Nationalism in the Internet Architecture Policy of Western Equatorial Africa

Introduction

In Western equatorial Africa, comprised of Côte D'Ivoire, Ghana, Togo, Benin, and Nigeria, national borders and cultural identity strike a balance between fluidity and rigidity. This balance appears not only in historical or political expressions, but also, as this essay shows, in the technologies present in the region. These states navigate a tangled modern history of French and British colonialism. Their anticolonial uprisings in the mid-twentieth century drew deeply on Marxist and Leninist principles, and on precolonial concepts of African sovereignty, yet their political borders deferred to colonial demarcations. Periods of revolution, coups, dictatorships and crisis wove together with periods of democratic governance, economic expansion, liberalization, and modernization. Contemporary national economies in the region continue to undergo transitions between agrarian and industrial production, liberalized and state-controlled markets, rapid growth and withering stagnation. In this context, the emergence of contemporary information and communication technologies, built from the infrastructure upwards, pose a challenge to the region's policymakers, as they confront the horizon of inter-networked societies that bridge local with global politics, commerce, and culture. Internet architecture, internet policy, and national culture form an unsteady triangle here.

This essay addresses the puzzle of how nationalism affects the deployment of internet architecture policy for these five countries. In particular, it examines how the institutions that support the creation and enforcement of internet policy draw on cultural concepts of nationality and internationalism, and how these compare to the practice of establishing an internet architecture. Questions it must answer along the way include how to understand nationalism in this context, what the primary institutions are in this context, and what the relationships between states, institutions, and populations are, regarding internet policy across the region.

It shows that nationalism appears in the creation of policy and the stated scope of institutions that support and regulate the internet, largely driven by cultural factors. However, technologies themselves hold a less direct relationship to these factors. The physical architecture and practices of implementation remain separated from nationalist ideology, but the patterns of diffusion, adoption, and restructuring that take place political and financial terms do have a lasting effect on technology's role in

culture.

Telecommunications policy in the region has included mandates for state control, monopoly, duopoly, limited competition, or liberalized competition, depending on the service provided and the country in question. And in terms of real hardware on the ground, personal computer use in the region remains minimal, available to only a small fraction of people there on a regular basis. Internet access is similarly limited, still only barely in the double digits across the coastal populations of these countries. Further, the Anglophone states – Ghana and Nigeria – are discontiguous, with two Francophone countries – Togo and Benin – between their borders. Yet internet traffic continues to grow at an immense rate between Ghana and Nigeria, along with online commerce and trade.

The global scope of digital communications technologies arises in concert and conflict with the international institutions, policies, and market conditions that sustain the development and implementation of each layer of that technological stack. From transfer control and internet protocols to the cables themselves that provide their physical backbone, each element of contemporary information/communication technologies has undergone significant deliberation and evolution. While adoption of mature, stable ICTs continues to grow, it is not yet a fact of life for the vast majority of the world's citizens. However, the negotiations of global governance institutions over these technologies, both private and transparent, have lasting impacts on the conditions of access to new communication opportunities and the ability to implement technological responses to developmental, political, economic, and social problems at the local level.

Mapping the internet's architectural layers and access points against its political boundaries yields revealing patterns of control and freedom.[1] Indeed, in authoritarian regimes, network architecture supporting Internet access is far more likely to have "choke points" at which information can be literally cut off from entering the (usually state-owned and -controlled) physical infrastructure. Extrapolitical factors, including linguistic, religious, or ethnic relationships, economic conditions, and diasporic communities, all carve out space online as well. We can examine internet architecture in light of political boundaries, then – but also in terms of cultural identity.

The formation of international institutions in the region has followed these patterns, with negotiations taking place largely between Anglophone or European corporations, these two Anglophone governments, and the world governance bodies along with the International Telecommunications Union. At stake in these negotiations, many of which take place in private, are the

conditions of access, transparency, and inclusion that will impact available knowledge and resources for millions. The national boundaries and cultural assumptions brought by the major players to these tables requires a conscientious unpacking.

The methodology deployed here begins from a comparative cultural perspective. It undertakes an analysis of extant and in-progress telecommunications policies put forward by each country in the region. These policies are drawn from official statements issued by the governments, and by international organizations operating in the region. In these statements, we isolate the elements of policy that draw on nationalist sentiment, identified by references to national values, national identity, state identification, and collective identification. We juxtapose this practice of reading with a more visual-spatial approach, identifying the architecture of and traffic on the region's data networks, as drawn from public data sets and official documentation. With these two variables, the research attempts to determine the relationship, if any, between the intensity of nationalist sentiment in policy making (sorted by the processes used to make that policy, such as open vs closed negotiations, institutional support available, and ability to enforce said policies) and changes to the architecture of the internet in the affected country or part of the country.

