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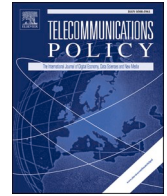
The technology we choose to create: Human rights advocacy in the Internet Engineering Task Force

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A B S T R A C T

This article is an ethnographic analysis of recent efforts in the Internet Engineering Task Force (IETF) to consider human rights values in the development of Internet networking standards and protocols. By deploying qualitative methods—65 semi-structured interviews and two years of ethnography—I provide a detailed anthropological picture of how IETF participants understand technology, and what consequences their perspectives have for human rights advocacy. Internet governance scholars have recently debated the "turn to the infrastructure" and the role of human rights advocacy in the IETF. Bringing these insights together, I argue that the IETF's shared view about the non-prescriptive nature of technology encourages participants to resist the inclusion of human rights values through standardization. I identify this non-prescriptive view of technology as a barrier to addressing human rights through direct civil society engagement in standardization organizations. This view explains why standards rarely reflect human rights concerns as a contextually embedded and social issue more than a technological or communicative problem. My findings inform ongoing academic and policy debates about the role of human rights advocates in the IETF and provide an epistemic grounding for the recent "turn to the infrastructure" in Internet governance research.

1. Introduction

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. (…) These concepts have little to do with the technology that's possible, and much to do with *the technology that we choose to create.* (source: RFC 3935, emphasis author)

The Internet was built on technical standards.[1] The first iteration of the Internet was driven by the need to connect disparate networks. Internet standards enabled such "internetworking" by standardizing how networks exchanged data. For example, the Transmission Control/Internet protocol (TCP/IP)—the suite of protocols that enables packet routing—provided the foundation for Internet applications and services Faltstrom, 2016; Mathew, 2014). These standards are developed in industry-led standard setting bodies, like the Internet Engineering Task Force (IETF).

The IETF is a social as much as it is a technical organization. The quote above comes from RFC 3935 "A Mission Statement for the IETF". The 2004 document was created to help guide the IETF's organizational decisions in the case of competing views about standards development. Interestingly, this mission is also a statement of social intent and shared norms in the IETF, visible in the focus

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on a "shared commitment to openness and fairness". This RFC raises the question how cultural views about the nature of IETF standards guide technical discussions and engineering practices. Anthropology and its methodology of ethnography is particularly suited to answering this question as it, "forcibly reminds us that the deeply affectual relation people have to infrastructures—the senses of awe and fascination they stimulate—is an important part of their political effect" (Larkin, 2013, p. 334). Such affective connections to technology are commonplace in the IETF.

In this article, I outline the sociotechnical views that guide IETF engineers and their political impacts on ongoing human rights advocacy efforts in this technical organization. Shrouded in acronyms, the IETF's work remains crucial to the Internet's current functioning and governance. Over the last three decades, it developed multiple crucial Internet standards, and remains at the forefront of application and networking protocols. The IETF developed the widely used Hypertext Transfer Protocol (HTTP), the security protocol Transport Layer Secure (TLS), and the Quick UDP Internet Connections (QUIC) protocol, the first new transport protocol deployed on a wide scale in two decades. This technical organization's continued leadership makes it a relevant site of research on norm contestation and entrepreneurship (Finnemore & Sikkink, 1998; Wexler, 2003), in the context of Internet governance.

Hidden in the IETF's discussions and argot of abbreviations are questions of norm emergence, acceptance, and internalization (Finnemore & Sikkink, 1998) familiar to Internet governance scholars and as well as anthropologists. For example, debates about token binding in Hyper Text Transport Protocol Secure (HTTPS) are fundamentally about who defines the functioning of online identity management. Whether to include "spinbits" in transport protocols like QUIC demands weighing the privacy needs of users with industry needs to monitor networks. Conversations about the Registration Data Access Protocol (RDAP) gravitate around how to define what information about domain name registrations is accessible, and to whom. IETF standards inherently raise questions about whose norms are being translated to networked technology through standardization practices, and what role civil society interventions play in this process. Such questions require ethnographic approaches. However, to date there has been limited anthropological inquiry of Internet governance or the role of engineering cultures in the promotion of norms by civil society.

This article provides an anthropological case study of efforts to include human rights values in IETF standards. I analyze recent human rights advocacy endeavors by a small group of human rights advocates and engineers between 2014 and 2017. I ask what happens when human rights advocates join the IETF? How do their values and norms conflict with those of IETF engineers? Where is "rough consensus" found in the debate about the relationship between protocols and human rights? I use ethnography and interviews to provide insight into how IETF culture shapes protocols and civil society attempts to introduce novel norms into the standards design. Such anthropological research is of interest to scholars debating norm contestation in Internet governance because it provides an *emic* account of the world as understood by those in it (Kottak, 2006), raising new insights into how collective social behavior shapes digital networks.

I bring together Internet governance literature from two main areas—the role of human rights advocacy in Internet governance and the infrastructural turn—with anthropology of technology to reconcile the debate about the specific contribution of civil society to standardization in the IETF. I also propose Internet governance research could benefit from including critical social science frameworks, that consider organizational cultures and discusses how Internet governance practiconers persistently resist human rights interventions and cultural change.

This article adds new insights to policy debates. My findings are relevant to technology policy makers, who are calling on governments and companies involved in Internet governance to protect and respect human rights (Kaye, 2016; La Rue, 2011; Puddephatt et al., 2010). Such calls are likely to increase as the Internet becomes more widespread. Yet, little is known about what happens when Internet governance organizations heed that call, or why they do so. Rather than questioning whether engineers in the IETF understand human rights, I will focus on *how* they understand them. In doing so, I demonstrate the promises and pitfalls of applying human rights norms to the lower layers of the Internet stack, moving academic and policy conversations beyond the well-covered grounds of Internet platforms and services.

This article contains six sections. In the following section, I present my case study context and research questions. Section three introduces my methods. Section four reviews Internet governance literature, focusing on outstanding questions about the role of human rights advocates in the IETF and on epistemic limitations of the recent infrastructural turn. Section five presents my findings of how IETF participants view technology and its effects on human rights advocacy efforts. Section six outlines my conclusions and discusses contributions to ongoing academic debates.

2. Case study and research questions

In October 2014, two human rights advocates presented a bold idea to the IETF. They wanted to research how Internet standards and protocols impacted human rights values and develop guidelines that IETF engineers could use to mitigate the negative impact of

their work.[2] To do so, they set up a Human Rights Protocol Considerations Research Group (HRPC) in the Internet Research Task Force (IRTF).[3] In October 2017, after three years of elaborate online and offline discussions, these human rights advocates published Request For Comments (RFC) 8280 "Research into Human Rights Protocol Considerations," which outlines human rights protocol considerations.[4] RFCs are the IETF's formal document series, in which its standards are published.

After the publication of this novel human rights guidance document, the advocates had limited success in getting IETF engineers to use RFC 8280 or incorporate its claims about the relationship between protocols and human rights into their cultural understanding of protocols. In order to understand the advocates' limited success, it is necessary to understand the historical background of the human rights group in the IRTF. To develop RFC 8280, a core group of three people formed the HRPC human rights group. The group consisted of one lawyer who ran a digital rights organization in Brazil, a public interest technologist working for an international freedom of expression organization in the UK, and a US-based long-time IETF engineer with a background in communication rights. The human rights group provided a dedicated convening space for human rights advocates. Throughout its 30 years existence, several civil society and public interest technologists actively participated in the IETF (Cath & Floridi, 2017; Morris, 2011), yet this was the first time the community had a dedicated human rights research group in its research subsidiary.

The human rights group included a wide variety of participants. From 2014 to 2017, the core-group of contributors to the human rights discussions fluctuated between 15 and 30 people. The overall size of the group, as measured in active participation in discussions online and offline, totaled about 75 individuals. Around a third worked for industry, a third for Non-Governmental Organizations (NGO) with a human rights or civil liberties mandate, and a third in academia. A minority of individuals worked for government or other Internet governance organizations. In this article, the term "human rights advocate" refers primarily to people working for NGOs or those who self-defined as such. For my other research participants, I apply the term "IETF engineer".

The impact of the group's norm entrepreneurship reached beyond the IRTF, into the IETF. The The human rights group's offline meetings were often attended by up to 120 people, and discussion about human rights regularly moved from the IRTF to the IETF at large.[5] For example, in March 2017 one of the chairs of the human rights group was invited to discuss human rights and protocols during the plenary meeting of IETF 98 in Chicago.[6] Human rights advocates started their work in the IRTF but aimed to include human rights as structural considerations for standards development in the IETF. Many of the individuals participating in the human rights group were also active IETF engineers. As such, throughout this article I discuss my findings in terms of the IETF's organizational remit and culture.

I approach human rights following the definition set out by the human rights advocates. They define human rights according to the United Nations (UN) Universal Declaration of Human Rights (UDHR). I have not included ongoing policy and academic discussions about the genealogy of human rights (Alston, 2013) or their continued relevance (Alston, 2013; Hunt, 2008; Jensen, 2017; Moyn, 2012), especially in application to non-state actors. These discussions are part of my dissertation research, on which this work is based, but out of scope for this article.

