported the current governance structure rejecting any intergovernmental intervention in the management of the Internet, which is conducted by the private sector as embodied in ICANN. As CCBI puts it:

> "CCBI supports private sector leadership of the management of Internet names and numbers as embodied in ICANN. Therefore, business cannot accept any reference to an intergovernmental organization engaging in such management" (World Summit on the Information Society, Geneva Phase 2003e, 7).

The stance of the United States and ISOC reveals that power of knowledge, embodied in the Internet technology, has been used to justify specific trajectory of the Internet administation, which is the maintenance of the existing governance structures represented in ICANN's system. The architectural design and technological characteristics of the Internet have been employed by those actors to justify exclusion of alternative governance systems, particularly governance based on intergovernmental oversight. The architectural design is claimed to restrict the policy options and accordingly the framework of governance.

Shtern insightfully argues that, "by asserting that the power dynamics of global Internet governance simply preclude the possibility of dramatic calls for reform, the US, the ISOC and their sympathizers underline how, in the absence of a more intrusive legal framework, the ability to

control and define technology is power…technological power was being wielded alongside political economic power by the chief beneficiaries of the status quo in the effort to use their capacity leverage to bully the debate over meaningful reform of internet governance right off the WSIS agenda before it even got off the ground." (Shtern 2009, 90). This clearly illustrates how the knowledge can turn into power in the processes of forming international regimes.

Remarkably, the callers for reform did not present counter arguments to the claimed technological constraints that dictate the current governance system; the power of knowledge and technology seems to be irrefutable. Their focus was instead centered on the lack of legitimacy and inclusiveness of the existing structures. This inadvertently implies that the current structures can be adjusted to be more legitimate and inclusive without a need for radical change since dramatic overhaul is no option from the technical point of view.

Moreover, the bottom-up decentralized process of decision-making – which has been developed by IETF as indicated in chapter 4 - had been presented by ISOC as a successful model of governance that is based on self-regulation and lack of governmental control. This indicates how the Internet epistemic community has promoted its own model of governance internationally. The technical concepts that evolved into embraced values of such community had been advanced not only to defend maintaining the status quo, but also to provide a new non-traditional framework for establishing the international principles and norms related to the Internet.

Furthermore, it is clear that the United States, ISOC, and CCBI have formed a lobby to defend principles of the current system of ICANN. As indicted below, such lobby has continued its endeavors throughout WSIS to enshrine those principles into the outcome documents of the summit. Significantly, while the European Union did not question the principles of the current governance model of ICANN, it focuses on the need to address the management of the DNS without suggesting concrete alternatives to the status quo. On the other end of the spectrum, delegations from developing countries that called for reform provided intergovernmental governance as an alternative to the current arrangements.

The polarization over the Internet governance continued throughout the meetings of PrepCom III (September 15-26, November 10-14, December 5-6, and December 9, 2003 in Geneva). The proposition that intergovernmental organization should govern the Internet remained the most difficult issue of the negotiations. As it became clear that the consensus couldn't be achieved between the two ends of the spectrum (Kummer 2007, 7)**,** the compromise was eventually achieved on a proposal to subsequently convene a follow-up study group, led by the United Nations

Secretary General, to examine Internet governance issues and propose recommendations for the second phase of the summit (Kummer 2005, 246).

Moreover, another compromise has been achieved by agreement on recognizing that the Internet governance include both technical as well as public policy issues, and while the private sector should assume the leadership at the technical level, the governments should be involved in coordinating public policy issues with other stakeholders (Shtern 2009, 91). This implies that the technical administration of the Internet represents only one element of the Internet governance. Moreover, it is clear that while the label of the Internet governance had been used throughout Geneva summit to characterize the debate over the Internet issues, such debate had actually focused on the administration of the Internet architecture with the attempts to reform the current regime.

Analysis of the outcome document adopted by Geneva phase of WSIS

The outcome document adopted by Geneva summit includes two parts. The first is a 'Declaration of Principles', which is a political statement towards establishing information society for all (World Summit on the Information Society, Geneva Phase 2003f) , and the second is 'Plan of Action', which includes action-oriented commitments (World Summit on the Information Society, Geneva Phase 2003g). The document includes four paragraphs related to Internet governance[36]. The Internet governance has been addressed for the first time in an official international document.

The document recognizes that multi-stakeholder approach is the basis for international management of the Internet, which should be "multilateral, transparent and democratic" with the involvement of all stakeholders. The enshrinement of the multi-stakeholder approach to Internet governance in an official document adopted by the United Nations' states significantly indicates that the relevant future processes of forming an international regime for the Internet administration will not be confined to state actors. It is a formal recognition by the states on the non-state actors' indispensable role in forming such regime.

Moreover, the document recognizes that the Internet governance includes two categories of issues, technical and international public policy issues. While the private sector should continue its role in the economic and technical fields, the states have the sovereign right in international public policy issues. This distinction among the issues of the Internet governance (technical and public) has been in fact a step towards legitimizing the status quo arrangements of the Internet administration. Identifying that the technical domain falls outside the realm of the governments implies their exclusion in matters related to the management of architecture and resources of the Internet, which

[36] Paragraphs 48, 49, and 50 of Geneva Declaration of Principles, and paragraph 13 (b) of the Plan of Action.

is currently handled by ICANN's system and IETF. The defenders of the status quo consider the management of root zone servers, IP addresses allocation, and DNS is merely technical, where the governments should not accordingly have any role. Although there is no definition of either the technical or public policy issues in the document, this categorization itself implies such tendency for maintaining the status quo, while it opens the door for a potential role of governments in other specific issues to be defined.

While the document recognizes that the role of the Internet technical community in developing the Internet standards and the relevant policies[37] should continue, it limits the role of intergovernmental organizations to the coordination of Internet public policy issues. This represents an additional indicator of the tendency to maintain the current arrangements of the Internet administration, whereby the Internet standards are formulated and adopted by the organizations established by the Internet epistemic community; particularly IETF, and industry consortiums such as W3C. The intergovernmental organizations have been ambiguously granted a non-defined role in coordinating unidentified public policy issues.

Due to the lack of consensus on any substantive issues, the document created a follow-up process by asking the Secretary General of the United Nations to set up a working group on Internet Governance (WGIG) in order to formulate proposals for action to be considered by the second phase of WSIS in Tunis. It stipulates that this working group should consist of representatives of all stakeholders. The mandate of WGIG is to develop a definition of the Internet governance; to identify the Internet-related public policy issues; to develop a common understanding of the respective roles and responsibilities of the relevant stakeholders, and to present a report on its activities by Tunis summit. Thus, there was an agreement that the basis for discussion on the

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[37] The document does not refer directly to the Internet technical community, and refers instead to 'international organizations' that develops Internet standards and relevant policies as distinct from intergovernmental organizations. Although there is no indication in the document about the difference between intergovernmental and international organizations, it is clear that international organizations are meant to be 'international non-governmental organizations'.

Although this issue is outside the scope of this study, it is worthy to note the view of the United Nations Economic and Social Council (ECOSOC) concerning intergovernmental organizations is implicit in its Resolution 288 (X) of February 27, 1950. The resolution indicates that "any international organization which is not established by intergovernmental agreement shall be considered as a non-governmental organization for the purpose of these arrangements." Thus, the Yearbook of International Organizations, which aims to identify and list all intergovernmental organizations, defines such bodies as: "being based on a formal instrument of agreement between the governments of nation states; including three or more nation states as parties to the agreement; possessing a permanent secretariat performing ongoing tasks" (http://www.uia.org/archive/types-organization/cc).

The ECOSOC defines International Non-Governmental Organization as "any organization which is not established by inter-governmental agreement" (Resolution 288 (X) of February 27, 1950), "including organizations which accept members designated by government authorities, provided that such membership does not interfere with the free expression of views of the organizations" (Resolution 1296 (XLV) of 25th June 1968)

Internet governance during Tunis summit will be based on the inputs and recommendations developed by a multi-stakeholder group. Multi-stakeholderism has been operationalized through the composition of WGIG.

Clearly, the unanticipated emergence of the Internet governance and the lack of clarity of what could constitute this governance made it difficult to achieve consensus on any relevant substantive issue in Geneva summit. The compromise was to defer the discussion of this controversial topic to Tunis summit.

Working Group on Internet Governance (WGIG)

Pursuant to the mandate of Geneva phase of WSIS, the United Nations Secretary General set up the WGIG on November 11, 2004, which composed of 40 members from governments, private sector, and civil society, who "all participated on equal footing and in their personal capacity."[38] To fulfill its mandate, the group held four meetings in Geneva that led to its final report, which had been presented to the second phase of WSIS in Tunis (Working Group on Internet Governance 2005). In addition to the open consultations conducted by the WGIG, certain regional and sub-regional meetings submitted inputs to the WGIG's work (Drake 2004).

Since ITU considers itself the legitimate United Nations' agency that should administer the Internet instead of ICANN, its Secretary General attempted, during the first formal meeting of WGIG, to direct the WGIG's agenda to focus on the international management of the Internet architecture as follows:

> "The focus of the group's work should be the managing of names, addresses and protocols. The rest was illusory…. the group should concentrate on discussing proposals for the worldwide management of Internet's logical infrastructure" (Afonso 2005, 9).

This was interpreted as an effort to set the WGIG's agenda to go in line with ITU's apparent interest in international management of the Internet. Taking into consideration this ITU's interest and the contention over its role in the management of the Internet throughout Geneva phase of WSIS, the WGIG was able to take a broader look at the issues (Shtern 2009, 101).

Analysis of the WGIG's report

The WGIG's report (Working Group on Internet Governance 2005), which was released on July 14, 2005, introduced a definition for the Internet governance, a list of international public policy issues related to the Internet, an accounting of the roles of each stakeholder, and proposals for reforming the existing governance structure of the Internet. Since the WGIG's report had been a basis for the discussions and negotiations on Internet governance over the course of Tunis phase of

[38] For a list of WGIG members, consult 'Working Group on Internet governance 2005: 20-22.'

WSIS, the following paragraphs analyze the main elements of this report highlighting some of key issues addressed in this regard.

The WGIG's definition of Internet governance, which was subsequently adopted by Tunis summit, affirms that multi-stakeholderism is a basic principle in forming the Internet-related regimes as follows:

> "Internet governance is the development and application by governments, the private sector, and civil society, in their respective roles, of shared principles, norms, rules, decision-making procedures, and programs that shape the evolution and use of the Internet"

It is worthy to note that this definition derives from Krasner's definition of international regime as "a set of explicit or implicit principles, norms, rules, and decision making procedures around which actors' expectations converge in a given area of international relations" (Krasner 1982, 186). However, whereas Krasner's definition is state-centric, the WGIG's definition of Internet governance identifies set of various actors: governments, private sector, and civil society. WGIG adopts a pluralistic approach to the definition of the Internet governance.

The report adopts a broad scope for Internet governance, which goes beyond the Internet names and addresses that is being handled by ICANN. It identifies public policy issues that are relevant to the Internet governance categorizing them into "four key public policy areas"[39]. One of those categories, entitled "issues relating to infrastructure and the management of critical Internet resources", addresses ICANN's functions. The administration of DNS and the root servers system as well as IP addresses is remarkably one of a series of issues identified under such category. Thus, for WGIG, administration of DNS, root servers, and IP addresses are not considered only technical issues as being claimed by the defenders of ICANN's status quo; they are claimed instead to be public policy issues.

Among the issues identified, the report recommended thirteen issues as priority for consideration by the Tunis Summit[40]. Additionally, it determines the relevant challenges to each issue. Among those issues, three are related to ICANN's functions: administration of the root zone files and system, allocation of domain names, and IP addressing. Under 'administration of the root zone files and systems', two challenges have been further identified. The first is the unilateral control of the United States government regarding authorization of changes to the root zone file. The second is the

[39] The four categories are: a) "issues relating to infrastructure and management of critical Internet resources"; b) "issues relating to the use of the Internet; c) issues relevant to the Internet but have an impact much wider than the Internet for which existing organizations are responsible, such as intellectual property rights or international trade; and d) issues related to the developmental aspects of internet governance, in particular capacity-building in developing countries." (WGIG report, 5)

[40] Those issues are: administration of the root zone files and systems; interconnection costs; Internet stability, security and cybercrime; spam, meaningful participation in global policy development; capacity building; allocation of domain names; IP addressing; Intellectual property rights; freedom of expression; data protection and privacy rights; consumer rights; and multilingualism.

lack of formal relationship with root server operators. Under 'the allocation of domain names', the challenge is the need for further development of policies and procedures for generic Top-Level Domain names (gTLDs). Under 'IP addressing', there is a need to develop allocation policies for IP addresses that ensure the balance in the distribution of resources. Significantly, none of those issues have been tackled by the Tunis summit despite being among the priorities identified by the WGIG's report. As indicated in chapter 6, most of these issues had been subsequently addressed through a self-regulatory process of reforming ICANN as well the United States announcement to relinquish its control over the Internet.

The report provided an account for the respective roles and responsibilities of the government, civil society, and the private sector. Significantly, it mentions that the role of governments include "oversight functions", which became one of the most contentious issues in the Tunis summit. The report also adds the Internet academic community as well as the Internet technical community to the stakeholders relevant to the Internet governance recognizing their role in the evolution, functioning, security and stability of the Internet.

The WGIG report concluded that some adjustment needed to be made to bring the current Internet governance arrangements "more in line with the WSIS criteria of transparency, accountability, multilateralism and the need to address all public policy issues related to Internet governance in a coordinated manner." In response to this, the report recommended creating a global mulit-stakeholder forum in order to enable policy dialogue among all stakeholders "on equal footing" on Internet-related public policy issues. It proposes that the forum be linked to the United Nations, open to all stakeholders from all countries, modeled on the WGIG open consultations, supported by a lightweight structure, and guided by a multi-stakeholder coordinating process. The Tunis summit approved this proposal and created the Internet Governance Forum (IGF) as elaborated below.