Overall, the study aims to provide a clear understanding of the interaction between the cultural politics of identity, international (especially continentally scaled) institutions, and the implementation and growth of key communications technologies. If it succeeds in demystifying its puzzle, it can provide a tangible piece of knowledge on which to conduct future research on specific cultural, political, and technological interactions, as well as help guide policymakers' planning and discovery towards thoughtful, useful policy.

Literature Review

Recent studies of infrastructure for ICT in developing countries show its rise as an economic sector, particularly in Africa. Liberalization of telecom markets, and increased network traffic in the region, have both contributed to this growth, in both fixed and mobile communications sectors.[2] And yet the adoption of Internet technologies in the region, particularly of fixed broadband lines, has encountered technical knowledge gaps, a lack of local advocacy, and the high cost of building modern network infrastructure. Perhaps most tellingly, early policy to support satellite and other traditional telecommunications networks confronted extraordinarily strict regulatory policy, where it existed.[3] Today's resultant situation rests on a continuing process of development that incorporates technologies,

policies, institutions, and culture.

Questions of who is empowered to communicate, and on whose behalf, rose to the foreground of international policy with the MacBride report in 1980, and eventually with WSIS in 2005.[4] The MacBride Commission's 1980 report to UNESCO, which formulated the basis for the New World Information and Communication Order (NWICO), and eventually for WSIS, concentrated on global issues of media and communication.[5] Among the many themes investigated in the report that resonate today, the role of international governance bodies for both fostering and regulating media and communications stands at the fore. In particular, a lingering dissonance between institutions' stated purposes and their effective practices highlights the longest-standing struggles incumbent upon global IT governance.

The MacBride report discussed a broad variety of ICT issues that affected the developing world. Problems and open questions of media creation, distribution, and consumption took a high proirity. This included the failure of international news coverage to reflect the developing world's realities, instead bearing out the sensationalism of American and European outlets. Observing the flow of media from those outlets towards that developing world, unbalanced by any substantial flow of media in the opposite direction, enjoined analysis of the stakes of representation. The patterns of control over technologies that enable communication also grounded NWICO. International radio broadcast spectrum and satellite positions were allocated by very a few actors, especially military interests. Effects of this imbalance included included broadcasting satellite signals into sovereign nations without their consent, against which the UN voted in the 1970s, and the collection of data about those countries without their having the computing capacity to manage that data. So NWICO addressed claims to justice in this light, even going so far as to propose protections for journalists. This last point became more contentious than might have been expected, since it also incorporated certain restrictions on the legitimacy of journalistic activities that were cast as threats to free speech by the United States, among other UN member nations, who subsequently left UNESCO for two decades.

Historically, the grounds of international governance bodies' claims to legitimacy rested on moral principles, and on the cooperation of their member states, where military force did not exist. However, the viccissitudes of politics and policies allowed WSIS to change its financial infrastructure, granting its international governance a fiscal justification for its actions as well. In this shift, from member states' dues towards service and patent fees, WSIS transmuted the scope of its oversight.

Moreover, it moved away from the emphasis, in the MacBride report and NWICO, on an innate and universal “right to communicate,” instead concentrating on a right to “participate” in global media.

And the change was not merely rhetorical, but also conceptual. In an “information society”, the rough mix of progress, regression, regulation, deregulation, and discussion that underpins global governance institutions can be directly tied to the many layers of technical and mediated conditions for a social environment, from utilities and basic security charters through computing and mobility. In a “knowledge society,” on the other hand, a prerequisite for social inclusion is the manufacture of knowledge, rather than the immersion in information as such. This distinction, essentially one of structure prioritized in context, leads to problematic social assumptions. For example, it invites an implicit – sometimes explicit – disjuncture between “global” and “indigenous” knowledge, especially in terms of politics and economics.

Milton Mueller asks what institutions can govern the internet, and how.[6] His argument reviews the internet’s cultural and political effects, such as its push towards democratizing global communication. It takes an historically institutionalist position to the research, and also draws on social network analysis to determine the role of WSIS in international technological governance. Due to its supporting institutions’ strong connections to powerful local interests across developing nations’ states, WSIS puts the idea of multi-stakeholder governance to the test, and that it succeeds where these efforts to make standard the bases of institutions have robust support from economic and political actors. This helps them realize a cogent critique of the avowed ’right to communicate’ in information society. Rather than the fundamental status of communication, a right to *participate* in civil societies, catalyzed or obstructed by institutional environments, takes the forefront for these authors. The practical implication of this focus on participation is that participation can take place through a broader variety of techniques, not limited to communications.[7] Other elements beyond technological capacity or economic structures can also come into play in securing rights to participate, such as the interplay of institutions of governance.