Deploying anthropological methods provides a detailed picture of how IETF participants *choose to create* technology, and what consequences this has for the ability of the human rights advocates to achieve their goals. The process of negotiation over these decisions situates human rights advocacy in the cultural context of norm entrepreneurship at the IETF. This article is guided by the following research questions:

(1) How do IETF participants understand Internet standards?
(2) How does this understanding shape human rights advocacy efforts?

I argue that the dominant understanding of the nature of technology in the IETF undermines human rights advocates efforts. That is, IETF engineers speak about protocols in terms of functional connectivity, permissionless innovation, interoperability, and openness. These understandings reflect IETF culture, in the sense that they reproduce the tacit normative framework of "protocol non-prescriptiveness" that underlies the engineers dominant understanding of protocols as fundamentally voluntary and opt-in. This cultural understanding of technology, the notion that IETF participants cannot and should prescribe how their products are used, in turn,

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[2] This article follows the terminology set out by Denardis by using the terms protocol and standard interchangeably (Denardis 2009, p. 6).

[3] The IRTF is the research subsidiary of the IETF, focusing on long term research to inform standardization.

[4] See here for RFC 8280 https://trac.tools.ietf.org/html/rfc8280 As the careful reader will note, I am listed as a co-author of RFC 8280. In 2014, I wrote my master dissertation on HRPC and as part of that ethnographic work I became one of the penholders for RFC 8280. Early in my PhD, I decided to keep that position as it allowed me to closely follow the discussion, get public and private input on the progress of the work, without being expected to engage in the content of the discussion (as penholders are usually not process drivers but rapporteurs). Being involved in the process of creating a Request For Comments (RFC) from start to finish helped me, as Diesing (1972, p. 291) states: "learn the concepts and distinctions [of a culture] not just by asking people or reading an article but by participating".

[5] The IETF keeps limited formal data on participation numbers for each working group or mailing list. As such, it is difficult to compare the engagement in HRPC with other groups. However, over the last three years I followed and participated in other research groups. Many of which have equal participation numbers as HRPC but were less contentious in terms emails sent and tone. There are some interesting methodological questions around how to operationalize what participation or contention means. Because of the way that IETF and IRTF mailinglists are set up, for researchers it is only possible to see who responds on the list, as opposed to all the people that are subscribed to a list. Together with several other researchers, I am exploring how to improve current methods for researching mailing list conversations (Benthall, 2015).

[6] See here for a write up of this discussion: https://www.ietfjournal.org/ietf-debates-its-role-in-supporting-human-rights-via-internet-protocol-development/.

illuminates why IETF's engineers resist and largely dismiss human rights advocacy efforts, which were seen as overly prescriptive.

3. Methods: pushing all the wrong buttons

During a meeting of the European Internet Protocol Networks (RIPE) forum in 2016, I presented findings from my research to a group of network operators, many of whom participated in the IETF.[7] In the presentation, I argued that these technical actors have a responsibility to consider the impact of their technical decisions on society. This might seem obvious or even blasé, but in this technical community a pro-active approach is contentious. Jan Aarte Scholte, a global governance scholar who researches the Internet Corporation of Assigned Names and Numbers (ICANN), attended my presentation. Below is what Jan relayed about his neighbor's reaction to my presentation:

I was not sure whether to tell you this, but I sat next to this technical guy, a network operator, during your presentation. And you might want to know what he said about you. Here, look, I jotted it down: "Ah yes, young female anthropologist pushes all the wrong buttons".

This short vignette neatly captures my main arguments in this article. First, the community involved in the technical governance of the Internet has clear (if often unspoken) norms about its work and the artefacts it creates. I argue these norms are grounded in the idea that engineers do not, and should not, prescribe how their technologies are used. Second, Jan's neighbor's comment suggested that, by revealing the social implications of Internet protocols, I was pushing "all the wrong buttons." Doing research on Internet governance cultures, requires a method that critically interrogate existing norms and questions taken for granted knowledge. In this section, I outline how my ethnographic research approach enabled such critical inquiry and provide further details about my methods.

In many ways, all IETF participants—human rights advocates, engineers, and the ethnographers studying them—are peers. They are all part of what Traube calls, "the knowledge classes: individuals who claim status on the basis of possession of special knowledge" (Traube, 1996, xv). During my research, I found that human rights advocates faced an obstacle of rigid IETF knowledge practices (Cath, 2020). If a social norm could not be engineered (i.e., measured, statistically tested, and directly observed in the network), human rights advocates faced an uphill battle to include it in the design process. The inclusion of the knowledge, experiences, and values of the human rights advocates at the IETF were often stymied.

Likewise, my dissertation research was often described as "anecdotal" or "not scientific enough" by IETF participants, because I did not use quantitative methods to understand IETF culture. Yet, it is precisely these social dynamics of rendering different types of data and experiences as irrelevant that indicate how designing protocols is sociotechnical work, that requires minds and machines. While the role of the latter can often be measured quantitatively, the social aspects of engineering cannot be numerically accounted for. Much as some of my research participants might disagree, to understand the human factor of Internet engineering, qualitative and ethnographic research is needed.

By showing the benefits of "knowing differently" in anthropology, my ethnographic research broadens the appreciation for critical qualitative methods to the study of Internet governance. This paper also provides a unique methodological contribution to this special issue on *norm entrepreneurship*, as the only paper taking an ethnographic approach to Internet governance rooted in cultural anthropology. Anthropological methods of interviews and ethnography are well-positioned to tease out answers about the role of norms in Internet governance. The value of anthropology to the study of Internet governance lies in its ability to unearth naturalized worldviews, knowledge practices, and categories. Applying anthropological tools to study human rights advocacy in the IETF allowed me to surface how cultural forces shape the inclusion of norms in standards' design and governance. It also enabled me to ask how things could be different, given that IETF practices, protocols and norms are neither natural nor inevitable.

Qualitative methodologies let me to draw from a diverse set of methods and data sources that reveal the complexity of IETF culture. My overarching dissertation project, on which this article is based, investigates "what role IETF culture play in its infrastructural politics?", through a multi-event ethnographic study. Between 2016 and 2020, I engaged in online and offline participant observation at the IETF. During this time, I participated in 14 IETF meetings, five in person and nine online. I also participated in-person by organizing workshops around the topic of human rights at three Internet Governance Forums (IGF) and several national IGFs. I used these adjacent meetings to do interviews and observe human rights advocates in the broader Internet governance community. I conducted 65 semi-structured elite interviews.[8] For this paper I draw from that data.

My interview sampling strategy was a combination of purposive sampling (Guetterman, 2015; Palinkas et al., 2015) and subsequently snowball sampling (Patton, 2002). For the purposive sampling, I drew from my prior experience in the IETF, as well as from archival research including document and mailinglist analysis. I used my existing network, working with insider references (Ostrander, 1993) and making strategic use of gatekeepers (Richards, 1996) to gain access. I identified the most prolific contributors to the online

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[7] For my master's degree, I wrote about the Human Rights Protocol Considerations Group (HRPC). My 2015 master thesis was entitled "A Case Study of Coding Rights: Should Freedom of Speech Be Instantiated in the Protocols and Standards Designed by the Internet Engineering Task Force?". In it, I make the case for the need for a more delicate consideration of human rights values by IETF engineers. Not by baking human rights values into their designs, but by understanding and identifying tensions between their design and human rights values. This doctoral project builds on those early findings. Carr (2015). A Case Study of Coding Rights: Should Freedom of Speech Be Instantiated in the Protocols and Standards Designed by the Internet Engineering Task Force? *Thesis for Degree in Master of Science in Social Science of the Internet, Oxford University*. https://mailarchive.ietf.org/arch/attach/hrpc/pdfbyB1Dp.pdf.

[8] The interviews lasted between 60 and 90 min on average. When possible, they were conducted face-to-face during, or around, IETF meetings. Ten interviews were conducted online due to scheduling conflicts.

and offline HRPC conversations and contacted them for interviews. Based on my participant observation and initial set of interviews, I developed a further set of interviewees. For each of these, I would round off my conversation by asking my interlocutors to name five people they think I should talk to. This snowball approach informed my final interviewing phase until I reached saturation (Fusch & Ness, 2015; Guest et al., 2016; Saunders et al., 2018). I transcribed the recorded interviews and analyzed them using a combination of manual coding and qualitative coding software NVIVO.

Coding qualitative data is similar to developing running code for the IETF: at its core, it is about defining the relationship between different concepts such that they provide insights into the functioning of a network, whether between machines or humans. I analyzed data from my interviews and participant observation to inform my interviews (Aberbach & Rockman, 2002), relying on a critical constructivist grounding (Kincheloe & McLaren, 2005; Wyn Jones, 2001). For the data analysis, I used a mix of the coding, category handling, modelling, and writing models as defined by Saldaña (2015), allowing me to dynamically develop theoretical insights.