Moreover, the report proposed four different organizational models that would serve as a basis of reforming the existing governance mechanisms with the objective of establishing a proper system of "global public policy and oversight". Three of those models propose major changes of the existing structures of the DNS and root servers' administration, either replacing ICANN or transferring the Internet oversight functions from the United States' government to a new international institution. The remaining model limits the reform to enhancing ICANN's Governmental Advisory Committee in order to meet the concerns of some governments on specific issues. Remarkably, the report recommends that any institutional structure of the proposed model should not involve "in day-to-day operational management of the Internet that does not impact on public policy issues." Significantly, Tunis summit did not endorse any of these models.

In summary, the WGIG's report is a comprehensive document that identifies the relevant issues to the Internet governance. Besides the definition of the Internet governance, it extends the scope of the relevant issues to the Internet governance beyond the technical administration, which indicates the inherent complexity of setting international principles, norms, or rules for the Internet. The diversity of the issues identified and their crosscutting nature with other domains reveals the difficulty associated with forming an international regime for a sector that has historically evolved without central regulating authority. On the other hand, the report recognizes that the administration of the architecture and resources of the Internet are among the international public policy issues, and make it a priority issue to be tackled by the Tunis summit.

Tunis summit, 2005: Pushing Internet governance to the front

As was the case in the Geneva phase of WSIS, several meetings and events were held over the course of the preparatory process of the Tunis phase of WSIS. WSIS regional and sub-regional conferences as well as thematic meetings and other related events were organized to provide inputs for work of the PrepCom[41](International Telecommunication Union 2006b).

Examining the comments received from all stakeholders on the WGIG's report[42], which was complied in a long document (World Summit on the Information Society, Tunis Phase 2005a) indicates an emerging consensus on the definition of the Internet governance. There is also minor opposition to include some public policy issues mentioned in the report - such as multilingualism, interconnection costs, combating spam, and states' sovereignty over their country code Top-Level Domains - in the outcome document to be approved by Tunis summit. One the other hand, divergence of views was clear over the institutional issues; in particular, replacement of the existing governance arrangements by alternative structure based on governmental oversight.

The United States and CCBI argues that the status-quo should be maintained affirming the effectiveness of the existing structures, and calling for market-oriented Internet with leadership of the private sector. ISOC criticized the focus of the report on policy issues as it gives the impression that regulation and international treaties are the best solutions to the Internet-related issues, contending that more effective and global solutions could be provided by new technologies and standards as well new Internet services. ICANN claimed that any improvement should be within the existing structures explaining how its bylaws require continuous improvement. Significantly, the

[41] The PrepCom held three meetings: PrepCom I on June 2004, PrepCom II on February 2005, and PrepCom III on September 2005 followed by resumed session on November 2005. Two Subcommittee of the PrepCom were created: Subcommittee A was dedicated to the Internet governance and Subcommittee B for the other issues.

[42] The United Nations Secretary-General transmitted the report of WGIG to the WSIS the chair of PrepCom and ITU Secretary-General on July 14, 2005 (http://www.wgig.org/WGIG-Report.html). Two informal consultation meetings on the Internet governance were subsequently held (Geneva, July 20 and September 6, 2005 respectively) in order to discuss the WGIG's report. See http://www.itu.int/wsis/wgig/index.html.

European Union insisted that internationalization of Internet governance lie in the management of the Internet's core resources, namely the DNS and the root server system, calling for a new public-private cooperation model.

The early discussion that took place in September's meeting of the PrepCom III indicated that despite the continuous divergence of views over the institutional issues related to the Internet, the difference of opinions had evolved. There was little discussion over the role of ITU as a potential alternative to ICANN in the Internet governance as compared to the discussion that took place over the course of the Geneva phase of WSIS. Instead of ICANN versus ITU, the discussion was mainly over '"the current system" versus "a different system with a larger role for governments" (Shtern 2009, 110). The lack of reference to ITU's role in the four governance models proposed by the WGIG's report seems to be a significant factor in such evolution.

Spectrum of proposals on the Internet governance were further submitted by many delegations. These proposals ranged from either focusing on creation of new intergovernmental body, following progressive approach towards more internationalization of the existing governance arrangements, or creating a policy dialogue forum for Internet governance issues.

For instance, Iran (World Summit on the Information Society, Tunis Phase 2005b) and Saudi Arabia, on behalf of the Arab Group (World Summit on the Information Society, Tunis Phase 2005c), proposed explicitly a new intergovernmental organization to assume the oversight functions over the Internet. Russia proposed that adjustment to the current governance structure is needed and that no single government – referring to the United States - should dominate the international Internet governance, which should involve all the stakeholders including governments (World Summit on the Information Society, Tunis Phase 2005d). Argentina recommended revolutionary approach to the existing governance structures proposing continued internationalization of ICANN, and reinforcement of the role of governments in its decision-making with regard to public policy issues (World Summit on the Information Society, Tunis Phase 2005n). The African countries proposed progressive approach that can lead to a more internationalized multi-stakeholder oversight functions of the Internet public policy (World Summit on the Information Society, Tunis Phase 2005e). The proposals of Brazil (World Summit on the Information Society, Tunis Phase 2005f), Japan (World Summit on the Information Society, Tunis Phase 2005g), and Canada (World Summit on the Information Society, Tunis Phase 2005h) centered only on creating a forum to discuss the Internet governance issues.

While this divergence continued over the course of September meeting of PrepCom III, the European Union introduced a new proposal regarding future arrangements of the Internet

governance on September 28, 2005. The proposal mentions that the existing institutional arrangements for the Internet governance are not adequate and need to be adjusted into a "new model for cooperation." According to the proposal, this model should involve governments in developing and applying global public policy principles over "naming, numbering, and addressing-related matters[43]". Additionally, the proposal suggested creation of forum for Internet governance in a separate process parallel to a simultaneous transition process for the proposed new model of international cooperation (World Summit on the Information Society Tunis Phase 2005i). This proposal represents an elaboration of the European Union's views communicated during Geneva phase of WSIS.

On the other hand, the European proposal identified some guiding principle of the new model, affirming that it should not replace the existing structures of Internet governance, and should instead build on them with the involvement of all stakeholders. In addition, the role of governments should mainly focus on the public policy issues without any involvement in the day-to-day operation of the Internet. Significantly, the proposal asserts that the suggested model should respect the "the architectural principles of the Internet, including interoperability, openness, and the end-to-end principle." (World Summit on the Information Society Tunis Phase 2005i).

Recognizing the architectural principles of the Internet, the European proposal clearly demonstrates Europe's adherence to fundamentals of the current Internet structure established by the Internet epistemic community. Moreover, the proposal supports multi-stakeholder governance. Simultaneously, it criticizes the current state of affairs regarding administration of the Internet architecture: naming, numbering, and addressing-related matters. Whereas there is no explicit reference in the European proposal to the hegemony of the United States in the current governance arrangements, the criticism about the current state of affairs implicitly reflected the European concerns about such hegemony. Despite this concern, the European proposal neither seek to change the principles nor the fundamentals of the current system, it just aimed at adjusting the system to bring about the balance against the American hegemony.

Affirming the hegemonic status of the Untied States in the current governance arrangements, the American delegation immediately rejected the European proposal as follow:

> "We want to make perfectly clear once again [the distinction] between public policy and the day-to-day operations of the Internet. The day-to-day operations of the Internet, of which any changes or modifications to the authoritative root zone file is a part, is essential to the trust and confidence that the world may have and should have in the Internet. It is a responsibility that the US takes with great seriousness and we will not do anything to

[43] These matters, according to the proposal, such as allocation of IP number blocks, procedures for changing the root zone files, rules regarding DNS system, contingency planning in order to ensure the continuity of DNS functions, and establishment of dispute resolution mechanism and arbitration based on international law.

> adversely impact that responsibility. On the other hand, there are many issues that we would say fall in the domain of the public policy realm. That includes: spam, viruses, cyber security, cybercrime all of the issues that we are very much concerned with and that we wish to engage in actively on a dialogue that will lead to the resolution of those issues" (World Summit on the Information Society, Tunis Phase. 2005j)

Notably, many delegations expressed either support or interest in the European proposal. The supporters included the delegations who had been vocal in calling for reform of the existing mechanisms of governance throughout WSIS such as China and Brazil; governments such as Saudi Arabia whose perspective regarding regulation of communication has historically been different from that of most European states; and other states such as Cuba, Iran and Venezuela that engage at the time in diplomatic hostilities with the United States. However, when some of these supporting delegations – which had already submitted their own proposals - were asked by the chair to consult with the European Union to explore merging those series of proposals into one, the consultations revealed no common ground (Shtern 2009, 114). This reaffirms that the Europeans did not seek dramatic overhaul and revision of the fundamentals of the current system as those countries do.

The media attention to the WSIS had subsequently increased framing the issue as a clash between the Untied States and European Union over control of the Internet. The period between the closing of PrepCom III session on September 2005 and its resumed session on November of the same year, the United States was claimed to have exercised extreme pressure over the European Union to give up its proposal (Shtern 2009, 116).

In the resumed PrepCom III session on November 2005, the discussion over creating new model of governance, including the European proposal, was unproductive. The discussion then turned to whether reforming ICANN's Governmental Advisory Committee - in order to reinforce the role of governments in the current governance structures - or to create a new body. Eventually, the discussion did not lead to any progress regarding this issue (World Summit on the Information Society, Tunis Phase 2005k).

On the other hand, the discussion over creating Internet governance forum revealed an emerging consensus. The focus was on the institutional nature of the potential forum and the host organization. While the United States and Australia delegations called for a multi-stakeholder non-binding forum hosted by ISOC, the reform seekers called for the United Nations or ITU to be the host of the forum. The compromise reached was to create multi-stakeholder non-binding forum linked to the United Nations. Moreover, the European Union proposed a parallel process, which is called 'enhanced cooperation', in order to enable governments to carry out their roles and responsibilities in international Internet-related public policy issues. The proposal satisfied status-quo defenders, since there is no intergovernmental oversight, as well as reform callers as it creates a

process dedicated to examine the role of governments in the Internet governance (World Summit on the Information Society, Tunis Phase 2005k).

The above-mentioned dynamics revealed dissatisfaction, with varying degrees, among certain states about the current governance structure of the Internet, albeit it derives from different sources. Some states are concerned about the principles of the current governance structures, embodied in ICANN, due to domestic political reasons such as China, Iran and Saudi Arabia. For those states, lack of governmental control in the current structures restricts their abilities to censor the Internet. Other states, mainly from developing countries, view the principles of the current system are illegitimate since they do not reflect the traditional state-centric mechanisms of governance embodied in governance through intergovernmental organizations, let alone the United States hegemonic global status over the Internet. Those two categories sought radical overhaul of not only of the current governance structure but also of its underlying pluralist, self-regulatory, non-governmental principles and norms. They aim at replacing the current structure by the traditional state-centric governance through intergovernmental organization.

Other states, mainly the European Union states, are concerned that the status quo privileges the United States. The unilateral control of the United States over the DNS and root servers as well as its influence on ICAAN's decisions create disequilibrium in the current governance structure in the favor of the Americans, which had apparently been a source of concern for the European Union throughout WSIS. The focus of the European contributions to WSIS was centered on the need to adjust the current administration of Internet resources. The European aim was limited to adjustment of the current institutional structure in order to bring about the balance in governance of the Internet architecture against the American dominance

Nevertheless, the European Union embraces the principles of the current system: self-regulation, non-governmental, and multi-stakeholder governance; it rejects control of the Internet through intergovernmental machinery. Moreover, the European Union affirms its willingness to maintain the Internet's decentralized structure through emphasizing the adherence to the architectural principles of the Internet, particularly the end-to-end principle. This significantly demonstrates the attachment of the European states to the values of the Internet epistemic community. This is clearly the impact of the Internet epistemic community through its transnational network. In addition, the values of the Internet epistemic community reflects the Western values in general including that of the European Union. *Clearly, the European Union consciously prefers self-regulatory approach to Internet administration, much as the United States does.*

Thus, the European Union does not seek radical change of the status quo; it aims instead to rectify the balance. The difference over principles of the current governance system between states calling for radical overhaul and the European Union was manifested by the failure to reach a common position regarding merging their proposals on the Internet governance as demonstrated above..

Analysis of the outcome document adopted by Tunis phase of WSIS

The outcome document of the Tunis summit includes two parts, 'Tunis Commitment' (World Summit on the Information Society, Tunis Phase 2005L) and 'Tunis Agenda of the Information Society'' (World Summit on the Information Society, Tunis Phase 2005m). The document includes considerable part dedicated to Internet governance making it a reference document in this regard. Since the document is an outcome of tough negotiations, its language is a compromised one that reflects, with varying degrees, spectrum of different views and interests. This consensus-based international document satisfies, to the extent possible, all the concerned parties. Regardless of the differentiated capabilities among those parties in reflecting their own views and interests in the document, the rule of consensus renders the document an expression of the collective agreement over the issues at question. Thus, examination of such document clarifies the scope of international consensus on Internet governance and the potential international cooperation in this area.

Examination of this document indicates that the principles of the current governance system of the Internet architecture; particularly multi-stakeholderism, self-regulation, and non-governmental intervention, will continue as the underpinnings of the Internet technical administration. The involvement of all stakeholders in governance arrangement is emphasized throughout the document. The existing non-governmental governance structure will remain without change since the document recognizes their effectiveness affirming that the private sector should take the lead in the day-to-day operations of the Internet. Throughout the document, administration of the Internet architecture and the relevant technical issues are explicitly excluded from the future debate on the Internet governance. This implies that administration of the Internet architecture is considered a settled issue where the current status quo will continue.

The document adopts the WIGIG's approach to the Internet governance, which goes beyond the Internet architectural issues of naming and addressing. It recognizes the need for international cooperation on cybersecurity, fighting cybercrime, combating spam, countering terrorism on the Internet. It calls for respect of freedom of expression and privacy as basic human rights. The document committed to work towards multilingualisation of the Internet, the participation of stakeholders from developing countries in the Internet governance decision making, and the achievement of affordable international interconnection costs for the developing countries. While

such approach to the Internet governance reaffirms the tendency to exclude administration of the Internet architecture from potential intergovernmental processes that may address Internet governance issues, it also opens the door for intergovernmental cooperation on other areas related to international public policy issues. Ironically, the document stipulates that even the international cooperation on those public policy issues should be addressed in a multi-stakeholder settings.