M.I. Franklin frames the importance of WSIS to policy-making participation by NGOs as the support of an ongoing partnership.[8] Accounting for interactions between civil society, government, and business interests, of global ICTs, their relevant media agendas, and their political and economic partnerships, she details the impact that even minor acts of discourse can have on the ground. Advocacy ranging from the input of multilateral institutions, proponents of social justice, and ICTs themselves

certainly all make the huge leaps that she describes in terms of activity online. The role of international policy in technological questions of development can be discerned through either Mueller's means-first or Franklin's mode-first approach. Just as markets can be conditions of liberation alongside those of oppression, technologies' supporting institutions and end users alike have an impact on their structural development over time and across cases. Central to all these are the issues of national identity, and empowerment.

Matters of control over technologies that enable communication continue to resonate among policymakers today.[9] The recently-concluded World Communication Information Technology (WCIT) conference, held in Dubai in early December 2012, spotlighted similar issues.[10] [11]Under the aegis of the United Nations, the ITU, and the Internet Society, the conference raised, among other issues, potential revisions to the International Telecommunication Regulations (ITR).[12] This global treaty governs definitions for, access to, jurisdiction of, and participation in telecommunications networks around the world.[13] Of all the countries who are party to this treaty (nearly every recognized nation), very few have traditionally taken part in their revision and review, which has only occurred every 24 years, to boot.[14] This time, developing nations played crucial roles in the negotiations: for instance, Ghana's Joshua Prepah headed up the critical Committee 5 of the conference. This body dealt with Article 2 of the regulations, which contains its Definitions, and Article 6, which includes issues of Charging and Accounting – the two most contentious areas for new proposals.

In these committee negotiations, as with many UN meetings, one working group handled the revisions and composition of each article, passing reports up to the Committee. That group then coordinated the results of the groups' work and presented it to the Plenary for discussion and an eventual vote.[15] As expected, the proposition that the internet be included in the definition of telecommunication, with the attendant revisions to scope and type of regulations applicable by the UN and ITU, led to serious resistance from the United States, with intervention from the European member states and Canada in order to keep proceedings along.[16] Yet other results mattered more. For example, the decision by the African member states to work as a single group granted them surprising influence over the conference's outcomes. Ghana, whose thoughtful contributions to the suggested revisions had included energy efficiency responsibilities, spearheaded this African group. Their persistence and coherence led to votes on issues like the internet's inclusion in the ITRs as well as calling for the inclusion of all member states regardless of discrimination. In short, the conference saw a push, especially by developing nations, for more complete representation at this international level in the

decision-making and policy-making processes that have long remained behind closed doors.

One way in which African states in particular have sought reparation for this imbalance has been their steady implementation of organizational bodies. The African Union, for example, has struggled to find its voice within the ITU, though the latter has made its interventions on the continent quite public.[17] And yet, by forming more informal (and later, formal) groups to carry out specific political tactics such as directing discussion at WCIT, the AU's member states have grown its strength in these circumstances.[18] One important development in recent years for the institutional landscape of African technology policy has been the establishment of the African Telecommunications Union by the AU. [19] This organization provides support and advocacy to improve both technical infrastructure and communications policy on behalf of its member states.[20] It also sponsors the annual ICT Week, an Africa-wide initiative designed to bring together those building ICTs on the continent.[21] In the wake of this group's impacts, the African Union and the non-governmental, international Internet Society signed a "Memorandum of Understanding" in 2008, promoting their continued cooperation.[22] This outreach is significant because it provides a high-level partnership aside from the United Nations' ITU, as well as separation from the World Bank's direct interventions on continental telecom policy.[23] Still, the influence of the World Bank is clearly felt in policymaking initiatives that draw on their extensive guidelines for composition and scope.[24]

Africa's ICTs promise great potential for international representation to foster further development and broader human benefits. At the moment, however, their burgeoning role might prove problematic, as shown by other literature focused on the current infrastructure.

Steven Livingston details the effects of the rapid growth of ICTs on governance in Africa.[25] ICTs have no inherent political valence, and can be used for criminal or violent means as well as for human benefit. But Livingston argues that, in contrast to previous generations' experience with the politically malicious use of communication tools to propagate insecurity and violence, new ICTs are improving security and economic development continent-wide, because they develop in tandem with democratic institutions and are being used to promote transparency. He also stresses the importance of scientific research to support political technology policy and investment.