The methods I used have several constraints. First, they reflect the insights of the people I interviewed and "hung out" with during fieldwork. I included a diverse cohort of interviewees and exposed myself to a wide range of IETF and IRTF processes. However, like all anthropological research that emphasizes the situated nature of knowledge, I do not claim that my findings are complete or universally applicable. Rather, I present a situated account of human rights advocates in the IETF within a specific timeframe that provides a window into IETF culture. Second, IETF culture is malleable and driven by a wide variety of evolving views on the nature of technology. This article's scope is not intended to provide a comprehensive picture of IETF culture, but rather approach it through the tensions between the orientation to technology of IETF engineers and human rights advocates. Still, I believe these findings can provide relevant grounding for a number of ongoing debates in Internet governance, to which I turn next.

4. Critical Internet Governance

In this literature section, I am setting the stage for the discussion of my findings. Following on the methodological contribution of anthropology to Internet governance, I start with an introduction of the theoretical contribution critical social sciences, especially anthropology, can make to ongoing Internet governance debates. Subsequently, I bring together two current discussions in Internet governance directly relevant to my case study: the role of human rights advocacy in Internet governance and the infrastructural turn. I use these literatures to elucidate the contribution of human rights advocates to standardization in the IETF.

Lacking in much of the current research on Internet governance, is a critical perspective with the aim of understanding "how embedded power hierarchies (e.g. of culture, gender and geopolitics) could skew global multistakeholderism in favor [sic] of already privileged circles in world politics" (Scholte, 2020, pp. 18–19). Such research adds to Internet governance by illustrating "the IP-based Internet as uninterested in social and political structures of inequity in which these technologies are built and used and, consequently, as incapable of bringing about a better technological future" (Paris, 2020, p. 20). Internet governance as a practice, in other words, has always been inequitable and is often disengaged with questions of social justice. Yet, contemporary research barely captures this.

Critical race and Science and Technology Studies (STS) studies scholars have long made this point. Nelson (2002, p. 3), for example, argued that the liberatory ideologies underpinning the early Internet contained a colorblind racism, unsensitive to the fact that "bodies carry different social weights that unevenly mediate access to the freely constructed identity" advocated for by Internet "evangelists". More recently, McIlwain (2016; 2019), shows how the architects of the web replicates structural inequality along racial lines. Likewise, Everett (2002, p. 125) argues that the normalization of the use of "master/slave" terminology to execute commands in computer operating systems re-inscribes race and racism in the Internet. Such language is commonplace at the IETF[9] and has been at the center of recent controversy,[10] but has not received much academic attention of Internet governance scholars.[11]

The lack of engagement with structural inequity is slowly changing, as more Internet governance scholars are taking STS approaches. Some scholars are questioning the narrow focus of the field (van Eeten & Mueller, 2013). Others are raising concerns regarding the use of the Internet's infrastructure for political means (DeNardis 2010, 2013, 2020; Bradshaw & DeNardis, 2019; Musiani et al., 2015) and showing how current Internet governance arrangements broadly favor US interests (Carr, 2015). In the process, Internet scholars are deepening their understanding of cultural forces, like the role of trust, norms and human connection (Epstein et al., 2016; Mathew 2014, 2016; Meier-Hahn, 2015; Sowell, 2012; Ten Oever, 2020). Likewise, they are considering the impact of Internet control points and telecom policies on underrepresented groups, like marginalized communities of color (Moran & Bui, 2019) and queer communities (DeNardis & Hackl, 2016). This emerging work at the intersection of critical social sciences and Internet governance is encouraging but remains incomplete.

Largely missing are critical perspectives into what Scholte (2020, 18) calls the performance of Internet governance through "bureaucratic rituals, dress codes, office layouts, patterns of friendship, [and] deployments of language." Such studies are important to understand how cultural dynamics tilt Internet governance processes in favor of its most privileged participants. Recent work in anthropology has much to add, by theorizing how discriminatory outcomes of Internet governance processes often have cultural roots.

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[9] See for instance RFC 8163 on the transmission of IPv6 over Master-slave/Token-passing (MS/TP) Networks https://tools.ietf.org/html/rfc8163.

[10] There is an ongoing discussion about the use of oppressive and exclusionary language within the IETF https://www.ietf.org/about/groups/iesg/statements/statement-on-oppressive-exclusionary-language/.

[11] A number of human rights advocates as well as industry engineers in the IETF have recently raised their concerns regarding this terminology: https://www.ietf.org/id/draft-knodel-terminology-01.txt the subsequent was voluminous and the tone of the conversation often breached the IETF's code of conduct, such that on August 10th, 2020 the IETF chair decided to mute the mailing list, who in her words "was not sure that threads have ever been muted on. ietf@ietf.org before" reflecting the contentious nature of the discussion.

In her ethnography of open tech communities, Dunbar-Hester (2019) argues that the importance of the norm of autonomy makes open source organizations resistant to rules that improve diversity. Likewise, Miltner (2020) looks at how the UNICODE standards body for emojis—miniature digital communication pictographs—suffers from structural racism, which leads to a lack of racial representation in early emoji sets. Reagle argues that the argumentative working style of the Free and Open Software (FOSS) movement, which has many cultural similarities with the IETF, creates "informal but significant barriers to women's participation" (2013, 1) through unaddressed misogyny and aggression.

Anthropology provides novel insights into the "embedded power hierarchies" of Internet governance. Yet, there is limited understanding of such dynamics in Internet governance organizations like the IETF. Given the ideological and professional overlap between FOSS, computing, and Internet governance communities, these cultural and discriminatory dynamics have unexplored parallels, but require theoretical and methodological grounding currently underrepresented[12] in Internet governance research. This article aims to draw together these disparate literatures by undertaking critical anthropological inquiry into Internet governance at the IETF.

My approach builds on existing Internet governance scholarship that unpacks how "Internet governance produces itself" (Hofmann, 2020, p. 254) through academic knowledge production (Ziewitz & Pentzold, 2014) and "mundane practices" (Flyverbom, 2016). By highlighting the need to integrate critical social sciences into Internet governance, I hope to spark further debate about how Internet governance cultures replicates power dynamics, how knowledge claims are made about what constitutes Internet governance, and who can make those claims.

Anthropology is especially suited for this cause. It can add to ongoing debates about "what counts as Internet governance" (Ziewitz & Pentzold, 2014, p. 319), by unpacking the political and socio-cultural functions served by technical design. These insights in turn add to ongoing academic conversation about what it means to do human rights advocacy work in Internet governance (Cath & Floridi, 2017) or co-opt the infrastructure for political ends (DeNardis & Musiani, 2015). To further explore what a future program of critical anthropological inquiry might look like, in the next section I will introduce the debate about the recent "infrastructural turn" in Internet governance.

4.1. The turn to the infrastructure: Co-optation or core objective?

Over the past decade or so, Internet governance as an academic field has taken a "turn to the infrastructure" (DeNardis, 2012; Musiani et al., 2015). The central premises of this turn are twofold. The first premise is that the infrastructure of the Internet, and the organizations responsible for its governance, are sites of economic and political power used by academics, governments, civil society, and industry. The second premise is that these sites are used—or *co-opted* as the academics postulating this turn suggest—for purposes "beyond their original constructed technical and policy functions" (DeNardis & Musiani, 2015, p. 3). In that same chapter, DeNardis and Musiani define co-optation as "the use of Internet infrastructures and systems of governance—such as the DNS—for purposes other than those for which they were initially designed" (2015, 5). There are outstanding questions regarding the turn's philosophical foundations. I will highlight two directly relevant to this article and use them to critically reflect on what my case study adds to the first and second part underlying this turn.

Some Internet governance academics question the first part of the premise. They argue that infrastructure has always played a prominent role in political discussions (Mueller & Badiei, 2018). This is true—as Musiani et al. (2015) acknowledge, infrastructure has permanency as a site of political contention. They don't argue that there is anything completely new about Internet infrastructures being used as proxies for politics. Rather, they argue that the current use of infrastructure is more blatantly political than before. In their words, the infrastructure is used to "carry out functions completely extraneous to the core technological objective of the system" (2015, 19). Musiani et al. (2015) argue that using infrastructure as a proxy for external functions raises questions about the "unintentional consequences of these developments for the stability and security of the Internet as well as human rights online" (2015, 19).

The crux of their argument, thus, lies in the second premise of the infrastructural turn—how Internet governance sites are co-opted. Hence, a different way to build on this turn would be to problematize how it can be known whether something constitutes an "original technical or policy function" or a "co-optation of the infrastructure." Concurrently, a related line of inquiry could examine whether co-

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[12] This is not to say that there are no qualitative inquiries of Internet governance. Over the past six years, a number of qualitative case studies have been conducted (Mathew, 2016; Myers West, 2017; Milan & Ten Oever, 2016; Sowell, 2012), which provide partial insights into these cultures and how they shape Internet technologies through unspoken norms and informal networks.

optation is inherently bad,[13] as suggested by recent case studies (Musiani et al., 2015). Doing so requires ethnographic insights into the core functions of the infrastructure and the effects of its political use.