The main operational outcome of WSIS is the creation of the IGF as a multi-stakeholder policy dialogue forum in order to discuss the Internet governance issues with five years renewable mandate. According to the document, IGF is a non- binding forum without any oversight functions. It will not involve in day-to-day or technical operations of the Internet and will not replace any of the existing governance structures. It should have a lightweight and decentralized structure, and will be convened by the United Nations Secretary General. Such mandate renders IGF a multi-stakeholder forum limited to exchanging views on the Internet-related issues.

Another operational outcome is the creation of an ill-defined multi-stakeholder process, called "enhanced cooperation", to be started by the United Nations Secretary-General in to order to "enable governments to carry out their roles and responsibilities in international public policy issues pertaining to the Internet, but not in the day-to-day technical and operational matters." Again, the document reaffirms that operational administration of the Internet should be excluded from any process that involves the governments. While the document mentions that such cooperation should include the development of global principles on public policy issues related to the management and coordination of critical Internet resources, it does not identify the spectrum of issues that will be subject to such cooperation.

In summary, the international debate on the Internet governance throughout WSIS did not produce or even envisage any real substantive change to the status quo; it instead affirmed its legitimacy and effectiveness. Moreover, WSIS has legitimized the 'multi-stakeholderism' as a fundamental principle of governing the Internet, which subsequently dominated the discourse of the United Nations' discussions on Internet governance. The operational outcomes of WSIS are limited to creation of processes – IGF and enhanced cooperation - in order to continue discussion on the Internet governance, which was a compromise to the reform seekers that provides an opportunity to bring about evolutionary or progressive reform for the current governance structure. The following paragraphs address the recent developments that took place within the two processes.

IGF

IGF is an embodiment of how states departed from traditional state-centric forms of International organization to a new multi-stakeholder model. It reflected a compromise between *intergovernmentalism* and *self-governance* approaches to the Internet governance.

The IGF structure comprise a secretariat and a group called Multi-stakeholder Advisory Group (MAG). MAG consists of fifty-five members from governments, the private sector and civil society, including representatives from the academic and technical communities, who are appointed by the United Nations Secretary General. MAG's purpose is to advise the United Nations Secretary General on the agenda and program of the Forum's meetings. It holds annual meetings, which are organized in the form of parallel sessions and workshops dedicated to discuss various topics related to Internet govenance (Internet Governance Forum 2015). The five years mandate of IGF's was extended by the United Nations General Assembly for from 2011 to 2015 (United Nations General Assembly 2011, 6).

One of the main challenges of IGF effectiveness is its inherent inability to produce concrete outcomes of its meetings since it is not entitled to issue resolutions, guidelines, or even recommendations about Internet governance issues.

Summarizing the dynamics within IGF, Mueller (2010) categorized the actors in IGF as 'hawks' and 'doves'. He explains that hawks seek to leverage the forum for a tangible outcome in the form of resolutions or policy recommendations. Some 'state-actor hawks', such as Brazil, try to use the forum as preparatory phase to reach intergovernmental convention on the Internet principles. Others, such as China and Russia, look for transforming the forum into traditional intergovernmental entity. 'Civil society hawks' seek to harness IGF to achieve a multi-stakeholder consensus on the Internet policy issues and to institutionalize the practices of the bottom-up process of the forum, which could secure their participation in formulation of policy recommendations. On the other hand, the 'Doves' consider the forum as informational body rejecting any attempt to produce a concrete outcome of its meetings in form of resolutions or policy recommendations. Those doves include western developed countries, status quo organizations including ICANN and ISOC, multinational business interests, and major European country code Top-Level Domains (ccTLDs). Nevertheless, the IGF turned to be a forum for promoting the Internet self- governance and maintaining the status quo. Mueller argues that with the maturity of the forum, some 'doves' started to leverage it to promote their ideas of Internet self-governance, which led to a proliferation of national and regional IGFs (Mueller 2010, 110-111). The significance of IGF to self-governance and status quo defenders is reflected by the fact that IGF activities is financed by the donors belonging to the stakeholder groups (governments, private sector, and the civil society) of Western, liberal nations, where many of them are viewed as affiliated with status-quo defenders of Internet

governance (Epstein 2012, 141). Thus, the IGF, which was ironically created to satisfy the reform seekers, ended up as an instrument for promoting the status quo.

Furthermore, in a comprehensive study about IGF dynamics using theory of structuration and critical discourse analysis, Epstein (2012, 202-207) concluded that the main contribution of IGF to Internet governance is mainstreaming the values of the Internet community into the United Nations' system. Therefore, IGF became a tool employed to infuse values of the Internet epistemic community into the United Nations' system.

While IGF failed to address the controversial issues of Internet governance including ICANN's oversight and internationalization of the Internet administration, the controversy continued over the process of setting the forum's agenda as well as the stakeholders' representation in MAG (Shtern 2009, 130-132). The increasing dissatisfaction over IGF performance led to establishment of 'United Nations Working group on improvements to IGF', which is mandated to formulate recommendations for improving the forum's performance (United Nations Economic and Social Council 2010, 7).

Examination of the report of this working group (United Nations General Assembly and Economic and Social Council 2012) reveals that the recommendations do not address the key challenges that paralyze IGF from producing tangible outcomes. For example, the recommendation of the report regarding the inability of IGF to produce tangible outcome does not envisage any change in the form of the current outcome, which is limited to a mere reporting about IGF activities. Instead of recommending a change of such outcome to 'resolutions' or 'policy recommendations', the report focuses on how to improve the current reporting exercise. In fact, the report was a compromised outcome of tough negotiations among representatives of certain member states of the United Nations - with the participation of other stakeholders - which include both 'hawks' and 'doves'. Clearly, there was no possibility to issue recommendations that tackle the real problems, which undermines the functioning of the IGF, due to the ongoing divergence in this regard.

The inability of IGF to tackle the controversial issues of Internet governance and the lack of tangible outcomes of its meetings undermines the forum's prospect to affect the status quo. is still short of being an effective entity in Internet governance. However, IGF is being employed by the status quo defenders to promote the principles and values of the Internet's self-governance model.

Enhanced cooperation

Fulfilling the mandate given to the Untied Nations by the WSIS regarding initiation of a process of 'enhanced cooperation' in order to help governments carrying out their roles in the Internet governance, the United Nations' secretariat held open consultations in 2010 seeking inputs from all

the stakeholders about the framework and nature of such cooperation. The United Nations Secretary General presented a report in 2011 summarizing the inputs received during these consultations (United Nations General Assembly and Economic and Social Council 2011).

Examination of this report indicates that there are divergent views over the procedural aspects as well as the substantive issues that should be tackled through enhanced cooperation. The stakeholders' inputs identified a different, wide range of issues that should be addressed through this track. With this divergence, the report did not provide clear guidance about the framework and substance of such cooperation.

Due to the lack of progress, the United Nations General Assembly established multi-stakeholder Working Group on Enhanced Cooperation with a task to make recommendations on how to implement WSIS mandate regarding enhanced cooperation, through seeking, compiling and reviewing inputs from all stakeholders (United Nations General Assembly 2013). The group, which consists of 22 representatives of governments and 20 participants from private sector, civil society, and technical and academic communities, held four meetings from May 2013 to May 2014 (United Nations Conference on Trade and Development 2015a). The group failed to formulate recommendations for operationlizing enhanced cooperation due to the political sensitivity of the topic and the significant divergence of views on the relevant issues (United Nations Conference on Trade and Development 2015b, 144).

The deliberations within this working group was based on the responses of the stakeholders on a questionnaire submitted by its chair, which includes questions about the institutional framework of enhanced cooperation and the substantive issues needed to be addressed under such framework. Such deliberations reflect continuity of the tension that prevailed throughout the two phases of WSIS: competition between intergovernmentalism and multi-stakeholderism as a basis of Internet governance. Some members see that 'enhanced cooperation' was not implemented arguing that it should be dedicated to explore the governments' role as to the Internet governance; accordingly, there is a need to establish an intergovernmental platform to enable governments carrying out such role. Other members view that enhanced cooperation has already been in implementation arguing that the ongoing processes in various forums, including many international organizations, embody such cooperation. They further argue that even IGF represents a model of enhanced cooperation. Moreover, there is a divergence over identification of the public policy issues that needed to be tackled through enhanced cooperation[44].

[44] This account depends on the analysis of the interviews that were conducted in Geneva (30 April -2 May) with 10 delegations of various stakeholders participating in the meetings of the Working Group on Enhanced Cooperation, who expressed their willingness to be anonymous.

Ironically, the enhanced cooperation, which was envisaged to identify the role of governments in Internet governance, is conducted through multi-stakeholder process where non-state actors are key players. This indicates the extent to which multi-stakeholderism has been stabilized and embedded as principle of Internet governance. Furthermore, enhanced cooperation did not lead to any progress regarding the role of governments in Internet governance due to significant divergence on the topic. Clearly, the ill-defined enhanced cooperation was just a 'forum shifting' solution of WSIS, which faced the same dilemmas of the summit.

II. The World Conference on International Telecommunication (WCIT)

The treaty of the International Telecommunication Regulations (ITRs) was signed in 1988 by member states of the ITU with the objective to establish an international regulatory framework for international telecommunications (International Telecommunication Union 1989). ITU held WCIT in Dubai, from 3 to 14 December 2012, in order to revise the treaty of ITRs. The conference aimed at updating the ITRs in order to keep pace with the contemporary developments in the telecommunications technology through adopting a new treaty that will establish contemporary regulatory framework for international telecommunications.

Among 144 countries that participated in the conference, 89 countries signed the outcome document that includes the new treaty of ITRs. The United States, the European Union countries, Canada, and Japan are among the states that rejected to sign the treaty. The United States and the European Union did not sign the agreement due to the divergence and impasse over the Internet (Pfanner 2012).

The following paragraphs investigates the dynamics that took place among member states throughout WCIT with the objective to demonstrates how the international debate on the Internet has evolved almost after 10 years of WSIS, how the relevant issues have been framed, as well as the reasons that led western states to refuse signing the Final Acts of the conference.

Analysis of the Final Acts of WCIT

The Final Acts of the WCIT (International Telecommunication Union 2012a) includes the text of the ITRs treaty and two appendices attached to it as well as separate five plenary resolutions adopted by the conference. Examination of the ITRs treaty reveals that most of its provisions are in the form 'best-endeavors', which reduces the legal commitments to *'endeavoring'* to comply with the substantive obligations of each provision[45]. This means that most of the substantive obligations of

[45] Examination of the ITR text indicates that most of its provisions use the formulation "member states shall endeavor to…" Despite this issue is beyond the scope of this study, it is worthy to note that this formulation is legally weaker than the formulation "member states shall..." For example, the legal commitment of the formulation "members shall endeavor

the treaty are not compulsory. Moreover, most of the treaty's provisions give extensive discretion to the member states regarding implementation of the obligations. Thus, the treaty represents a sort of framework or guidelines for regulation of the international communications, which does not require strict measures to be taken by the member states in this regard.

Article 1 of the ITRs provides that the regulations "do not address the content-related aspects of telecommunications." This means that the regulations apply only to the operation of telecommunications, not to the content. However, Article 5b calls on ITU member states to take necessary measures to prevent propagation of the "unsolicited bulk electronic communications", which is known as spam**.** Since the spam is a form of content transmitted over the Internet, it represents the only Internet-related issue mentioned in the text of the treaty.

Additionally, one of the five plenary resolutions, entitled "To foster an enabling environment for the greater growth of the Internet" addresses the Internet issues, calls on the ITU to play an active role in the development of the multi-stakeholder model of the Internet. As mentioned above, the resolutions are not part of the ITRs' text; rather, they separately belong to the Final Acts of WCIT. Significantly, the multi-stakeholder approach to Internet governance has been ironically affirmed within ITU that had been - throughout WSIS - the candidate intergovernmental organization to replace ICANN. This does not only indicate that multi-stakeholderism is embedded into the international discourse of the Internet governance, but also demonstrates the increasing legitimacy of ICANN's system.

Examination of the official documents and transcripts of WCIT

Seeking to reveal the actual dynamics that took place during the negotiations on the draft text of the Final Acts, the following paragraphs examine the proposals and comments submitted by the member states of ITU on the draft text of Final Acts of WCIT, which has been complied in 223 pages document (International Telecommunication Union 2012b). In addition, we also examine the official transcripts of the plenary sessions of the conference (International Telecommunication Union 2012c), which demonstrates the interactive debate that took place among the member states. Moreover, we demonstrate the reactions of the key actors regarding the failure of achieving consensus on the Final Acts.

Our examination reveals that a group of states led by Russia, including China and the host country, the United Arab Emirates, argued throughout the negotiations on the draft of the Final Acts that the Internet falls within the scope of the envisaged regulatory framework of ITRs treaty because

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to ensure…" is limited to the obligation of *trying to ensure* the compliance, while the legal commitment of the formulation "member states shall ensure…" means the obligation to take the necessary measures *'to ensure*' the compliance.

the Internet traffic passes through telecommunication networks. They proposed to include a clause regarding the Internet in the actual treaty text. The original proposal calls for equal rights for all governments to manage "Internet numbering, naming, addressing and identification resources". Presenting the proposal during the third plenary session of the conference, the Russian delegation made it clear that the proposal aims at emphasizing the rights of ITU member states to participate in the Internet governance (International Telecommunication Union 2012e, 31-32). Clearly, these are the same concerns that had been raised during the two phases of WSIS, which focused on the Internet administration under the label of Internet governance.

Due to the severe opposition by the United States and the European countries, Russia and its allies agreed to compromise by withdrawing that proposal and to settle for a lesser measure. They accepted a separate resolution on the Internet, which is not officially part of the treaty wording. Moreover, the wording of the proposal was just limited to calling on the ITU to play an active role in the development of the multi-stakeholder model of the Internet. However, this was even unacceptable to the United States and its supporters, which considered the resolution an attempt to bring the Internet governance under the regulatory framework of the ITU.