The second question raised by the infrastructural turn's premises concerns epistemology. The principle proponents of the infrastructural turn provide limited background regarding how they delineate the "original technical and policy functions," or what sources of knowledge can be brought in as evidence to define them.[14] Considering the multiple histories of the Internet's development (Abbate, 2000; Clark, 2018; Turner 2010, 2017)—and the technical, commercial, socio-political, cultural functions it serves (DeNardis 2010, 2011, 2014; Braman, 2011; Carr, 2015; Musiani et al., 2015)—it is evident why defining such sources of knowledge is difficult.[15] The functions of the Internet evolved with its role in society, making it hard to develop static indicators for its original functions. The lack of clarification on what constitutes the core functions of the infrastructure leads to methodological difficulties when trying to determine whether a particular use is co-optation.

My findings show that the IETF's dominant cultural understanding of standards is not receptive to the knowledge claims made by human rights advocates about the "core functions" of Internet governance. These insights raise new epistemic questions for recent foundational work on the "turn to the infrastructure" (DeNardis, 2010; Musiani et al., 2015). The "infrastructural turn" posits that the Internet's infrastructure and the organizations that maintain it are increasingly co-opted for political purposes that undermine its "original technical functions" (DeNardis & Musiani, 2015, p. 3). I argue that drawing clear lines demarcating Internet governance functions presupposes that these functions are consistent across time and space, rather than culturally and historically defined as I argue here.

The infrastructural turn should look towards critical disciplines, like cultural anthropology, to find new sources of knowledge for answering outstanding questions about the nature of Internet co-optation. My anthropological study is uniquely positioned to provide new insights into what constitutes "original technical and policy functions" or co-optation of the infrastructure. It enables me to ask whether the Internet's "original technical functions" have always contained policy functions, and argue that the current turn to the infrastructure reflects what Larkin calls a "rearrangement of the hierarchy of functions" (2013, 335), rather than political co-optation. Critically analyzing the theoretical limitations of the infrastructural turn by building on anthropological research aligns with my earlier call to further include critical social science approaches to the study of Internet governance. In the next section, I pick up on this theme by considering its implications for the ongoing academic debate about role and efficacy of human rights advocates in the IETF.

4.2. Human rights advocacy in the IETF: futile or tour-de-force?

My research responds to the contentious debate about the role and efficacy of human rights advocates in the IETF. Over the last seven years, a growing group of researchers has debated the role of human rights advocates and public interest technologists in Internet governance organisations. This work, however, is largely devoid of studies that consider how culture affects the application of human rights norms to technology development, which is necessary to further the research agenda of norm entrepreneurship in Internet governance. I add to this research, by applying my analytical framework to map the practical challenges posed by the cultural domain of standard-setting in which human rights advocates intervene.

The role of human rights advocates and public interest technologists in Internet governance is a growing research topic (Bortzmeyer, 2018; Cath & Floridi, 2017; Milan & Ten Oever, 2016; Mueller & Badiei, 2018; Myers West, 2017; Orwat & Bless, 2016; Rachovitsa 2016b; Ten Oever, 2020; Zalnieriute & Milan, 2019). Standards in particular are considered to have implications for human rights, civil liberties, and social justice (DeNardis 2011, 2012, 2014; Bradshaw & DeNardis, 2019; Cath & Floridi, 2017; Deibert et al., 2008; Milan & Ten Oever, 2016; Morris, 2011; Hackl 2016). Private standards bodies and their engineers historically have considered these implications (Abbate, 2000; Braman, 2011). Increasingly, human rights advocates working for Non-Governmental Organizations (NGO) also engage in these Internet governance debates (Cath & Floridi, 2017; DeNardis, 2014; Milan & Ten Oever, 2016; Morris, 2011).

The ongoing debate about the role and efficacy of human rights advocates in the IETF is contentious; some academics argue that current IETF human rights efforts are misdirected (Mueller & Badiei, 2018), while others hold that public interest representation is crucial (Morris, 2011; Musiani et al., 2015). Various Internet governance scholars have researched the efforts of human rights

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[13] In her 2012 article DeNardis focuses on the use of the infrastructure for content control by political actors, as their traditional mechanisms for information control are limited by the Internet. Some of the same epistemic issues highlighted here come up in that article, however, its framing around content control as outside of the bounds of infrastructure provides a strong departure point for refining the outstanding epistemic questions regarding the turn to Internet infrastructure.

[14] For example, Musiani (2016) argues that the debates about the development of decentralized alternatives to the DNS show "how Internet governance infrastructures are increasingly being co-opted for political purposes irrelevant to their primary Internet governance function (…) (p. 73–74). Later in that same piece, she cites these functions to be: "name registration (…), name resolution (…) and trust". She does however not provide an in-depth explanation for how it can be known that these three functions are core, nor does this example elaborate on the fundamental social (as opposed to technical) nature of trust (Mathew, 2014; Meier-Hahn, 2015). Earlier work by DeNardis reflects the fundamentally embedded nature of Internet governance: "This technical architecture is not external to politics and culture but, rather, deeply embeds the values and policy decisions that ultimately structure individual freedom online and the pace of Internet innovation." (2013, 22) DeNardis raises questions similar to those in this article, as to how cultural dynamics play into current theorizing about the use of the infrastructure for political purposes.

[15] This debate goes back to the Internet's initial development. Abbate (2000, 1), for instance, details how "for many years there was no consensus on what its [packet switching] defining characteristics were (…) in part because computer scientists evaluated it in ideological as well as technical terms".

advocates in the IETF. Their work largely falls into two categories: those arguing that human rights efforts provides meaningful guidance to standardization (Brown et al., 2010; Liddicoat & Doria, 2012; Rachovitsa 2016a; Rogers and Eden 2017; Ten Oever, 2020; Zalnieriute & Milan, 2019) and those who argue it does not (Mueller & Badiei, 2018). I want to move beyond this apparent dichotomy by focusing on how these efforts are imbricated within IETF culture. Rather than determining that the human rights advocates wholesale succeed or fail, I analyze the cultural assumptions and views that drive their work, to contextualize their effects in Internet governance. My cultural approach adds nuance to an ongoing debate about the efficacy of human rights advocates in the IETF.

Several authors writing about human rights and civil society interventions in the IETF argue that these actors provide meaningful and necessary contributions to Internet governance. For example, Morris (2011) argues that the contribution of civil society to standardization bodies is important because they represent interests, users and concerns not naturally considered by the IETF's corporate participants. Roger and Eden (2017, 802–3) similarly argue that, "connecting human rights activists and standards developers holds great promise in beginning to frame technical standards in terms of their social impacts and consequences. In future, the IETF may even embed this work directly into standards development." Other academics simply argue that the IETF's work is inherently political. For this reason, they call for further research on how human rights values and actors can guide the IETF to be more mindful of the impact of protocols on human rights (Cath & Floridi, 2017; Orwat & Bless, 2016; Ten Oever, 2020).

Yet not all academics are supportive of human rights efforts. Mueller and Badiei (2018) argue that current human rights advocacy efforts in the IETF—the same ones at the center of this article—are futile because the advocates adopt a technologically-deterministic stance. That is, human rights efforts fail to influence the development of standards because the approach oversimplifies the relationship between technology and society. These critics locate the onus of this failure with the human rights' advocates framing of the problem. They briefly mention that "the IETF is an environment where certain values favoring Internet freedom, and a culture rooted in high-tech industries and universities, prevail" (2018, 9), but do not go into depth on how this culture shapes human rights advocacy. DeNardis considers "public interest" representatives in the IETF, as her work predates the work of the human rights advocates. She argues that while important, civil society impact is limited because their participation does not create additional legitimacy for these bodies, does not scale, and is corporate funded (DeNardis, 2014, p. 91).

Within this debate there is room for further empirical substantiation of these various positions through scholarship grounded in organizational culture.[16] I want to open up a novel line of inquiry that focuses on how these human rights efforts are imbricated with IETF culture. Such research should consider the IETF's idiosyncratic norms as well as how its engineers and human rights advocates make sense of the work they do. Rather than imposing *etic* indicators to either dismiss or encourage these human rights efforts, I show that they are hampered by IETF culture, particularly the cultural perception that protocols are non-prescriptive in nature. Current academic discussions hint at the imbrication of civil society efforts with IETF culture, but do not go into great depth on the normative barriers to advocacy efforts succeeding. In other words, the academics most critical or most supportive of the human rights efforts touch on, but do not theorize their findings in terms of, IETF culture. I turn to this in the next section where I present my empirical findings of how IETF participants view technology and its effects on human rights advocacy efforts.