When the draft of the Final Acts of the conference seemed to have been approved by a majority of member states in the thirteenth plenary session, the United States' delegation declared promptly that it is unable to sign the agreement in its current form. In the fourteenth plenary session of the conference, the American delegation intervened as follows:

> "It's with a heavy heart and a sense of missed opportunities that the U.S. must communicate that it's not able to sign the agreement in the current form. The Internet has given the world unimaginable economic and social benefit during these past 24 years, all without UN Regulation. We candidly cannot support an ITU Treaty that is inconsistent with the multi-stakeholder model of Internet governance. As the ITU has stated, this conference was never meant to focus on Internet issues. However, today we're in a situation where we still have text and resolutions that cover issues on spam and also provisions on Internet governance…..the United States continues to believe that Internet policy must be multi-stakeholder driven. Internet policy should not be determined by member states, but by citizens, communities, and broader society, and such consultation from the private sector and civil society is paramount. This has not happened here…" (International Telecommunication Union 2012f, 29)

The United States' intervention was revealing; it will not accept addressing the Internet issues through any intergovernmental channel of the United Nations. The United States clearly indicates that states are not entitled to formulate the Internet-related policies.

The United States' stance was supported by the European Union countries, Australia and Canada. Accordingly, the consensus could not be achieved after nearly two weeks of tough negotiations between western governments on one hand and Russia, China and several developing countries on the other. Like most of the United Nations' specialized agencies, the ITU resorts to a majority vote

when the consensus can not be achieved. Eventually, the Final Acts including ITRs treaty has been adopted by a majority vote.

Interestingly, the United States, before refusing to sign the Final Acts, succeeded to dilute and limit the Internet-related issues into an article on countering spam in the treaty text and non-binding resolution on the Internet as mentioned above. The resolution even acknowledges the multi-stakeholder model promoted by the United States and its supporters. Moreover, the United States was similarly able to remove other critical proposals from the treaty. Such proposals, sought by some African and Asian states as well as European telephone companies, require Internet companies to pay telecommunication companies for the traffic on the latter's networks, which was unacceptable for the United States. Nevertheless, the United States refused to sign the treaty. This indicates that even a minor reference to the Internet in an intergovernmental regulatory framework is very sensitive to the United States. Moreover, the technical nature of WCIT, which makes it the most convenient forum to address Internet administration issues, exacerbated the American sensitivity. Clearly, deregulation and non-governmental intervention in the Internet affairs is the only feasible option for the Untied States.

Significantly, the debate on the Internet throughout the conference has been framed on whether the Internet is a medium for *content* or just a *telecommunication service* similar to other telecommunications such as telephony. This added another complexity to the international debate on Internet governance. The United States, supported by western governments, considers the Internet a medium for content that should not subject to governmental regulation and must remain open in order to allow freedom of expression. On the contrary, other states, such as Russia and China, view the Internet as a telecommunication service that should be regulated by governments as it is the case for other telecommunication services[46]. The justifications provided by the parties concerned on the reasons of failure to achieve consensus further highlights this issue as will be demonstrated by the following paragraphs.

Reactions to failure of achieving the consensus

The Unites States delegation held a press conference to explain the reasons for rejecting the ITRs treaty. Similarly, the European Union Commission issued a memo explaining its view regarding the treaty. ISOC issues a statement supporting rejection of signing the treaty. On the other hand,

[46] The issue of content was raised throughout the negotiations on the Final Acts. The interventions of western delegations during closing plenary session of the conference were revealing. For instance, The United Kingdom delegation justified its rejection to sign the Final Acts as follows: "we all agreed that content was not intended to be part of the ITRs, but content issues keep coming up". Similarly Sweden put it as follows: "Sweden has serious concerns about some of the provisions in this ITRs, especially in relation to content and security" (International Telecommunication Union 2012f, 30-31)

Russian delegation criticized the American decision. The ITU secretary-general issued a statement commenting on the outcome of the conference. These reactions, which are demonstrated below further clarify the rationale of each actor's stance during WCIT.

In an interview with Ambassador Terry Kramer, the head of the United States' delegation to WCIT (US Department of State 2012), he clarified that his country believes that the scope of ITRs should extend neither to Internet governance nor to content. He added that because other countries made it clear that the treaty should be extended to cover those issues, the United States can not be part of that consensus.

Kramer identified five critical issues in the ITRs that led his country to refrain from signing the treaty; four of them are related to the Internet. Firstly, expansion of the scope of the entities that will be subject to the regulations from 'recognized operating agencies' to 'operating agencies', which means that this scope has been extended to include the Internet Service Providers (ISPs). Secondly, the provision related to regulation of spam, which is a form of Internet content. For the United States, regulating spam will inevitably opens the door to regulation of other forms of content, including cultural and political speech. Thirdly, several proposals related to the Internet governance seek to enable governmental control over the Internet, specifically Internet naming and addressing functions. The United States believes that these issues can only be handled through multi-stakeholder organizations. Fourthly, the resolution on the Internet directly extends the scope into the Internet and of the ITU's role therein. The fifth reason, which is not related to the Internet, is an article of the treaty about 'security of telecommunication networks'; an issue considered by the United States as inappropriate to be placed under the ITRs.

Moreover, Kramer undermined the direct impact of the new treaty mentioning that he does not "see a lot of near-term or intermediate-term risks here, because it's not a legally binding document." Eventually, he affirmed that the United States will continue to support and advance the multi-stakeholder model of Internet governance along with liberalized telecommunication markets.

After the closing of the WCIT, the European Commission issued a memo on December 14, 2014 entitled "No change to telecoms and Internet governance: EU member states - amongst dozens not signing proposed new International Telecommunications Regulations (ITR) Treaty, remain 100% committed to open Internet" (European Commission 2012). The European Commission clarifies that a proposal to extend the scope of the treaty to cover Internet issues was made during the final discussions, which ruptured the possible compromise. The memo adds that a vote was then called by Iran, which subsequently determined the final revised version of the treaty text. It adds that the European Union's member states were not in a position to sign such revised version.

According to the memo, the European Commission views the ITRs treaty in its current form a threat to the future of open Internet and Internet freedoms. The multi-stakeholder model should continue as a basis for Internet governance through the recent processes including the IGF and ICANN. Remarkably, the memo undermined the share of the signatory countries in international telecommunication traffic by mentioning that the signatories account for a "small proportion of global telecoms traffic." Thus, the European Commission invoked economic power as key factor in establishing an accepted international regulatory framework. Significantly, while the European states sought to address Internet administration issues during WSIS, they firmly refused to follow the same approach in WCIT. This reaffirms that the stance of European states during WSIS did not seek to address the Internet issues through intergovernmental channels.

Furthermore, the stance of the United States has been seconded by strong lobbying from the groups that oppose any restrictions on the Internet such as ISOC as well as the Internet's giant corporations like Google. Notably, the concerns about the outcome of the conference were fueled by the fact that it is convened in the United Arab Emirates, whose government was alarmed by the role of the Internet social networking in bringing about the Arab Spring (Pfanner 2012).

The statement of ISOC supported the United States' position indicating that the treaty is inconsistent with the multi-stakeholder model of Internet governance. The statement emphasized that the treaty should not extend to content of the Internet, or implicitly or explicitly undermines the principles that have made it so beneficial (Internet Society 2012c). This view was also supported by the Internet and web pioneers, Vinton Cerf and Tim Berners-Lee, who warned that any changes to the current Internet governance mechanisms could pose a "disruptive threat to the stability of the system" (Kelion 2012).

On the other hand, Russian delegation criticized the American stance. “The Americans are the fathers and mothers of the Internet, and we have to appreciate that… but words like ‘Internet’ and ‘security’ should not be treated like curse words. They have been treated like curse words by some delegations at this conference” said Andrey V. Krutskikh, a Russian Foreign Ministry official. In an interview, Mr. Krutskikh expressed disappointment that the United States' position did not change after Russia conceded by accepting a mere resolution, rather than treaty text, on the issue of the Internet public policy issues. He added that the proposal sought to reflect the reality that the Internet is a telecommunication service that should be subject to governmental regulation affirming that it can not be considered a form of content as being claimed by the United States (Pfanner 2012).

Furthermore, ITU, in a statement issued after closing of the conference, emphasized that the repetition of the word 'Internet' throughout the conference is a recognition of the reality that the

"telecommunications and Internet are inextricably linked". The statement clarifies that the conference is not about the Internet governance and there are no provisions on the Internet in the treaty text. It adds that a non-binding resolution annexed to the treaty aims at fostering growth and development of the Internet, which is a task central to the ITU's mandate in connecting the world that "today still has two thirds of its population without Internet access." The statement affirms that scope of the new ITRs treaty does not cover content issues, and the first article explicitly states that the treaty does not cover content-related issues (International Telecommunication Union, 2012d).

ITU further clarified that that the non-binding resolution on the Internet featured only in the treaty's appendices following the United States' efforts to remove it from the main regulations. It also indicated that the provision on spam in the treaty text was not related to deciding which content should or should not be permitted to get through, but about finding technical solutions to those sending "a million emails and flooding the pipes" (BBC 2012).

The above-mentioned reactions indicate that divergence over the Interne is not only on the entity that should be mandated to administer its architecture, but also on the different perceptions of such global network. Such divergence was framed in terms of perception where some actors perceive the Internet as form of content and others consider it a telecommunication service. Such framing of the issue adds a political and cultural aspect to the international controversy on the Internet governance since the debate extended beyond the administration of the Internet architecture that was the initial trigger behind placing the Internet on the international agenda.

Moreover, different perceptions of the Internet among actors participating in WCIT replicate the national debate that took place in the United States throughout the 1990s as demonstrated in chapter 5. Clearly, the domestic dynamics of the United States, which settled the perception of the Internet as form of content, has determined the country's international stance on Internet governance. This indicates that the extent to which domestic politics can shape international stance of state actors.

Conclusion

Examination of the key international events that addressed Internet governance demonstrates the struggle between various actors over how the Internet should be governed. Initially, there was no clarity about what constitute Internet governance, but it became clear that technical administration of the Internet represents only one component of the Internet governance. *While the international debate on the Internet was launched under the label of Internet governance, most of the discussion had focused on the Internet technical administration that was the most controversial issue discussed under such label.*

The international debate over the Internet administration embodies the struggle between the traditional intergovernmental governance through governmental organizations versus the de-facto self-regulatory multi-stakeholder governance embodied in ICANN's system. *Evidently, the self-regulatory multi-stakeholder approach has been internationally recognized as the appropriate governance model for the Internet administration.* This represents recognition for ICANN's system as the appropriate arrangement for the technical administration of the Internet. Thus, the ongoing debate within the United Nations regarding Internet governance is not expected to change the status quo of the Internet administration. However, such debate might address international cooperation in issue-areas related to the Internet other than the Internet technical administration.

Furthermore, the domestic dynamics within the United States has shaped its international stance as to Internet governance. Without understanding how the Internet has evolved and the influence of the Internet epistemic community on shaping the American perception as to the Internet, it is difficult to account for the American stance that seeks to promote self-regulatory governance of the Internet. The state-centric approaches to international regimes, which focus on the international dynamics among state actors ignoring how perception and preference are constructed, fall short of providing coherent account for the American stance. Clearly, knowledge has explanatory power in this regard.

While the international debate on Internet governance focused initially on the Internet technical administration, it has evolved over time to include other political and cultural aspects related to different perceptions of the Internet. Western countries perceive the Internet as a forum for published content and free expression that should not subject to governmental interference in line with their liberal values. On the other hand, certain states consider the Internet a communication tool that should be subject to governmental regulation. *This indicates the extent to which different perceptions of the Internet can lead to divergent international stances of the relevant actors.*

Finally, it is clear that multi-stakeholder approach to Internet governance does not reflect 'diminishing state role' in global governance of the network. Instead, multi-stakeholderism is the preference of the key state actors, particularly Western countries, which is based on constructed perception of these actors as to the utility and usefulness of such governance model.

Conclusions

I. General conclusion

The analytical work conducted throughout this study validates its hypothesis. The role of states does not diminish in regime formation. States, especially great powers, are the main actors that set international principles, norms, rules and decision-making procedures. They create regimes in order to regulate international behavior as to global sectors, including the Internet. States deliberately enable certain non-state actors to participate in regime formation and governance of some global sectors, based on conscious perception of the utility and usefulness of such participation. However, the structural state-centric perspective, which views the world in terms of symmetrical units of states struggling to maximize their power and interests does not reflect the growing complexity of international relations in the era of globalization and complex interdependence.

Globalization and complex interdependence did not only lead to spread of transnational actors, but also enabled complex mutual interaction among state and non-state actors at both national and international levels, whereby non-state actors can affect states' perception of their preferences and interests. Moreover, proliferation of technology-based sectors, such as the Internet, enabled certain epistemic communities, which own the technical knowledge, to affect the relevant international policies related to these sectors as well as policymakers' perception of national interest.

Thus, states' behavior could be affected because of cognitive change of their interests, as opposed to the behavioral change that respond to structural dynamics like distribution of power and wealth. In this context, involvement of non-state actors in regime formation and global governance of some sectors, including the Internet, is a conscious preference of states; it is not an indicator of a 'diminishing state role.'

In the case of the Internet, the Internet epistemic community has established and developed an international regime for the Internet administration under the patronage of the United States' government. The principles and values of such community as well as the domestic dynamics contributed to shaping the American perception of the Internet as an open and free medium that should not be subject to governmental regulation and should be administered through multi-stakeholder arrangements. Such perception, which has spread to European states through the Internet epistemic community, is the basis of the American international stance as to the Internet. Hence, the multi-stakeholder administration of the Internet reflects conscious preference of the key states to involve non-state actors in the

relevant arrangements, which is based on constructed perception of interests as to the Internet. The following paragpraphs elaborates on this brief general conclusion in accordance with the outcome of the analysis carried out in the chapters of this study.