5. Findings: running code, culture, and choice

The IETF's unofficial mantra holds that, "We reject: kings, presidents and voting. We believe in: rough consensus and running code." In this section, I analyse the IETF's participants' beliefs about standards. I show that standards represent the engineers' social preferences as much as technical prerequisites; standards reflect not just the technology that is possible, but also the technology that the IETF *chooses to create*. In particular, I illuminate their tacit and normative understandings of standards to argue that IETF engineers' understanding of technology is bound by a commitment to what I call "protocol non-prescriptiveness"—the idea that the IETF should not prescribe how its technologies are used. This protocol non-prescriptiveness is at odds with the perceived prescriptive approach of the human rights advocates, who seek a "rights-protecting" outcome of standard design and implementation. These findings provide insights into academic debates about human rights advocacy in the IETF. How standards are understood and acted upon also provides a source of knowledge—thus far untapped—for defining what constitutes the "original technical and policy functions" (DeNardis & Musiani, 2015, p. 3) of Internet governance.

Many of my interviewees spoke about standards in terms of connectivity, interoperability, permissionless innovation, and openness. These four terms are featured prominently in IETF and IRTF documents and rhetoric as well as in Internet governance literature. Connectivity, interoperability, permissionless innovation and openness are also discussed as the technical values that led to the Internet's proliferation (Faltstrom, 2016; van Schewick, 2011; Zittrain, 2008). These design principles reflect what I call "protocol non-prescriptiveness": an culturally shared view of standards rooted in liberal notions of freedom and autonomy, in which the IETF cannot and should not prescribe how standards are used. I argue that the non-prescriptive view explains the IETF's engineers focus on a limited number of liberal values and their dismissal of the human rights efforts.

My ethnographic approach maps the cultural views of technology that resulted in the limited uptake of human rights values,

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[16] I do not approach culture as a singular object or regard it as a stable explanatory power. Rather, following Seaver (2017, p. 4), I take culture to involve constantly changing practices and social relations: "Rather than a setting for actions, culture might be something people do—an outcome of actions. This multiplies culture radically: instead of unified 'cultures,' we have an array of loosely coordinated practices that compete and collaborate, sometimes for 'cultural' goals and sometimes for other goals—for instance, 'technical' ones." Such a practice-oriented approach (Abu-Lughod, 1991) to studying culture maps on to the Internet's design as a loosely coordinated set of networks, both held together through evolving human relations.

showing how this vision can inform ongoing academic discussions. Reframing the IETF's dismissal of human rights values as the result of deliberate human choice—instead of as a technical incompatibility between human rights and standards—provides a novel perspective on ongoing theoretical debates about the 'turn to infrastructure' in Internet governance. This turn establishes the political use of the Internet's infrastructure as a 'co-optation' of its 'original policy and technical functions' (DeNardis and Musiani, 2015, 3). Rather than assuming that Internet infrastructure has a singular original purpose, my work shows that infrastructural functions are constantly developing and contingent on culturally situated views of technology held by engineers and human rights advocates.

5.1. Connectivity

The community believes that the goal is connectivity, the tool is the Internet Protocol, and the intelligence is end to end rather than hidden in the network.

Connectivity is a reoccurring theme in how IETF participants spoke about standards. In the eyes of my engineering interlocutors, connectivity involved machine (rather than human) connection with the goal of network growth. In the next paragraphs, I will show how this dominant cultural understanding of connectivity created friction between IETF engineers and human rights advocates, two parties who held opposing views of the constituency and the purpose of standards. To do so, I first elaborate on how IETF engineers and human rights advocates understand connectivity differently. In the IETF, connectivity is often understood as the ability of systems to connect to each other. Braman (2011, 300) refers to this as connection between *daemon* users, rather than human users. My data confirms the prevalence of this daemon-centric understanding of connectivity in the IETF. As one IETF engineer told me in an interview:

I am a fan of some of the [human rights] work to define network segments as associations, but that obviously will create push back of people who view machines and implementations completely separately from their human manifestation. I think that kind of language just won't carry weight here.

This quote reflects a common response I got when asking IETF engineers about the relationship between human rights and standards: there was none. IETF protocols served to enable machine-to-machine communication. By insisting that humans were not the (primary) entities served by standards, IETF engineers dismissed the need for including human rights considerations in their development. Many human rights advocates, however, saw connectivity as the ability of humans to connect to each other. The tension arising from this difference in how connectivity is understood complicated the human rights efforts. Such tension reached beyond the daemon-human dichotomy; disagreements extended into what different participants saw as the goal of connectivity.

In the IETF, connectivity is often publicly discussed as an end, as opposed to serving a social goal. For example, RFC 1958 "Architectural Principles of the Internet", quoted above, focuses on connectivity as its own right. It reads, "The current exponential growth of the network seems to show that connectivity is its own reward and is more valuable than any individual application such as mail or the World-Wide Web." This definition situated connectivity as an ontological good. Yet, who is served by connectivity was implied by these various documents and statements. For many of my interlocutors, connectivity served a wide range of Internet uses and services, making them faster and more resilient. In turn, resilience and speed was good for their profit models. In the words of one engineer I interviewed:

Connectivity is about money. Money and leverage. Money is leverage. We see that, for example, with the new Google transport layer protocol QUIC. They talk about in terms of improving connectivity for all by reducing latency, but that also comes with financial benefits for them. Let's not forget that.

RFC 1958, in a similar vein, focused on how connectivity supported the business model underpinning the companies attending the IETF. It read, "Connectivity requires technical cooperation between service providers, and flourishes in the increasingly liberal and competitive commercial telecommunications environment." In other words, the implicit goal of connectivity is income generation, a commercial approach underpinned by market-driven business models and laissez-faire technology development. Connectivity is easy to articulate as a shared goal for standards, because it communicates tacit assumptions about the importance of machines, money, and markets—without explicitly privileging a particular set of customers, companies, or outcomes. This commercial view of connectivity differed fundamentally from that of the human rights advocates.

The human rights advocates built on RFC 1958 to reframe the nature of standards. In the words of one advocate on the mailing list, "We believe that our goal, consistent with RFC 1958, is for the Internet to continue to serve as a tool enabling connectivity among all people." In the working documents of the human rights group, including its charter and RFC 8280, the advocates explicitly relate their human rights goals to the importance of enabling Internet connectivity *for humans*. Their efforts to reframe standards as for humans, rather than machines or commerce, was resisted by many IETF engineers. They believed a human-centered approach contravened the tacit technical and commercial goals enabled by unfettered connectivity. The appeal of connectivity was that it served a wide range of industry interests, making it too valuable to give up in favor of a narrower focus on human rights concerns.

In short, IETF engineers and human rights advocates saw connectivity as a fundamental function of standards. Connectivity has a distinct meaning, purpose, and constituency. According to many engineers, connectivity was daemonic, enabled more (ontologically good) connectivity, and market driven. This view clashed with the human centric approach of the advocates. As mentioned, many of the IETF engineers I interviewed emphasized the universal appeal of their laissez-faire approach to connectivity. It came up repeatedly in my interviews and on the human rights mailing list. In the words of one engineer, "If there is an ethic of the Internet, it is this: that more internetworking is better because that makes the Internet better connected." It is apparent from this quote that the IETF engineers not only view connectivity as an ontological good, but that network growth is the Internet's overarching purpose. This growth had to happen in a particular way, through permissionless innovation. In the next section, I discuss permissionless innovation as another key theme in how IETF engineers understood standards.

5.2. Permissionless innovation

Permissionless innovation is the ability of any individual to connect networks or innovate by building applications and services that run on top of the Internet, without permission from a central authority. The absence of a single source of authority is how IETF engineers understood standards. In my interviews, they characterized standards as being the result of the individual choice to develop and implement protocols. As one interviewee explained, "The good thing is that the IETF is not the protocol police, because the Internet is permissionless, people can design the protocol and implement and deploy it without the authorization of the IETF." They saw standards as the result of volunteer engineers coming together and growing the network, without that work being mandated, guided or curtailed by a central authority. This painted a picture of standards as being understood through what I call "protocol non-prescriptiveness"—a view of standards rooted in notions of individual freedom and autonomy. This view ties directly to how they valued the human rights advocacy efforts.

Many IETF engineers resisted these efforts, because they saw it as trying to re-orient standards' development towards humans instead of machines. They believed it would move the IETF towards being a centralized authority reflecting the shape of the international body of human rights and the legal entities tasked with enforcing it (i.e., states and intergovernmental organizations) instead of growth through permissionless innovation. This proposed reorientation broke their tacit assumptions about the nature of standards, as well as the overarching purpose of the Internet. As one of my interviewees said:

It [the Internet] cannot stand still. If you were to give, a face and a body. It would be a very demanding person that wants to evolve, that wants to grow, to do things. That is how it was created. It is open, by the time that you make something open it means that you know… things will start coming in that will make it grow and grow and grow. And like, closed systems they never grow. They grow and they reach a peak, and that is it.