II. Detailed conclusions

Since most of the literature addressed the Internet under the label of 'Internet governance', this study draws certain conceptual distinctions in order to set clear framework for the research. We draw a conceptual line between the 'Internet governance' and the 'Internet administration.' The Internet governance is a broad concept that can involve any aspect related to the Internet such as the governance of its content or its physical infrastructure. From international regimes perspective, the Internet governance can involve wide-ranging spectrum of issue-areas such as technical administration, electronic commerce, protection of intellectual property rights, combating cybercrime, human rights online etc… On the other hand, the Internet administration specifically concerns the technical operation and management of the Internet. Thus, the Internet administration is one among many elements that could constitute Internet governance, which we have demonstrated throughout this study. However, the Internet administration is a key element of the Internet governance, since it can affect all the activities performed over the network.

This study focuses on the international regime related to the Internet administration, which we call the *Internet architecture regime*. This specification helps identify the relevant configuration of actors that can affect formation and administration of such regime. We used the label of Internet architecture regime since the Internet operation and functioning depends on its architectural components. Seeking to identify these architectural components, we have employed Lessig's and Domanski's conceptual models that break up the Internet into distinct layers where we have identified the technical protocols layer as the *architectural layer* of the Internet.

In this context, we argue that there are two architectural components responsible of the Internet functionality: the TCP/IP for communications and the DNS for addressing. The two components give the Internet its global status since TCP/IP is the common global language that enables communications to occur among independent networks worldwide, and DNS is the global system of addressing that guarantees the delivery of transmitted data to the right destination. Any host connected to the Internet must use TCP/IP and must be registered in the DNS name space.

These architectural components are not only responsible for the proper operation of the Internet, but also determine its expansion and growth. They give the Internet its two critical resources: IP addresses and domain names. The expansion and growth of the Internet depends on the availability

of IP addresses, which subsequently determines the extent to which the name space can be expanded over the global network.

Operationally, DNS combines those two critical resources of the Internet within a network of hierarchical database. While the structure of the Internet is extremely decentralized, the DNS database is the central point since it includes the authoritative list of all hosts connected to the Internet. The technical design of the DNS requires uniqueness of the domain name space (competing versions of domain names are not allowed) as well as the uniqueness of its policy authority (only one entity must coordinate the database of the name space). While the requirement of a unique DNS name space and a single authority to administer the system is a technical necessity, it is also a political arrangement for governing the system. The requirement that one entity should govern the system is inherently a political constraint. Moreover, the governance of the system can be exercised through the unique DNS name space, which determines who exists and who does not exist on the Internet. Thus, the DNS centrality along with the uniqueness requirement inherent in its technical design makes it an effective instrument to enforce policies over the Internet. The control flows down the hierarchy from the *root* into the remaining elements of the name space. Clearly, the technical design defines the political parameters of the system.

TCP/IP has been designed to avoid centralized control, both over the content of the network traffic and over its functionality. It was deliberately designed - according to the 'end-to-end' principle - to disregard the nature and purpose of data being transmitted, and to contain instead the minimum information required to enable exchange of data from one device to another. TCP/IP was designed to be permissive to the current decentralized structure of the Internet since any network that adopts TCP/IP can be easily connected to the Internet. This led to proliferation of the independent networks connected to the Internet worldwide. The deliberate design of TCP/IP to avoid centralized control has inherent political implications; for instance, it will limit the governmental control over the data transmitted. This reveals the extent to which the design of the Internet protocols has shaped the entire Internet environment. The Internet protocols can enable and constrain behavior on the Internet, such as enabling openness and anonymity and constraining centralized control and content censorship.

Consequently, the architectural components of the Internet, TCP/IP and DNS, are not only technical systems, but also have inherent political arrangements. They dictate the governance structure and define the political parameters of the Internet administration system.

This led us to argue that the technical parameters can define the framework of governance and determine the policy options in technology-based regimes such as the Internet technical

administration. Therefore, in order to understand the governance of a technology-based regime such as the Internet technical administration, a careful examination of the technical design and technological characteristics is needed. In addition, this highlights the significance of the technical knowhow and knowledge, and to which extent it could shape governance structures and determine the range of possible policy options.

Furthermore, this conclusion led us to examine the role of the actors that have developed the architectural components of the Internet. We have indicated that the Internet architecture was developed by a group of researchers and engineers that constituted an epistemic community, which we call the *Internet epistemic community*. This community has emerged and developed under sponsorship of the United States government that gave it an extensive operational autonomy for constructing the network. In this regard, we draw another conceptual distinction between such community and other technical communities and groups that are associated with the Internet technology. We define the Internet epistemic community as the individuals, with technical knowledge and knowhow, who work voluntarily to preserve the smooth functionality and operation of the Internet through maintaining and upgrading its architectural layer. Other technical communities, such as software programmers and designers of hardware equipment, are not concerned with the Internet core operation.

Thus, we have examined the institutions developed by the Internet epistemic community, particularly IETF and ISOC, analyzing their historical and current role in the Internet administration. IETF has designed and maintained the Internet architectural components TCP/IP and DNS. It has created and expanded the Internet critical resources, IP addresses and domain names. IETF continues to provide solutions for the problems that might counter the expansion of the Internet, which was proved by its capability to upgrade the Internet protocols in order to overcome the problem of IP addresses' exhaustion. Without such solution, the expansion of the Internet was impossible. Despite the rivalry with the official standards-setting organization, such as ISO and ITU, IETF is the de-facto dominant institution that set the Internet's protocols and standards as well as the principal body responsible for maintaining its architecture.

Moreover, we have indicated that IETF has established and developed a system for administration of the Internet. IETF has created and administered IANA throughout the Internet history until establishment of ICANN. It has set a system for IP addresses allocation and delegation scheme for databases of domain names, which is currently the basis of ICANN's policy. We have also demonstrated that even with the creation of ICANN, IETF still play a significant role in maintaining the Internet ecosystem. *Thus, IETF has established the Internet architecture and developed an*

effective system for its administration. Accordingly, we conclude that IETF has established a de-facto regime for governing the Internet architecture.

Furthermore, we have examined three aspects of IETF: institutional structure, principles and values, and policymaking model. Regarding the institutional structure, we have demonstrated that IETF represents an individual-based international community open to any interested individual without requirement of formal membership. The members of such community share common goal of preserving the smooth operation of the Internet through maintaining and developing its core architecture. IETF conducts much of its work on a daily basis via mailing lists. *The institutional structure of IETF and its working methods makes it an open transnational community with common goals rather than an international organization with a structured membership.*

Regarding the principles and values, we have indicated that the design of the Internet architecture - which determines the overall Internet design - can be traced to the principles adopted by the Internet epistemic community during the early stages of the Internet evolution. These principles, which is technically known as 'end-to-end, have been codified in special set of IETF's technical documents that describe the Internet design. The lack of centralized control, both over the content of the Internet's traffic and over its functions , follows from this 'end-to-end' design philosophy. We have indicated that these Internet's architectural principles reflect the political and ethical beliefs and embody some value judgments of the Internet epistemic community. Those values have been deliberately advanced and reflected in the architectural design of the Internet. *Therefore, we conclude that the current Internet architecture is not technologically deterministic or inevitable; rather it has been consciously and deliberately designed according to those values and principles. The possibility to create alternative Internet architecture existed, but the Internet epistemic community chose to create the design that reflects its values and principles. Those values and principles are centered on openness, lack of centralized control, providing the broadest access and use, and sharing of computing and communications resources as possible.*

As to the policymaking model of IETF, we have investigated how IETF formulate the Internet standards and how decisions are taken about which standards to be adopted. The IETF's community has developed an informal practical policymaking model in order to create such standards through a process known as 'rough consensus and running code'. This process follows a decentralized bottom-up approach where any individual or groups, including the newcomers, can introduce a proposal of standard, which will be subject to collective discussion and continuous refinement throughout several phases until it achieves the required 'rough consensus'. In such process, there is no central authority that prepares standards and proposes them for adoption. 'Rough consensus and running code' has constituted the guiding principle of governing the Internet architecture throughout the

Internet history. It has been the de-facto approach of creating norms in an environment that historically lacks central regulating authority. This policymaking model does not only characterize a technical process of standardization, but also the institutional system that governs it. It reflects the open structure of IETF itself, which lacks the formal character and requires no membership. Accordingly, this model and its guiding principle do not only reflect the technical values of IETF community, but also their political values that are evident in the very political structure of IETF. *Therefore, we conclude that the informal open decentralized governance structure and the bottom-up policymaking characterize the core political values of the Internet epistemic community, which are embodied in the open informal structure of IETF and its policymaking approach. Those values shape this community's perspective about governance of the Internet architecture as well as the Internet governance in general. Remarkably, the current administration system of the Internet mirrors those values.*

Furthermore, we have indicated how IETF's policymaking model has dominated over the rival traditional model of the official standards setting organizations (particularly ISO) and became the normative decision-making model for setting the Internet standards. This dominance of IETF over the Internet protocols and standards was not deterministic nor was not inevitable; instead, IETF competitively succeeded to establish its prevalence in setting the rules of the Internet architecture. The political values of IETF community have become the fundamentals of governance over the Internet protocol layer. We have also demonstrated that the rivalry between IETF's model versus that of ISO embodies a struggle between two governance systems: informal bottom-up decentralized self-regulatory system of IETF versus highly formalized central system of ISO. Thus, the prevalence of IETF over ISO led to political implications regarding governance of the Internet architecture and administration of the Internet, which is the dominance of the open informal self-regulatory governance model over the traditional formal country-based model. We have indicated that, the current ICANN's system is based on IETF's self-regulatory governance model. *Therefore, we conclude that the political values of the Internet epistemic community are embedded in the current system of the Internet administration.*

We have also indicated how the Internet epistemic community established ISOC, as the host organization to IETF, in order to support its goals and to promote its principles and values. ISOC, which officially became the institution representing the Internet epistemic community, has transformed the technical concepts of IETF into policy objectives. While IETF seeks to maintain the community's values through the architectural design of the Internet, ISOC promotes them within policy and public circles through its broad outreach to governmental and non-governmental entities across the world. IETF's values have evolved and moved from the technical level to the public and

political domain through ISOC. The technical concepts, which aimed initially to achieve technical efficiency, have evolved into political and social values that address public policy issues related to the Internet. The 'end-to-end' principle, decentralized structure, user-empowerment, and the bottom-up standardization process have crystallized into policy goals such as openness, resistance to governmental control and regulation, freedom of expression, and self-regulatory form of governance. ISOC, with IETF as its technical affiliate, has emerged as a major non-state actor that seeks to limit governmental control over the Internet and to keep self-regulation as fundamental principle for the Internet administration. ISOC does not only focus on governance of the Internet architecture but also on the Internet governance as a whole, since its goals include supporting freedom of expression, opposing any efforts to restrict the type or content of information exchanged over the Internet, and opposing any governmental control over the Internet content. *We conclude that the Internet epistemic community has transformed its technical principles, which aimed initially to achieve the optimal technical efficiency, into set of political and social values that promote self-regulatory governance and non-governmental control over the administration and content of the Internet.*

The Internet epistemic community has established a de-facto regime for governing the Internet architecture, which is the basis for the current system of the Internet administration. Such regime reflects the values and principles of such community, which have been deliberately advanced in the Internet design and the governance model of its architecture. Such community has evolved, along with the exponential growth of the Internet, into a transnational influential non-state actor that seeks to promote self-regulatory governance and non-governmental control over administration and content of the Internet. This indicates that the knowledge could have a significant explanatory power in understanding the dynamics related to the Internet architecture regime as well as the Internet governance as a whole.

Significantly, the evolution of the Internet epistemic community took place under the patronage of American government that provided an enabling environment for its members to consolidate and diffuse their principles and values into the design of the Internet. Moreover, the recruitment of the Interne epistemic community's members into the relevant governmental agencies, combined with the operational autonomy given to such community, allows for those principles and values to spread through the American governmental machinery.

We have investigated the domestic dynamics related to the Internet governance that took place within the United States throughout the 1990s, which accompanied the transition of the Internet from a research facility into a commercial public network. We have focused on how the United

States has constructed its perception as to the Internet as well as how it has identified its preference and interests regarding its governance with a view to clarify the premises of its policy in this regard.

The United States' domestic politics resulted in transforming the ad-hoc informal regime for managing the Internet architecture into a formal regime for the technical administration of the Internet with creation of ICANN. The Internet epistemic community has been the key influential actor in the formative process that led to establishment of the new regime due to its accumulated knowledge and historical experience in developing and administering the Internet architecture. *We have concluded that the United States' government embraced the Internet epistemic community's principles of self-regulatory bottom-up governance for the Internet administration, which successfully characterized development of the Internet architecture.*

Moreover, the United States' government has developed a conscious policy towards the Internet, which goes beyond the mere administration of the Internet architecture. This policy considers the Internet a valuable commercial medium that can be used as a vehicle to boost and enhance the American economy.

Furthermore, the Internet has been perceived nationally as a medium that should reflect and promote the liberal values of openness and freedom of expression. It is a medium for published content where civil liberties should be protected from governmental interference. *Thus, the non-governmental control and interference in both administration and content of the Internet has materialized as preference of the United States regarding the Internet. Such preference shapes the American international stance towards the Internet governance, which is clearly reflected in its position to promote the model of non-governmental self-regulatory governance for the Internet.*

While the United States generally oppose governmental regulation of the Internet and promotes multi-stakeholder approach to its administration, it has consciously resorted to intergovernmental organizations, as the case in the WTO and WIPO, in order to establish international regimes that promote its commercial interests over the Internet. *This led us to conclude that states, particularly the Untied States, are still the main player in formation of the international regimes related to the Internet. The self-regulatory administration of the Internet by delegated non-state actors has been a preference perceived by states as the most convenient arrangement that ensures the network's smooth operation, which is not the case for other Internet-related regimes such as e-commerce and intellectual property. Clearly, self-regulatory arrangement of the Internet administration is a constructed preference of the United States; it is not an indicator for 'diminishing state role' in regime formation.*

Moreover, we further conclude that international cooperation regarding the Internet can take different forms with various configurations of actors based on the issue-area of such cooperation. For instance, the Internet architecture regime was formed through United States' national process that was associated with extensive influence of the Internet epistemic community, whereas the international regimes related to electronic commerce and protection of intellectual property rights over the Internet were formed by state actors through WTO and WIPO respectively.

Then, we have explored the governance framework of the new Internet architecture regime through examination of ICANN, which currently assumes the responsibility of the Internet technical administration. We have investigated three aspects related to ICANN: the role of the Internet epistemic community in ICANN's system, the evolution of ICANN and its quest for international legitimacy through broadening the scope of stakeholders associated with its system including national governments, and ICANN's relationship with the American government. Firstly, we have indicated how the Internet epistemic community, through ISOC, has played an influential role in formation of the new Internet architecture regime that led to establishment of ICANN. Members of such community drafted ICANN's bylaws and established its governance structure. We have also demonstrated that ICANN's system is functioning through a self-regulatory bottom-up process replicating IETF policymaking process. Moreover, the Internet epistemic community, represented by IETF, has secured itself significant influential role in ICANN's system by the favor of its knowledge of maintaining the Internet architecture. *We have concluded that ICANN embodies values, principles, and governance model that were developed by the Internet epistemic community throughout the Internet history.*

Secondly, we have demonstrated that the dominance of the technical community over ICANN's governance structure as well as the oversight role of the United States on its decisions triggered international criticism for ICANN since its inception. Such criticism led ICANN to conduct a revolutionary reform process that aimed at acquiring broader international legitimacy. The reform resulted in enhancing the institutional role of governments within ICANN's system - without undermining its non-governmental nature -well as enlarging the representation scope for other Internet stakeholders. *We have concluded that this multi-stakeholder governance embodied in ICANN's system became the basis of its international legitimacy. Such multi-stakeholderism became a model for global governance whose legitimacy is based on participation of all the relevant stakeholders in the policy making process.*

Thirdly, we have investigated the relationship between ICANN and the United States' government through examination of the contractual documents signed between the two parties, whereby ICANN is delegated to assume administration of the Internet. We have indicated that despite the

American authority over the DNS root and its oversight function over ICANN's decisions, the substantive policies related to administration of the Internet have been formulated through a bottom-up and self-regulatory process conducted by ICANN. The role of the United States' government was limited to be a facilitator for this process without direct intervention. However, the continuous international pressure eventually led American government to announce its decision to relinquish control over the DNS root as well as its oversight function over ICANN, which enhanced ICANN's legitimacy.

Moreover, we have also indicated that multi-stakeholder model is not a unique example in global governance. We have demonstrated that there are well-established international regimes based on similar models. Thus, ICANN's system is not an anomaly, and can sustain as global governance model for the Internet administration, where non-state actors are indispensable players. *Therefore, we have concluded that self-regulation and bottom-up policymaking as well as multi-stakeholder governance, embodied in ICANN's system, are expected to continue characterizing parameters of the Internet architecture regime. We have also concluded that multi-stakeholder approach to global governance, including the Internet administration, is a conscious preference of states, rather than an indication of a 'diminishing state role' in formation and administration of international regimes.*

Furthermore, we have examined the key international events that addressed Internet governance, particularly WSIS and WCIT in order to investigate the struggle between various actors over how the Internet should be governed. Since the Internet governance was a new issue placed on the international agenda, there was no clarity about what constitute Internet governance during the early phases of the relevant international debate. However, such debate made it clear that technical administration of the Internet represents only one component of the Internet governance. *Moreover, while the international debate on the Internet was launched under the label of Internet governance, most of the discussion had focused on the Internet technical administration that was the most controversial issue discussed under such label.*

We have demonstrated that the international debate over the Internet administration embodies the struggle between the traditional intergovernmental governance through intergovernmental organizations versus the de-facto self-regulatory multi-stakeholder governance embodied in ICANN's system. *We conclude that the self-regulatory multi-stakeholder approach has been internationally recognized as the appropriate governance model for the Internet administration. This represents recognition for ICANN's system as the appropriate arrangement for the technical administration of the Internet. Thus, the ongoing debate within the United Nations regarding Internet governance is not expected to change the status quo of the Internet administration.*

However, such debate might address international cooperation in issue-areas related to the Internet other than the Internet technical administration.

We further conclude that multi-stakeholder approach to Internet governance does not reflect 'diminishing state role' in global governance of the network. Instead, multi-stakeholderism is the preference of the key state actors, particularly Western countries, which is based on constructed perception of these actors as to the utility and usefulness of such governance model.

We have also indicated that the international stance of the United States, which seeks to promote self-regulatory governance of the Internet, has been shaped by its domestic dynamics that took place throughout the Internet history. *Without understanding how the Internet has evolved and the influence of the Internet epistemic community on shaping the American perception as to the Internet, it is difficult to account for such American stance. The state-centric approaches to international regimes, which focus on the international dynamics among state actors ignoring how perception and preference are constructed, fall short of providing coherent account for the United States' stance. Clearly, knowledge has explanatory power in this regard.*

While the international debate on Internet governance focused initially on the Internet technical administration, it has evolved over time to include other political and cultural aspects related to different perceptions of the Internet. Western countries perceive the Internet as a forum for published content and free expression that should not subject to governmental interference in line with their liberal values. On the other hand, certain states consider the Internet a communication tool that should be subject to governmental regulation. *This indicates the extent to which different perceptions of the Internet can lead to divergent international stances of the relevant actors. The interest-based approaches to international regimes is not sufficient for providing convincing account for such international divergence on the Internet.*

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Appendix I

The Internet pioneers

J.C.R Licklider worked as associate professor in the department of electrical engineering at MIT (1950-1957). He Worked as vice president at the company that was subsequently contracted by ARPA to design ARPANET, Bolt Beranek and Newman (BBN) (1957-1962). He then worked as a director of the IPTO at ARPA (1962-1964), where he formulated the earliest ideas of global networking in a series of memos about an “Intergalactic Computer Network", which envisioned the predecessor of today's Internet, ARPANET. From 1964–1967, Licklider served as consultant to IBM director of research. He Taught at MIT as professor of electrical engineering and then professor of computer science (1967–1985) and then he went on leave from MIT (1974 to 1975) to serve a second time as director or ARPA/IPTO (Kita 2003).

Vinton Cerf began his career as assistant professor at Stanford University (1972–1976). He was recruited by ARPA and became ARPANET project manager (1976-1982), and then served as vice-president of MCI (1982-86). Cerf is now vice-president and Chief Internet Evangelist for Google (Google 2014b).

Robert Khan began his work on the Technical Staff at Bell Laboratories and then became an Assistant Professor of Electrical Engineering at MIT. Then he joined BBN, where he was responsible for the system design of the ARPANET. In 1972, he moved to ARPA and subsequently became Director of ARPA's Information Processing Techniques Office (IPTO). While he was Director of IPTO, he was able to mobilize one billion dollar from the United States government for Strategic Computing Program, which was then the largest computer research and development program ever undertaken by the United States federal government. Kahn conceived the idea of open-architecture networking. He is a co-inventor of the TCP/IP protocols and was responsible for originating ARPA's Internet Program. Kahn also coined the term National Information Infrastructure (NII) in the mid 1980s, which later became more widely known as the Information Super Highway (Corporation for National Research Initiatives 2014).

Appendix II
How does the Internet operate?

The Internet is based on a 'packet switching' technology. This technology represents a unique communication model, where the content is converted into a digital form of the machine language that takes the shape of binary numbers (0 or 1). The packet switching technology divides the content of communication into well defined, small groups of coded data, each with specific identifying numerical address. Once the content is digitized, it can be transmitted over the Internet in the form of packets. This communication model enables sending an unlimited number of packets through the same circuit. The routers are responsible to deliver the packets to the intended destination (Mathiason 2009, 6-7). This process is implemented by the TCP/IP and the DNS as demonstrated below.

1. Transmission Communication Protocol/ Internet Protocol (TCP/IP)

A protocol can be defined as a set of standards and rules for communication that are used by computers when they send data packets back and forth. Both the sender and recipient involved in the same data transfer must have the same protocols (Blank 2004, 14). The Internet standards are formulated in IETF's technical documents called Request For Comments (RFC), which are given serial numbers from 1 onwards (Dostálek and Kabelová 2006, 5). The IETF, which is the dominant institution for setting and developing Internet protocols and standards, formulate and issue those RFCs. IETF lays down the motivation of the Internet protocols[47] as follows:

> "The internet Protocol[s] is designed for use in interconnected systems of packet-switched computer communication networks…The internet protocol[s] provides for transmitting blocks of data called datagrams from sources to destinations, where sources and destinations are hosts identified by fixed length addresses. The internet protocol[s] also provides for fragmentation and reassembly of long datagrams, if necessary, for transmission through small packet networks" (Postel 1980, 1).

Furthermore, IETF sets the operation of the Internet protocol[s] as follows:

[47] *Internet protocol* is sometimes used to describe the standardized Internet networking protocols that consist of two elements, Transmission Communication Protocol (TCP) and Internet Protocol (IP). This study uses the plural format, *Internet protocols*, to refer to these two elements in order to avoid confusing them with Internet protocol as only one element.

> "The internet protocol[s] implements two basic functions: addressing and fragmentation. The internet modules use the addresses carried in the internet header to transmit internet datagrams toward their destinations. The selection of a path for transmission is called routing. The internet modules use fields in the internet header to fragment and reassemble internet datagrams when necessary for transmission through "small packet" networks. The model of operation is that an internet module resides in each host engaged in internet communication and in each gateway that interconnects networks. These modules share common rules for interpreting address fields and for fragmenting and assembling internet datagrams. In addition, these modules (especially in gateways) may have procedures for making routing decisions and other functions" (Postel 1980, 2).

The growing number of independent networks connected to the predecessor of the Internet, ARPANET, brought about the need to develop a standard routing protocol to serve as a gateway between networks to send and receive data. In 1983, ARPANET and all the networks linked to it, adopted TCP/IP as the networking protocols, which were developed in the 1970s by Vinton Cerf and Robert Kahn. From then on, ARPANET and all affiliated networks that use TCP/IP became to be collectively known as the Internet.

Therefore, the Internet protocols, TCP/IP, are the standardized communication language of the Internet. TCP/IP enables interconnectivity among different networks. Every host connected to the Internet is provided with a copy of the TCP/IP. The standardization of the TCP/IP contributed substantially to the exponential growth of the Internet. The TCP/IP consists of two layers. The first layer is the Transmission Control Protocol (TCP) that disbands a message (of the sender's computer) into small packets, which are subsequently transmitted over the Internet, and then received by a TCP layer (of the recipient's computer) that reassembles those packets into the original message. The second layer is the Internet protocol (IP), which is responsible for routing those packets into the right destination where they reassembled by TCP into the original message (Blank 2004, 6-10). Dostálek and Kabelová (2006, 239) provide simplified explanation for TCP/IP as follows :

> "TCP is an upper layer protocol from the IP point of view. The first question that always occurs to a beginner is 'why do we need two protocols, IP and TCP?' While IP transmits data between two individual computers on the Internet, TCP transfers data between two actual applications running on these two computers. IP is used for data transfers between computers. An IP address is the address only of a computer's network interface, while TCP uses a port number as its address. If we

> were to compare this to a standard postal system, the IP address would be the building address and the port number (the address in TCP) would be the name of an actual resident in the building."

The Internet protocol (IP) uses the Internet Protocol address (IP address) to route the data packets into the intended destination. The Internet Protocol address is simply a series of numbers assigned to each device connected to the Internet, which serves as an identifier of the location of that device (Blank 2004, 68). The system of the Internet protocol, known as IP version 4 (IPv4), determines IP address as 32-bit number (Blank 2004, 76). IETF describes the function of IP address as follows:

> "A distinction is made between names, addresses, and routes. A name indicates what we seek. An address indicates where it is. A route indicates how to get there. The internet protocol deals primarily with addresses….Addresses are fixed length of four octets (32 bits)" (Postel 1981b, 7).

Significantly, IPv4 has pool of 4.3 billion unique addresses that have not been sufficient to satisfy the accelerating growth of the Internet. The designers of IPv4 did not anticipate this exponential growth of the networks connected to the Internet, which eventually led to the depletion of the available 4.3 billion IPv4 addresses (Chimiak, Patton, and Janansky 2013, 62). On February 2011, the exhaustion of the available free pool of IPv4 addresses has been officially announced (Number Resources Organization 2011). This limitation of the addressing space means that new devices could not connect to the Internet.

Early before the actual exhaustion of IP addresses in 2011, IETF designed a successor version of IPv4 to compensate for the rapidly diminishing of addressing space (Internet Engineering Task Force 2007). IPv6 has expanded the addressing space from 4.3 billion addresses to 340 undecillion (i.e. 340 trillion trillion trillion), which means a growth factor of 79 octillion (billion billion billion) (Goldman 2012). However, the migration from IPv4 to IPv6 has accelerated only after the actual exhaustion of the available IP addresses. IPv6 was standardized by IETF in 1998 with the following motivation:

> "IP version 6 (IPv6) is a new version of the Internet Protocol, designed as the successor to IP version 4 (IPv4) [RFC-791]. The changes from IPv4 to IPv6 expand Addressing Capabilities… IPv6 increases the IP address size from 32 bits to 128 bits, to support more levels of addressing hierarchy" (Deering and Hinden. 1998, 2).

Clearly, the number of IP addresses determines to which extent the Internet can grow. Without an IP address, the existence over the Internet system is impossible.

With their function as identifiers for each host[48] connected to the Internet, IP addresses represent *critical resource* of the Internet. Moreover, it is clear that IETF has played the main role in designing and maintaining the Internet architecture. IETF has designed and standardized TCP/IP, which is a core element of the Internet architecture that ensures growth of the Internet and interconnectivity among its networks. IETF's role continues in maintaining and upgrading such architecture, which has been evident in the creation of IPV6 as a solution provided for the depletion of IPV4 addresses.