This quote shows that the IETF's cultural understanding of the Internet's continued existence was dependent upon its ability to grow and its designers to innovate. The human rights efforts were perceived as undermining that growth. In the words of one IETF engineer assessing the human rights' work:

I mean, I think that there is a general agreement that human rights are important, and we can acknowledge international human rights standards and we can even refer to them in the IETF. But when it comes down to really putting restrictions on the daily practices of the entities involved in this whole ecosystem, then it becomes controversial.

When engineers were asked to consider an external source of authority (human rights) in their work, the human rights advocates were cast as a threat to the permissionless part of innovation. Some of the tensions between the human rights advocates and IETF engineers originated from opposing views regarding the purpose of the Internet. In discussions about permissionless innovation, many IETF engineers stressed that standards were rooted in voluntary agreements to exchange data across diverse networks. As one wrote, "By definition, the Internet is a network of network " …" Each participating network makes its own rules, including the rules about how to interconnect." This statement reflected the general sense amongst IETF engineers that standards cannot be mandatory. The Internet worked because different stakeholders saw mutual benefit in cooperating, without being forced by a central authority. This understanding of standards surfaced repeatedly. Another engineer wrote to the mailing list:

Keep in mind, there is no duty whatsoever to route someone else's packets. There is no duty at all to peer, and therefore there needn't be any contract or any "process in place for … de-peering". This non-contractual basis for collaborative growth is in fact what makes the Internet grow the way it does.

The IETF engineers rejected the advocates call for including human rights considerations in standards development. They felt that requiring people to include them ran counter to the prevailing ethos of decentralized development. Many saw human rights as guiding relations between governments, and worried that human rights would undermine their ability to work without explicit government oversight. As one engineer told me:

I am not convinced human rights fits in the IETF. I am willing to be told otherwise, but when we talk about the political world of human rights, what comes to my mind quickly is the International Telecommunications Union (ITU) or something like that, in which the question becomes, "Madame chairwoman, I would like to speak about the gentleman from 'Slowbovia,' who has just said something with which I disagree."

IETF engineers saw the decentralized and voluntary nature of standards as fundamental to the Internet's continued functioning. Becoming more prescriptive in how it should occur was seen as directly harmful to both the Internet and the IETF. This understanding of standards as decentralized ran counter to the goals and claims introduced by human rights advocates. They believed that standards needed to serve humans and should be geared towards the social goal of respecting their rights. Even though the advocates did not advocate for changes that would fundamentally hamper permissionless innovation, many engineers worried that introducing human

rights into standards design would undermine the IETF's decentralized and voluntaristic approach to internetworking. The tensions between these differing articulations of permissionless innovation remain unresolved, and play an important role in explaining why, at the time of writing, the human rights document published by the advocates (RFC 8280) sees limited uptake. [17]

5.3. Interoperability

A third theme that came up repeatedly in the conversations about the nature of technology was interoperability, which provides another avenue for understanding how the human rights efforts were entangled in IETF culture. The need for networks to interoperate and facilitate exchange of information led to the creation of the IETF (Abbate, 2000, p. 5). Echoing this concept, one IETF engineer wrote on the human rights mailing list, "Indeed, the very point of standardization is to enable a core minimum of interoperability, and the question is whether or not this core minimum of interoperability should be explicitly designed with a focus on human rights." This quote emphasized the importance of interoperability and the ambivalence around the role of human rights.

This ambivalence of the engineers towards human rights becomes more tangible when understood from the earlier mentioned "protocol non-prescriptiveness." In the IETF, interoperability, like connectivity, was often conceptually anchored in voluntary agreements between network operators to facilitate efficiency and innovation. As mentioned in the previous section, the human rights advocacy efforts were based on particular articulations of the nature of the network that ran counter to those held by many IETF engineers. The debate about interoperability followed a similar pattern. Interoperability was often qualified in terms of the voluntary, non-contractual nature of standards. One engineer explained on the mailing list:

We write them [standards] _not_ because they have some sort of "standing", but because we need conventions. Getting the benefit of the Internet relies on interoperation without explicit agreements among the various parties. RFCs are, basically, advice for interoperation. "If you do it this way, then you'll interoperate. If you don't, you might not." The IETF is notable for its total lack of a protocol police force, and that's because we're not writing law. We're writing guides for how to interoperate. It's still your network; you can make your own rules if you want. You just won't get the benefits of interoperation.

This view of the Internet as a set of independent networks tied together by the shared benefits gained from interoperation was held by many in the IETF. Individuals were free to choose how and when to interoperate, because interoperation couldn't be forced. Accordingly, engineers believed they should not try to "police" how different individuals run their network.

Interoperability was thus central to how IETF engineers viewed standards. The efforts of the advocates and their human rights considerations were perceived as undermining a view of unenforceable interoperability. In the words of one engineer: "All that [standards] needs to be consistent and predictable, you cannot create a suite of human rights considerations for protocols, then a completely different suite for whatever because they need to be interoperable. Everything on the Internet needs to be interoperable in order to make sense." IETF engineers saw the human rights advocates as prescribing not just how to develop standards, but also how and when to interoperate. Instead of focusing on mutual benefit, engineers felt the advocates tried to force a foreign view of technology on them. A similar dynamic arose when discussing openness.

5.4. Openness

Openness is another crucial concept through which IETF engineers understand standards. There is no single definition of openness, nor definitive guidance on how it should be operationalised (DeNardis, 2011). Existing literature indicates that openness is not a given, since there are many other ways the Internet could have been built (Clark, 2018). This in turn, clarifies why it is important to understand what is meant by openness in the IETF and how it shapes human rights efforts. Within the IETF, openness mirrored the articulation of connectivity, and principally referred to the ability of nodes to freely connect. Discussing why the IETF chose the Internet over alternative models like the Catenet, [18] one engineer wrote:

What you don't get in that model [Catenet] is what we get from the Internet model, which is each node in the Internet is part of the same, if you like, overlay. And you get the end-to-end principle of the mechanisms by which any node talks to any other node are the same. The result of that is, when we evaluate that, and say one of them is better than the other, there is a whole bunch of reasons that we could come to that describe them in technical terms but ultimately it comes down to the fact that the end-to-end model is a statement about the ability of two nodes—and therefore the people connected to those nodes—to directly interchange.

The IETF could have built a Catenet, but it chose not to. Catenet might have performed similarly, but in comparison to the Internet,

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[17] At the time of writing, there was only a few IETF RFCs that included a human rights protocol considerations section. RFC 8492 Secure Password Ciphersuites for Transport Layer Security (TLS), published in February 2019, for example reads: "At the time of publication, there was a growing interest in considering the impacts that IETF (and IRTF) work can have on human rights (…). As such, the human rights considerations of TLS-PWD are presented here. (…) The most fundamental of Human Rights is the right to protect oneself. The right to keep and bear arms is an example of this right. Implementations of TLS-PWD can be used as arms, kept and borne, to defend oneself against all manner of attackers – criminals, governments, lawyers, etc. TLS-PWD is a powerful tool in the promotion and defence of universal human rights." This text shows that the inclusion human rights as structural engineering considerations can have unintended consequences. In this case, it led human rights to be subverted beyond the purposes originally stipulated by human rights advocates, for pro-gun advocacy. In my doctoral thesis, I explain in detail why and how this happened and what it means in terms of the ability of human rights advocates to shape Internet governance.

[18] In a Catenet model, the network of networks is composed in a way where there are firm borders between each network. For further information about Catenet models, see: https://www.rfc-editor.org/ien/ien48.txt.

it would have introduced additional points of control. The decision to build one network over another demonstrated a social preference for an Internet that minimized control. Conversely, the notion of openness—as the opposite of control—was often explicitly mentioned as constitutive of the IETF. RFC 7704, which outlines its professional code of conduct, stated that, "The process of producing today's Internet technologies through a culture of open participation and diverse collaboration has proved strikingly efficient and effective, and it is distinctive among standards organizations." Voluntary collaboration, rather than control, was part of all facets of IETF standards, from their technical constitution to the governance processes through which they were designed.

In their articulation of the nature of technology, IETF engineers stressed the importance of openness as freedom from coercion. These cultural beliefs around openness were also applied to guide human interaction between IETF engineers. I often heard the mantra that, "in order to participate in the IETF all one needs is an email address and an Internet connection." Or as one of my interviewees bluntly put it, "any fucker with a mail address can start whining about your standard on a mailing list." Discussions about human rights also included references to the openness of IETF working procedures. For example, in one particularly contentious discussion about the development of RFC 7258 on Pervasive Monitoring (PM) the question was raised whether protocols were political. To diffuse the heated tone of the ensuing discussion, one engineer focused on the importance of the open process through which RFC 7258 came into existence. He wrote:

What's important is that we followed our documented, open consensus process in publishing that statement, and that we made sure it was relevant to our work. Some people think that RFC was overreaching; others think it didn't go nearly far enough, so it's probably about right.