The role of IETF in establishing system for administration of IP addresses allocation[49]

In addition to its role in creating, designing and expanding IP addresses space, IETF has established a system for administration of IP addresses allocation and assumed the responsibility of managing such system until the creation of the Internet Corporation for Assigned Names and Numbers (ICANN) in 1999. The guidelines for management of IP address space have been formulated in a series of IETF's RFCs documents: RFC 1466 (Gerich 1993), RFC 2050 (Hubbard et al. 1996), and RFC 7020 (Housley et al. 2013).

IETF has created what is known as the Internet Assigned Numbers Authority (IANA), whose main task is the allocation of IP addresses in accordance with the prescribed guidelines. IANA is a "role, not an organization", for managing the top of IP addresses hierarchy (Housley et al. 2013, 4). In performing its functions for global IP addresses allocation, IANA delegates five Regional Internet Registries (RIRs) – each of which serves a continental region - for subsequent allocation of IP addresses. IANA allots IP addresses from the pools of unallocated addresses to these RIRs according to their needs. RIRs subsequently allocate IP addresses to Internet Service Providers (ISPs) and users within their areas. When an RIR needs more IP addresses for allocation within its region, IANA can make an additional allocation to that RIR (Internet Assigned Numbers Authority 2015a). Thus, the system of IP addresses allocation depends on delegating responsibilities by IANA to RIRs, as sub-administrators, which subsequently allocate IP addresses to ISPs and users.

[48] Host can be defined as "any device (such as workstation, server, mainframe, or printer) on a network or internetwork that has a TCP/IP address" (Blank 2004, 3).
[49] Since Internet users need IP addresses to connect to the Internet, there has been a need for a system of IP addresses allocation to organize assignment of IP addresses to these users.

Such system of delegating responsibility to regional sub-administrators as well as identifying qualifications of these sub-administrators has been established by IETF (Gerich 1992, 1-2). This delegation of responsibilities and division of labor is a distinguishing characteristic of the Internet ecosystem.

Remarkably, IETF's administration of IANA had been actually implemented by Jonathan Postel, who assumed this role until his death in 1998. Postel had been one of the founders and prominent figures of IETF known for his role as the editor of its RFCs document series since its inception (Cerf 1998, 1-2). In 1999, administration of IANA has been delegated to the newly created non-profit organization, ICANN, according to a contract signed with the United States government (US National Telecommunications and Information Administration 2015a). The current system of IP addresses allocations are made in line with the ICANN Global Policy (Internet Corporation of Assigned Names and Numbers 2014f). Significantly, this ICANN Global Policy is based on the same system that has been initially established and administered by IETF including delegation of responsibility to RIRs. Therefore, IETF has established the foundations of IP addresses allocation system that is currently administered by ICANN.

Furthermore, even after moving IANA administration from IETF to ICANN, ICANN has allocated IPV4 addresses in coordination with IETF (Internet Assigned Numbers Authority 2014). After establishment of IPV6, IETF delegated IPV6 addresses management to IANA in 1995 in accordance with RFC1881 (Internet Architecture Board and Internet Engineering Steering Group 1995), and the relevant procedure was confirmed with IETF's chair in 2000 (Internet Assigned Numbers Authority 2013). Hence, although IANA functions have been delegated to ICANN, IETF still a key player regarding IP addresses allocation.

Whereas IP addresses are the 'numerical' identifiers of each host connected to the Internet, domain names are the corresponding 'alphanumeric' identifiers. DNS combines both identifiers in order to achieve its role as 'naming' and 'addressing' system of the Internet. The following paragraphs demonstrate the foundations of DNS.

2. Domain Name System (DNS)

As indicated above, IP address is a sequence of numbers identifying each device connected to the Internet. For IPV4, IP address takes the form of xxx.xxx.xxx.xxx, with each 'xxx' ranges from 0 to 255 (for example 192.0.2.54). IPv6 expanded the range so that each 'x' can be a 0 through 9 or 'a' through 'f' and it's structured as follows: xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx (for example, 2001:0db8:582:ae33:30) (Deering and Hinden 2006, 4)

Since it is difficult to remember IP addresses, it was necessary to develop a more human-friendly readable format to facilitate communications among hosts connected to the Internet. The idea has emerged to register host names that correspond to IP addresses; so that each host can be located by its name through a 'name resolution' process, which converts such name into the corresponding IP address.

At the early stages of the Internet, the initial idea was to maintain a file, known as HOSTS.TXT file, which contains a list of all host names and their corresponding IP addresses in one single file. When a new host was to be connected to the Internet, a simple entry had to be inserted into HOSTS.TXT file with the name and the corresponding IP address of this new host. The idea is similar to a phone book that includes the names and their corresponding phone numbers, and is being updated continuously to reflect the new additions. When a host was to connect to another host on the Internet, it could use the name of this host, and TCP/IP would look at the HOSTS.TXT file in order to translate the name into the corresponding IP address (Blank 2004, 190).

Initially, each host maintained a copy of the "HOSTS.TXT" file, which provided a chart of host names and the corresponding IP addresses in a set of simple text records that were readable by an individual or program. With any modification of the hosts file, each host had to download the updated version of the file. In 1973, IETF realized that keeping multiple copies of the "HOSTS.TXT" file at each host proved inefficient. Consequently, IETF proposed, in its RFC 606, centralization of maintaining the hosts file, whereby the file will be kept online on a single host that is accessible to anyone without a need for copies at each host (Deutsch, Peter1973, 1). The matter was further addressed in RFC 608 (Kudlick, 1974) and RFC 623 (Krilanovich, 1974) until it was settled in 1974 (RFC 625) that the Stanford Research Institute

Network Information Center (SRI-NIC) would serve as the official source maintaining the master hosts file (Kudlick and Feinler 1974)[50].

HOSTS.TXT file was stored on what is known as 'name server', which is the computer or the server performing the resolution (conversion) of names into their corresponding IP addresses. With the exponential growth of the Internet, the file turned out to be unmanageable and only one 'name server' proved to be insufficient to perform the required functions. The process of the name resolution (converting a host name into its corresponding IP address) became to be bottlenecked (Blank 2004, 190).

Seeking to solve this problem, IETF members wrote several RFCs aiming to find out a more effective system. Those efforts resulted in outlining what is known as the Domain Name System (DNS), which had been introduced by Paul Mockapetris in RFC 882 that presents the conceptual framework of the system (Mockapetris, 1983a). This was followed by RFC 883, which presents the operational aspects of the system (Mockapetris, 1983b). IETF continued its effort to develop the system, which has been eventually established in RFCs 1034 (Mockapetris, 1987a) and RFCs 1035 (Mockapetris, 1987b).

The basic idea of DNS is to divide the task of name resolution between several 'name servers' in order to avoid the bottleneck that had been associated with a single name server performing such task. DNS makes it possible for several 'name servers' to coexist, and enables communications among them. Thus, DNS consists of a network of name servers; each of them contributes to the name resolution (Mockapetris 1983a, 1-3). Klein (2002, 195) provides a simple explanation for DNS operation as follows:

> "Internally, the DNS consists of a database and a dynamic lookup service. The database includes pairs of domain names and IP numbers. Domain names are alphanumeric (and hence human-friendly) identifiers of computers on the Internet. IP (Internet Protocol) numbers (or addresses) are machine-friendly numeric identifiers. For example, a given computer's domain name might be mycomputer.org, and its corresponding IP number might be 12.34.56.78. The DNS resolves {translates} domain names into IP numbers. In name resolution, the DNS accepts a domain name from a user and returns the corresponding number. The DNS computers performing name resolution are called

[50] Jonathan Postel had been in charge of maintaining this file, along with administration of IANA, until his death in 1998.

> *name servers*. Only after resolution has occurred can the user-to-user e-mail or web communication begin"

Nevertheless, this is a simplified explanation for DNS. Operationally, DNS is a distributed database that contains IP addresses and the corresponding host names. The database is distributed since one database containing all host names on the Internet can not be efficient. Instead of maintaining all host names and IP addresses in a single overloaded database, DNS divides the job across the Internet. In other words, instead of having a single name server containing one database of all host names and IP addresses, DNS distributes the task over many name servers where each of them has its own database that contains specific category of host names and their corresponding IP addresses. In order to do this, categorization of host names had been required.

Categories of the Internet host names are called 'domains', and categorization of these domains follows a hierarchical structure where 'Top-Level Domains' are at the top of the hierarchy. IETF conceptualizes domains in RFC 920 as follows:

> "Domains are administrative entities. The purpose and expected use of domains is to divide the name management required of a central administration and assign it to sub-administrations…Most of the requirements and limitations on domains are designed to ensure responsible administration… The domain system is a tree-structured global name space that has a few top-level domains. The top-level domains are subdivided into second level domains. The second level domains may be subdivided into third level domains, and so on" (Postel and Reynolds 1984, 1).

All host names on the Internet is referred to as 'name space' and the hierarchical subdivision (or the tree-structured) of this name space is known as 'domain name space' (Mockapetris 1987a, 6). The domains serve the purpose of dividing the labor regarding management of the Internet name space. They enable distribution of tasks among sub-administrators. Therefore, domain can be defined as "a unique portion of the name space in which an administrator creates an authoritative database of records to give resolution of names within the zone to an IP address" (Blank 2004, 190).

The Top-Level Domains are specific categories of host names; for instance, .edu domain includes the hosts of the educational institutions, and .com domain contains hosts of the commercial organizations (Postel and Reynolds. 1984, 7). There are two kinds of Top-Level Domain: Generic Top-Level Domain (gTLD) and Country

Code Top-Level Domain (ccTLD). The most famous gTLDs are .com, .net, .edu, and .mil; which are mostly used in the United States. ccTLD is composed of two letters referring to specific country in accordance with the relevant ISO standard (Postel 1994, 1). For example, .eg domain refers to Egypt and .uk domain refers to the United Kingdom.

Those Top-Level Domains are subdivided into second-level domains, and so forth. Apple.com is an example of second-level domains. Each Top-Level Domain keeps a database that contains all the second-level domains. Subsequently, each second-level domain keeps a database for the next layer, and so forth. The databases maintained by the Top-Level domains are used to identify DNS servers (i.e. name servers) of the next layer. For instance, .com database contains the data needed to locate all .com DNS servers. Then, apple.com server maintains a database containing all the host names and the corresponding IP addresses of its sub-hosts (such as store.apple.com). In other words, the Top-Level Domains are further divided into sub-domains for particular entities (company, organization, etc…), such as google.com. This sub-domain can be broken up into lower levels of sub-domains such as news.google.com and images.google.com and so forth (Dostálek and Kabelová 2006, 274-275).

The *root* is at the top of the domain name space. The *root zone file* describes where the DNS servers for Top-Level Domains are located; i.e., which server the user has to ask for names ending in one of TLDs, such as .com, .edu, or .eg. IANA is the single authority that can edit the root zone file. The *root name servers* publish the root zone file to other DNS servers and clients on the Internet (Karrenberg 2007).

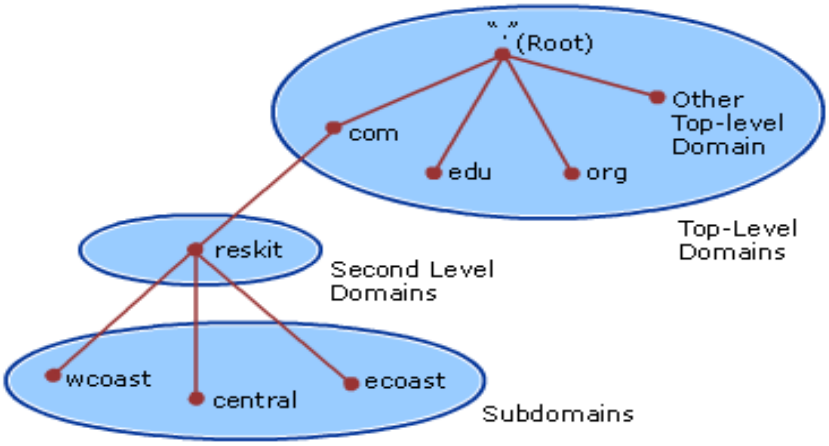

Figure (2) [51]: Part of the domain name space.

These distributed databases of DNS operate as follows:

> "When network users attempt to connect to an Internet address, their computer send a request to the nearest name server, which searches for the IP number for that address. If it can not find the number, it asks another name server, and so on until the correct IP number is found and the message is delivered or the site is called up. The first name server stores the IP number for a set amount of time, so that the user (or other users) can access the site more quickly on the next attempt. The DNS is known as a distributed database; it encompasses all the name servers around the planet, but there is no single organization or site that stores all the information on all the name servers. Distributed databases can typically handle vast growth without encountering problems related to size." (Moschovitis 1999, 118).

Therefore, DNS has three major components: domain name space (the hierarchical structure of the name space), name servers (which maintain the databases including the information about each of name space subdivision), and resolvers (programs extracting information from name servers in response to client requests) (Mockapetris 1987a, 6).

The question arises about who coordinates this division of labor of DNS's management. IANA assumes such responsibility along with its above-mentioned role in allocation of IP addresses. IANA is responsible for the management of the DNS 'root zone'. This role means the responsibility of assigning (selecting) the operators of Top-level Domains, and maintaining their administrative and technical details (Internet Assigned Numbers Authority 2015b). In order to perform these tasks, IANA maintains the 'Root Zone Database', which includes the delegation details of Top-Level Domains. IANA coordinates these delegations in accordance with its established policies and procedures (Internet Assigned Numbers Authority 2015c).

In this regard, the responsibility of operating each Top-Level Domain is delegated by IANA to a particular entity, which maintains a registry (database) of the domain names registered under this Top-Level Domain. These entities are referred to as 'registry operators' (Internet Corporation of Assigned Names and Numbers 2014g). While administration of generic Top-Level Domains (gTLDs) are assigned to private entities that do not have geographical or country designation, administration of country code Top-Level Domains (ccTLDs) are assigned to individual country

[51] https://technet.microsoft.com/en-us/library/cc786128(v=ws.10).aspx.

managers, which are mostly governmental entities performing a public service on behalf of their Internet communities (Internet Corporation of Assigned Names and Numbers 1999). For instance, VeriSign (private company) operates the generic Top-Level Domain of .com, and the Egyptian Supreme Council of Universities (national entity) operates the country-code Top-Level Domain of .eg (Internet Assigned Numbers Authority 2015c).