Hence, the IETF community used the technical function of openness to alleviate social friction between engineers and human rights advocates. Openness—articulated as the freedom to connect and the minimization of control and oversight—was crucial to IETF engineers' understanding of standards. It served as the guiding principle for running code, as well as guiding human interaction in the IETF community. This is how the IETF's understanding of standards worked its way into its culture, norms, and values that guided standards design. The reciprocal relationship between the IETF's technical functioning and its social norms suggested they are more tightly intertwined than many scholars currently believe.

Even though the human rights advocates closely followed the technical requirements for running an IRTF group and publishing their RFC, their work directly contravened the cultural requirements regarding what constituted standards. One IETF engineer explained what this meant for the human rights advocates work, saying that, "The problem is that it will be seen as didactic by the community that it is meant to influence. And far from achieving what it wants, there is a risk that it could back-fire. It gives ammunition to the enemies of groups like the HRPC, at times." This quote captures my argument that standardization in the IETF was driven by cultural imperatives rather than solely by technical requirements. In turn, a reliance on cultural imperatives explained the lack of uptake of the human rights work.

The dismissal of the human rights work was rooted in the belief that the approach of human rights advocates required a shift in the IETF's view of protocols as non-prescriptiveness. The majority of IETF engineers were unwilling to make this shift, for fear of how it would affect the Internet's overall technical functioning and the economic and cultural imperatives that undergird it. In the final section, I place these findings in the context of my literature review and make some concluding remarks about human rights advocacy as a co-optation of the Internet's infrastructure.

6. Conclusion

When discussing the nature of standards, IETF engineers highlighted connectivity, interoperability, permissionless innovation, and openness. Their articulation of these technical functions of the Internet's infrastructure were rooted in cultural notions of individual freedom, voluntarist connection, and choice. That is, they understood standards through protocol non-prescriptiveness, which led to tensions between the human rights advocates and IETF engineers. Many IETF engineers saw the human rights advocates aims and goals as imposing requirements on standardization that contravened their culturally situated set of beliefs about the nature of standards. These findings show how culture replicates power dynamics, highlighting the need for anthropological inquiry in Internet governance research.

The barrier of protocol non-prescriptiveness infuses ongoing discussions about human rights advocacy in the IETF (DeNardis, 2014; Morris, 2011; Mueller & Badiei, 2018) with new insights. I argue that the human rights' work was shaped by how the advocacy efforts complimented and conflicted with the IETF's dominant understanding of standards. I do not, unlike other academics, consider these cultural barriers as insurmountable; I am not yet willing to write off human rights advocacy in the IETF as a "requiem for a dream" (Mueller & Badiei, 2018). Rather, I think these findings call for further research on how human rights advocates can successfully introduce alternative norms into Internet governance organizations in the IETF and other such technical bodies.

My findings about the close connection between culture and code have implications for the infrastructural turn in Internet governance. The findings in this article suggest that isolating the "operational and administrative functions" (DeNardis, 2012, p. 721) of Internet infrastructure is epistemically complex; it is difficult to disentangle technical functions from their social relationships and cultural context. I am not the first anthropologist to make this argument (Kelty, 2008; Larkin, 2013). The novelty of this article lies in the challenge my findings raise questions for current theories on the turn to the infrastructure. Primarily, it complicates how it can be known when a technical function constitutes a "primary Internet governance functions" (DeNardis, 2012) rather than fulfilling a tacit social or cultural function. Such tacit social and cultural functions could perhaps be part of explicit primary functions or reflect politically motivated rearrangements in the "hierarchy of functions" (Larkin, 2013) of Internet governance.

These nuances matter. My findings inform debates about what can be known about Internet infrastructure co-optation and its impact on human rights. On its face, it can be argued that using protocol development in the IETF for human rights advocacy is a co-

optation of the infrastructure. However, following the same epistemic line of reasoning set out above, demarcating certain uses of Internet governance as co-optation because they are outside of "primary technical and policy functions" assumes those functions are stable and fundamentally knowable. As opposed to culturally contingent and socially situated, as my findings suggest. My findings are in line with the IETF's historic development. The IETF has a long history of including social and political considerations in standard development (Braman, 2011), as well as a documented track-record of long-term NGO participation (DeNardis, 2013; Morris, 2011). As such, it is difficult to sustain a distinction between primary and secondary functions, especially when considering how IETF participants are themselves embedded in broader ideological and economic structures of market capitalism.

Building on my findings regarding the epistemic limitations of the turn to the infrastructure, I end by arguing that human rights advocacy—and other public interest efforts—within Internet governance are not necessarily outside of its technical and policy functions. As can be gleaned from this case study, these entrepreneurial efforts can also be a novel iteration of an established IETF practice: structurally including social and political questions in standard development, this time including those related to human rights. This article does not discount the importance of the "turn to the infrastructure" or the insights it garners. Rather, it presents anthropological inquiry as a viable avenue for further refining these important insights into how code and culture come together to constitute the various functions of Internet governance.

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References

Abbate, J. (2000). *Inventing the internet*. MIT Press.
Aberbach, J. D., & Rockman, B. A. (2002). Conducting and coding elite interviews. *PS: Political Science and Politics, 35*(4), 673–676.
Abu-Lughod, L. (1991). Writing against culture. In *Recapturing anthropology. School of American research press*.
Alston, P. (2013). Does the past matter? On the origins of human rights. *Harvard Law Review, 126*(7), 2043–2081. JSTOR.
Benthall, S. (2015). Testing generative models of online collaboration with BigBang. In *Proceedings of the 14th Python in science conferences (SciPy 2015)*.
Bortzmeyer, S. (2018). Cyberstructure: L'Internet, un espace politique. *C&F Editions*.
Bradshaw, S., & DeNardis, L. (2019). Privacy by infrastructure: The unresolved case of the domain name system. *Policy & Internet, 11*(1), 16–36. https://doi.org/10.1002/poi3.195
Braman, S. (2011). The framing years: Policy fundamentals in the internet design process, 1969–1979. *The Information Society, 27*(5), 295–310.
Braman, S. (2017). *Internet designers as policy-makers*. Berkman Klein Center. https://cyber.harvard.edu/events/luncheons/2017/02/Braman.
Brown, I., Clark, D., & Trossen, D. (2010). Should specific values Be embedded in the internet architecture?. In *Paper presented at th Re-Architecting the Internet workshop*. http://conferences.sigcomm.org/co-next/2010/Workshops/REARCH/ReArch_papers/10-Brown.pdf.
Carr, M. (2015). Power plays in global internet governance. *Millennium: Journal of International Studies, 43*(2), 640–659.
Cath, C. (2020). *HackCurio: Decoding the cultures of Hacking. What's Wrong with Loud men talking Loudly? The IETF's culture Wars*. https://hackcur.io/whats-wrong-with-loud-men-talking-loudly-the-ietfs-culture-wars/.
Cath, C., & Floridi, L. (2017). The design of the Internet's architecture by the internet engineering Task force (IETF) and human rights. *Science and Engineering Ethics, 23*(2), 449–468.
Clark, D. D. (2018). *Designing an internet* (1 edition). The MIT Press.
Deibert, R., Palfrey, J., Rohonzinski, R., Zittrain, J., & Stein, J. (2008). *Access Denied: The practice and policy of global internet Filtering*. MIT Press.
DeNardis, L. (2010). *The turn to infrastructure for internet governance*. https://concurringopinions.com/archives/2012/04/the-turn-to-infrastructure-for-internet-governance.html.
DeNardis, L. (2011). *Opening standards*. MIT Press.
DeNardis, L. (2012). Hidden levers of internet control. *Information, Communication & Society, 15*(5), 720–738.
DeNardis, L. (2013). *Protocol politics: The Globalization of internet governance*. MIT Press.
DeNardis, L. (2014). *The global war for Internet governance*. Yale University Press.
DeNardis, L. (2020). *The internet in Everything: Freedom and security in a world with No off Switch*. Yale University Press.
DeNardis, L., & Hackl, A. (2016). Internet control points as LGBT rights mediation. *Information, Communication & Society, 19*(6), 753–770.
DeNardis, L., & Musiani, F. (2015). Governance by infrastructure: Introduction, 'the Turn to Infrastructure in internet governance' (SSRN scholarly paper ID 2730689). *Social science research network*. https://papers.ssrn.com/abstract=2730689.
Diesing, P. (1972). *Patterns of Discovery in the social sciences*. Routledge.
Dunbar-Hester, C. (2019). *Hacking diversity: The politics of inclusion in open technology cultures*. Princeton University Press.
van Eeten, M. J., & Mueller, M. (2013). Where is the governance in Internet governance? *New Media & Society, 15*(5), 720–736.
Epstein, D., Katzenbach, C., & Musiani, F. (2016). *Doing internet governance: Practices, controversies, infrastructures, and institutions*. Internet Policy Review.
Everett, A. (2002). The revolution will Be digitized: Afrocentricity and the digital public sphere. *Social Text, 20*(2), 125–146.
Faltstrom, P. (2016). *Market-driven challenges to open internet standards*. Ourinternet.Org. https://www.ourinternet.org/sites/default/files/publications/gcig_no33web.pdf.

Finnemore, M., & Sikkink, K. (1998). International norm dynamics and political change. *International Organization, 52*(4), 887–917. https://doi.org/10.1162/002081898550789

Flyverbom, M. (2016). Disclosing and concealing: Internet governance, information control and the management of visibility. *Internet Policy Review, 5*(3).

Fusch, P., & Ness, L. R. (2015). *Are We there yet? Data saturation in qualitative research*. The Qualitative Report.

Guest, G., Bunce, A., & Johnson, L. (2016). How many interviews are enough?: An experiment with data saturation and variability. *Field Methods*.

Guetterman, T. (2015). Descriptions of sampling practices within five approaches to qualitative research in education and the health sciences—ProQuest. *Forum for Qualitative Social Research, 16*(2).

Hofmann, J. (2020). The multistakeholder concept as narrative: A discourse analytical approach. In L. DeNardis, D. Cogburn, N. S. Levinson, & F. Musiani (Eds.), *Researching internet governance: Methods, frameworks, futures*. The MIT Press.

Hunt, L. (2008). *Inventing human rights: A history*. W. W. Norton & Company.

Jensen, S. L. B. (2017). *The making of international human rights: The 1960s, Decolonization, and the Reconstruction of global values* (Reprint edition). Cambridge University Press.

Kaye, D. (2016). *Freedom of expression and the private sector in the digital age [The 2016 report of the Special Rapporteur on freedom of expression*. David Kaye, to the Human Rights Council. https://www.ohchr.org/en/issues/freedomopinion/pages/privatesectorinthedigitalage.aspx.

Kelty, C. M. (2008). *Two Bits: The cultural significance of free software*. Duke University Press Books.

Kincheloe, J., & McLaren, P. (2005). Rethinking critical theory and qualitative research. In N. K. Denzin, & Y. S. Lincoln (Eds.), *The sage handbook of qualitative research* (pp. 303–342). SAGE Publications.

Kottak, C. (2006). *Mirror for Humanity: A Concise introduction to cultural anthropology*. McGraw Hill.

La Rue, F. (2011). *Report of the Special Rapporteur on the promotion and protection of the right to freedom of opinion and expression*. United Nations Human Rights Council. https://www2.ohchr.org/english/bodies/hrcouncil/docs/17session/A.HRC.17.27_en.pdf.

Larkin, B. (2013). The politics and poetics of infrastructure. *Annual Review of Anthropology, 42*(1), 327–343.

Liddicoat, J., & Doria, A. (2012). *Human rights and Internet protocols: Comparing processes and principles*. https://www.unesco-ci.org/cmscore/sites/default/files/2013wsis10/human_rights_and_internet_protocols-_comparing_processes_and_principles28129.pdf.

Mathew, A. J. (2014). *Where in the world is the internet? Locating political power*. Internet Infrastructure. Ph.D. dissertation https://www.ischool.berkeley.edu/research/publications/2014/where-world-internet-locating-political-power-internet-infrastructure.

Mathew, A. J. (2016). *The myth of the decentralised internet. Internet Policy Review*.

McIlwain, C. (2016). Racial formation, inequality, and the political economy of web traffic. *Information, Communication & Society, 20*(7).

McIlwain, C. (2019). *Black software: The internet & racial justice, from the AfroNet to Black Lives Matter*. Oxford University Press.

Meier-Hahn, U. (2015). *Creating connectivity: Trust, Distrust and social Microstructures at the core of the internet*. HIIG Discussion Paper Series. No. 2015-03 https://papers.ssrn.com/abstract=2587843.

Milan, S., & Ten Oever, N. (2016). Coding and Encoding rights in internet infrastructure. *Internet Policy Review, 6*(1).

Miltner, K. M. (2020). *"One part politics, one part technology, one part history": Racial representation in the Unicode 7.0 emoji set*. New Media & Society.

Moran, R. E., & Bui, M. N. (2019). Race, ethnicity, and telecommunications policy issues of access and representation: Centering communities of color and their concerns. *Telecommunications Policy, 43*(5), 461–473.

Morris, J. (2011). Injecting the public interest into internet standards. In L. DeNardis (Ed.), *Opening standards: The global politics of interoperability* (pp. 3–12). MIT Press.

Moyn, S. (2012). *The last Utopia*. Harvard University Press.

Mueller, M., & Badiei, F. (2018). *Requiem for a dream: On advancing human rights via Internet architecture*. Policy & Internet.

Musiani, F., Cogburn, D. L., DeNardis, L., & Levinson, N. S. (2015). *The turn to infrastructure in internet governance*. Palgrave Macmillan US.

Myers West, S. (2017). *Searching for the public in internet governance: Examining infrastructures of participation at NETmundial*. Policy & Internet.

Nelson, A. (2002). Introduction. In *Future text* (pp. 1–15). Duke University Press.

Orwat, C., & Bless, R. (2016). Values and networks: Steps toward exploring their relationships. *ACM SIGCOMM - Computer Communication Review, 46*(2), 25–31.

Ostrander, S. (1993). 'Surely you're not in this just to Be helpful': Access, rapport, and interviews in three studies of elites. *Journal of Contemporary Ethnography, 22*, 1.

Palinkas, L., Horwitz, S., Green, C., Wisdom, J., Duan, N., & Hoagwood, K. (2015). Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Administration and Policy in Mental Health Services Research, 42*, 533–544.

Paris, B. (2020). The internet of futures past: Values trajectories of networking protocol projects. *Science, Technology & Human Values*, Article 162243920974083.

Patton, M. (2002). *Qualitative evaluation and research methods* (3rd ed.). SAGE.

Puddephatt, A., Horner, L., & Hawtin, D. (2010). Information and communication technologies and human rights. *European Parliament*. http://www.europarl.europa.eu/thinktank/en/document.html?reference=EXPO-DROI_ET(2010)410207.

Rachovitsa, A. (2016). *Rethinking privacy online and human rights: The Internet's Standardisation bodies as the Guardians of privacy online in the face of Mass Surveillance*. European Society of International Law.

Reagle, J. (2013). "Free as in sexist?" Free culture and the gender gap. *First Monday, 18*(1).

Richards, D. (1996). Elite interviewing: Approaches and pitfalls. *Politics, 16*(3), 199–204. ht.

Saldaña, J. (2015). *The coding manual for qualitative researchers*. SAGE Publications Ltd, 3rd ed. (3rd ed.).

Saunders, B., Sim, J., Kingstone, T., Baker, S., Waterfield, J., Bartlam, B., Burroughs, H., & Jinks, C. (2018). Saturation in qualitative research: Exploring its conceptualization and operationalization. *Quality and Quantity, 52*(4), 1893–1907.

van Schewick, B. (2011). *Internet architecture and innovation*. MIT Press.

Scholte, J. A. (2020). *Multistakeholderism Filling the global governance Gap? Research Overview for the global challenges foundation*. https://globalchallenges.org/multistakeholderism-filling-the-global-governance-gap/.

Seaver, N. (2017). Algorithms as culture: Some tactics for the ethnography of algorithmic systems. *Big Data & Society, 4*(2). https://doi.org/10.1177/2053951717738104, 2053951717738104.

Sowell, J. (2012). Empirical studies of bottom-up internet governance. *SSRN Electronic Journal*. https://www.researchgate.net/publication/255698974_Empirical_Studies_of_Bottom-Up_Internet_Governance.

Ten Oever, N. (2020). *This is not how we imagined it' – technological Affordances, economic drivers and the internet architecture Imaginary*. New Media & Society.

Traube, E. G. (1996). Introduction. Ohmann R (ed.) Making and Selling Culture. Hanover, NH: Wesleyan University Press, xi–xxiii. In R. Ohmann, G. Averill, M. Curtin, D. Shumway, & E. G. Traube (Eds.), *Making and Selling Culture (pp. xi–xxiii). Wesleyan University Press*.

Turner, F. (2010). *From Counterculture to Cyberculture: Stewart Brand, the whole Earth network, and the Rise of digital Utopianism*. University of Chicago Press.

Turner, F. (2017). Can we write a cultural history of the internet? If so, how? *Internet Histories, 1*(1–2), 39–46.

Wexler, L. (2003). The international deployment of shame, second-best responses, and norm entrepreneurship: The campaign to ban landmines and the Landmine Ban Treaty. *Arizona Journal of International and Comparative Law, 20*(1), 562–606.

Wyn Jones, R. (Ed.). (2001). *Critical theory and world politics*. Lynne Rienner.

Zalnieriute, M., & Milan, S. (2019). Internet architecture and human rights: Beyond the human rights gap. *Policy & Internet, 11*(1), 6–15.

Ziewitz, M., & Pentzold, C. (2014). In *, Vol. 16*. *Search of internet governance: Performing order in digitally networked environments* (pp. 306–322). New Media & Society, 2.

Zittrain, J. (2008). *The future of the internet – and how to Stop it*. New Haven, CT: Yale University Press.