Each generic Top-Level Domains registry (such as VeriSign for .com domain) operates its corresponding domain through a contract with ICANN, which currently administers IANA (Internet Corporation of Assigned Names and Numbers 2014c). Each country code Top-Level Domain manager (such as Supreme Council of Universities for .eg domain) operates its corresponding domain under a memorandum of understanding with ICANN (Internet Corporation of Assigned Names and Numbers 2014d). Significantly, IETF – during its administration of IANA - has established the DNS structure as well as the above-mentined delegation system, which has been laid in RFC 1591 (Postel 1994). This structure and delegation system is the basis for the current system administered by ICANN.

Interestingly, the domain names management is based on the same principle of IP addresses allocation: the division of labor and delegation of responsibilities. The delegation of Top-Level Domains' management to sub-administrators is similar to the delegation of subsequent IP addresses to Regional Internet Registries (RIRs). It is clear that delegation of responsibilities and division of labor is a distinguishing characteristic of the Internet ecosystem, where IANA is the single authority responsible of formulating the relevant policies. Apparently, the driver behind such principle of delegation is to achieve efficiency and resilience in the administration of the whole Internet system. Thus, technical and administrative efficiency is the value that characterizes IETF's decisions related to design and administration of the Internet architecture.

Furthermore, the domain names are another critical resource of the Internet along with IP addresses. Both domain names and IP addresses are the building blocks that compose the Internet architecture. They are the *unique identifiers* of each host connected to the Internet. In other words, they are manifestation of the existence over the Internet. Since DNS operates through combination of those unique

identifiers, the following paragraphs investigate whether DNS can be a system of governing the Internet.

Does DNS represent a system of governing the Internet?

DNS defines the name space of the Internet, which lists all hosts connected to the Internet. For a computer to exist on the Internet, it must be registered in the name space. Without such registration (without a domain name and corresponding IP address), a host cannot be found on the Internet. Elimination of a computer from the name space represents an expulsion from the Internet, since this computer disappears from the listing of addressable hosts (Klein 2002, 194-195).

IETF claims that the domain name space must be unique and must be administered by a single entity. Only one name space includes the definitive listing of all hosts on the Internet should exist. While copies are permitted to coexist, independent name spaces are not allowed since they could end up having different contents. With the existence of several independent name spaces, a given domain name could be translated into different IP addresses based on which name space is used, which could make the communication unreliable. This accordingly requires a global unique 'root', which should be supported by a set of 'root servers' administered by a single authority. IETF explains the rationale behind the uniqueness requirement of name space as follows:

> "To remain a global network, the Internet requires the existence of globally unique public name space. The DNS name space is a hierarchical name space derived from a single, globally unique root. This is a technical constraint inherent in the design of the DNS. Therefore, it is not technically feasible for there to be more than one root in the public DNS. That one root must be supported by a set of coordinated root servers administered by a unique naming authority. Put simply, deploying multiple public DNS roots would raise a very strong possibility that users of different ISPs who click on the same link on a web page could end up at different destinations, against the will of the web page designers. This does not preclude private networks from operating their own private name spaces, but if they wish to make use of names uniquely defined for the global Internet, they have to fetch that information from the global DNS naming hierarchy, and in particular from the coordinated root servers of the global DNS naming hierarchy...The DNS fulfills an essential role within the Internet protocol environment, allowing network locations to be referred to using a label other than a protocol address. As with any other such symbol set, DNS names are designed to be globally unique, that is, for any one DNS name at any one time there must be a single set of DNS records uniquely describing protocol addresses, network resources and services associated with that DNS name. All of the

> applications deployed on the Internet which use the DNS assume this, and Internet users expect such behavior from DNS names. Names are then constant symbols, whose interpretation does not specifically require knowledge of the context of any individual party. A DNS name can be passed from one party to another without altering the semantic intent of the name. Since the DNS is hierarchically structured into domains, the uniqueness requirement for DNS names in their entirety implies that each of the names (sub-domains) defined within a domain has a unique meaning (i.e., set of DNS records) within that domain. This is as true for the root domain as for any other DNS domain" (Internet Architecture Board 2000, 1-2).

This explanation of the name space uniqueness indicates that the DNS is in fact a centralized system. The single unique root of the DNS is the central point within the system that rests at the top of the name space hierarchy. Thus, while the Internet structure is extremely decentralized, its addressing system, DNS, is centralized.

Moreover, while the requirement of a unique DNS name space and a single authority to administer the system is a technical necessity, it is also a political arrangement for governing the system. The requirement that one entity should govern the system is inherently a political constraint. Moreover, the governance of the system can be exercised through the unique DNS name space, which determines who exists and who does not exist on the Internet. The control flows down the hierarchy from the root into the remaining elements of the name space. Here, the technical design defines the political parameters of the system.

In this regard, Klein (2002, 196-197) applies Robert Dahl's four minimum requirements needed to achieve governance - authority, law, sanctions, and jurisdiction[52] - on the DNS in order to examine whether DNS is a system of governance. Klein argues that the four requirements of governance can be achieved through DNS. Firstly, the uniqueness of the name space necessitates a single central authority whose decisions apply to all hosts registered in the name space. ICANN is the current central authority of the domain name space through its role in the administration of IANA. Secondly, the law is included in the contracts of the

[52] According to Klein, Dahl argues in his book *Democracy and its Critics* that any system of governance should have four requirements: Authority, law, sanction, and jurisdiction. Regarding the authority, any governance needs an entity, whether it is an individual or group, which has the authoritative power to make policy decisions. The laws, whatever the form they take, are the binding rules to implement policy decisions. Sanctions are instruments to enforce laws, and can be imposed to punish those who breach those laws. Jurisdiction defines the constituency over which policy decisions, laws, and sanctions are applicable

domain name registration that are signed between ICANN and every registry operator. The provisions of those contracts regulate the actions of the networks' administrators as well as the sub-administrators. Moreover, the scope of regulation can be extended through those contracts. Thirdly, the sanctions can be enforced through the denial of a domain name (the elimination of a domain name from the name space). The users that do not obey the specific regulations provided in the contracts could be eliminated from the name space. Registration in the name space is a privilege that can be revoked if a user infringes the rules. Fourthly, the jurisdiction of the DNS regulating authority includes every host connected to the Internet. This jurisdiction is manifested in the registration contracts whereby every user must abide by the policies prescribed by the DNS authority. Therefore, the DNS provides the means to attain the four requirements of governance. If needed, the regulatory scope can be merely broadened by the DNS authority through introducing broader regulations in the registration contracts with networks operators. Regulation of individual users could be realized through 'flow-down contract'; i.e., the regulations flow down from the central authority of the DNS to networks operators and from there to all users.

This led Klein to conclude that that DNS is an effective instrument for governing the Internet arguing that DNS it is the point through which the Internet can be controlled, and the entity that controls the database of the name space controls the Internet. While we agree with Klein's argument that DNS is an effective instrument of governance, we argue that such governance is currently limited to the technical administration system of the Internet. The DNS neither regulate nor enforce policies regarding the Internet layers of infrastructure, software applications, and the content. However, this does not undermine the critical indirect role of the DNS in affecting these layers as it relates to the core operation of the Internet, which could affect all activities performed over the network. Significantly, the DNS management through ICANN as well as the unilateral control of the United States over the DNS root was the trigger of the international debate on the Internet governance.

Appendix III

ISOC

In 1992, the two Internet pioneers, Vinton Cerf and Robert Kahn, formed ISOC as non-profit, non-governmental international organization with a view to mobilize financing for IETF activities. Although ISOC emerged out of IETF, it became its organizational host. ISOC aims at promoting the open development, evolution and use of the Internet (Internet Society 2015a).

Besides its main offices are in Washington and Geneva, ISOC has established 100 Chapters across the world. ISOC currently enjoys worldwide membership that comprises more than 145 organization members and 65,000 individual members. ISOC's members include government agencies; corporations and organizations that have historically been involved in developing the Internet-related technologies; in addition to foundations, educational institutions and non-profit, trade and professional organizations (Internet Society 2015b).

ISOC is governed by board of trustees who are elected or appointed by three groups: Chapters, organization members, and IETF (Internet Society 2013). ISOC has four membership levels for the individuals; each is determined on the basis of annual contributions that ranges from 75 to 500 $ a year. Similarly, it has six membership levels for organizations and corporations, each level is granted on the basis of the annual financial contributions that range from 1250 to 100000$ (Internet Society 2015c).

As with any institution, the influence and power of each organization is weighted according to the membership level. The highest ranking of the 'organization and corporation' members is the ‘platinum membership’, which includes eleven members (Internet Society 2014b). Those members are granted corresponding powers to this membership level, such as, the right to participate in nomination of four representatives of the organization members to the ISOC's board, participation in development of the ISOC's global public policy positions, and provision of major financial and organizational support for IETF (Internet Society 2014c).

Examination of the list of ISOC members indicates that five of those platinum members are affiliated with ICANN's system: ICANN, two of the Regional Internet

Registries[53], an administrator of country code Top-Level Domain[54], and an administrator of Generic Top-Level Domain[55]. The remaining six members represent American cable industry and services as well as manufacturers of networking equipment: three American-based multinational corporations of cable and broadcasting services[56], the American trade association for cable industry[57], two American-based multinational corporations that manufacture networking equipment[58]. It is clear that the high-ranking members of ISOC belong to ICANN's system as well as the American business related to cable and networking industry.

However, what makes ISOC distinct from other non-state actors associated with the Internet, particularly its organization and corporate members? The following paragraphs address this question.

ISOC and other non-state actors associated with the Internet

As indicated above, the initial rationale behind the establishment of ISOC was to provide financial support for standardization activities of IETF. Nevertheless, IETF faced a dilemma about how could it keep its independence from the entities that will provide funding for its activities. In other words, how could IETF preserve its principles and values, which seeks to maintain the neutral architecture of the Internet, from the external influence of the donor entities that will become members of ISOC? As one of IETF's members puts it:

> "The IETF is not an industry consortium, and much of our integrity comes from the fact that we operate outside corporate and governmental structure. Our mission is to create standards for the Internet in general, not geared towards anybody in particular. I do not see how we could do this without bias while accepting funding from an entity that does not necessarily share this goal" (Pelstring 2003).

ISOC handled this dilemma by defining itself as a global cause-based organization and not a membership-driven organization. The members should support the cause, values, and principles of ISOC, not vice versa. The members are not entitled to alter such cause and values. Formulation of ISOC's position towards various Internet policy

[53] American Registry for Internet Numbers (ARIN) and Reseaux IP Europeens Network Coordination Center (RIPE NCC).
[54] DENIC, the administrator of the country-code for Top-Level Domain of Germany (.de).
[55] Afilias, the administrator of the Generic Top-Level Domain of .INFO
[56] Comcast, Time Warner Cable, and NBC Universal.
[57] National Cable & Telecommunications Association (NCTA).
[58] Cisco and Juniper Networks.

issues must respect its cause and values as benchmarks that determine the parameters of ISOC's stance.

As demonstrated in chapter 6, ISOC was key player in creation of ICANN and establishing its system. Accordingly, the organizations affiliated with ICANN's system, including those that are organization members of ISOC, share the cause and values of ISOC about the Internet. However, this might not be the case with some corporate members of ISOC.

In general, the private sector actors, including the corporate members of ISOC, share ISOC's values of openness of the Internet, resistance to governmental control over the Internet, as well as the self-regulatory form of its governance. The reason is that those values reinforce the commercial prospects of the Internet and enhance it as market-oriented facility. Therefore, ISOC and the private sector actors oppose any governmental control over the Internet, and they reject accordingly its governance through traditional intergovernmental arrangements. They support the de-facto self-regulatory model of the Internet, which is perceived to maintain its openness as well as its market-oriented characteristics.

However, some of those private sector actors, particularly telecommunication and cable companies, seek to limit the Internet 'neutrality' aspect in order to promote specific interests, which could relatively jeopardize the 'end-to-end' architectural principle of the Internet (Lessig 2002). Companies such as AT&T, Comcast and Verizon – which are corporate members of ISOC - seek to interfere with the delivery of Internet content so that they can deliver the content on a differential basis according to specific arrangements with content providers. For example, those companies could strike deals with certain content providers, such as Amazon or Netflix, to deliver their videos and data to consumers faster than those of other content providers could. This allows cable and telecommunications companies to discriminate against content providers and to charge them differentially based on such deals (New York Times Editorial Board 2014). This can be done through creation of different tiers of online service, which enable those companies to "sell access to the express lane to deep-pocketed corporations and relegate everyone else to the digital equivalent of a winding dirt road" (Lessig and McChesney 2006). This dynamic triggered what is known in the Internet policy circles as 'Net-Neutrality' debate.

On the other hand, ISOC considers the economic power of the incumbent telecommunication monopolies can delay or prevent the growth of the Internet, much as governmental regulation can do, advocating policies that promote competition in telecommunications and Internet services (Internet Society 2015e). Thus, while ISOC and the private sector actors share the goal of preventing governmental control and regulation over the Internet, the motivation seems to be different. ISOC's values derive from the IETF community views of maintaining the Internet as an open neutral decentralized public facility shaped by its users. Differently, some of the major private sector actors, in particular cable and telecommunication companies, are motivated by specific monopolistic interests that could contradict such views of IETF community. This distinguishes ISOC from the private sector actors, including its corporate members. Moreover, it is clear that the private sector actors may have different, and even contradictory, interests regarding the Internet, as demonstrated by the case of cable and telecommunication companies versus content provider firms. Therefore, ISOC can not be considered a profit-oriented industry consortium. On the contrary, ISOC is a political embodiment of the Internet epistemic community and its values.