Philip Howard and Muzammil Hussain's article on the Arab Awakening of 2011, "The Role of Digital Media," demonstrates the key shift in these networks' impact on political change over the past decade.[26] In their words, "one of the most consistent narratives from civil society leaders in Arab

countries has been that the Internet, mobile phones, and social media such as Facebook and Twitter made the difference" between the failures of Third Wave democratization in MENA and the efficacy of the Arab Spring uprisings in 2010-2011. They argue that the anti-governmental movements were able to use digital media as tools to organize material protests and even entire revolutions. However, it should be noted that the difference between the effective uprisings, such as in Tunisia, Egypt, and Algeria, from those that took longer and cost more lives, such as Libya, Syria, and Algeria, underscores the impact of the underlying architecture — including its political/cultural constraints — on the ability of populations to deploy such tools for change. In short, however, a paradigm shift has taken place that allows people and technology to combine on what Howard and Hussain call "Digital Scaffolding for Civil Society". It is this scaffolding that inter/national internet policy addresses in direct and indirect ways.

In their collaborative work *Managing the Infosphere*, drawn from a long-term partnership, authors Stephen McDowell, Philip Steinberg, and Tami Tomasello delve into the details and implications of these complex relationships. They consider global communications a mobile space, which does not correspond exactly with the borders or territories of traditional sovereign states. They see problems with policymaking arise largely as a result of the attempt to manage the internet in particular, because extant institutional environments and patterns of governance or culture can conflict with the goals of businesses or organizations seeking specific outcomes from general policies. In fact they examine more than the internet, turning their attention to other networks as well. Their call for an understanding of the mutual constitution of communications, technology, and society through networked structures and practices rings clear with the knotty situations of African development.[27]

In ICT for Development writings, several comparisons across countries concentrate on the economic issues at hand. Bollou and Ngwenyama undertake a review of the returns on foreign and domestic investment in ICTs. They find that the investments are hampered by the regulatory environment, which often lacks clear political enforcement or confronts corruption in its aims.[28] Without these safeguards, and in the absence of strong competition, they argue, returns on investment to these technologies may not flourish as quickly as hoped. Similar findings arise from Erumban and de Jong's study of the impact of national culture on rates of ICT adoption. Taking a comparative approach here as well, they discover how those states with clearer policies on ICTs find more consistently high rates of adoption of those technologies. They ascribe the difference between states which lack good ICT governance and those that possess it to essentialized tendencies of nationality, but also to

socioeconomic histories in those countries that affect their ability to enforce policy or procedure effectively.[29] Rounding out this vein of economically-centered analysis, the Economic Commission for Africa undertook a study to determine the indicators of ICT usage and availability in countries, constructing not a cultural conclusion but a research methodology for these determinations moving forward. The argument here is that a consistent methodology would improve the standardization of process and procedure for international ICT regulation and development.[30] Along the same lines, and in multiple works, Gilliwald and Stork have stressed the need for a single ICT index, particularly a digitally available one, that would be a boon to the researchers and policymakers concerned with these questions of development and standards.[31] Finally, Gomez, as well as Jensen, question a key factor in slow ICT adoption, particularly of broadband internet access – why the cost of public access is so high. They agree that in order to address that crucial problem, governments and institutions must improve locally routed internet traffic, which itself depends on an investment in core infrastructure regionally and locally for Africa.[32] Their research is borne out by the study that shows how broadband utilization has increased tremendously in the region, but with a lag in the expected penetration rates, as measured by subscriptions to internet service provision.[33] Here again, disjuncture and contradiction is the order of the day.

In light of Manuel Castells's seminal theory of informational and networked societies, as set forth in *The Information Age,* these challenges appear even starker. The rise to dominance of contemporary, ICT-driven social formations is the subject of this theory.[34] It concentrates in large part on the status of labor in a Network Society as it supercedes industrial society globally. An information economy, dependent on knowledge and technology, also includes more exclusionary potential than an industrial economy. A global economy, connecting organizations across the entire planet, further excludes the vast majority of people, especially unskilled labor and the global poor, creating a “Fourth World” that penetrates both Northern and Southern populations. Enterprise fragments as it relies more heavily on networks, and labor gives way to flexibility, wherein individualization accompanies freelancing, along with the decline of salaries, benefits, and other trappings of corporate employment. Polarization becomes the norm, as financial inequality increases, buoyed by social exclusion. Meanwhile, as culture moves further into the digital, virtual realm, media become the grounds of politics. Castells argues that the network society reorganizes time and space: time into “timeless time”, a compression of events without sequences; and space into “the space of flows” to subsume the space of places, wherein social practices work on shared flows but everyday life remains under social and

political structures in specific places. The dominance of networks to structure social functions and processes has immense effects on capital, work, communication, and territory. Against this deeply mutable ground, the potential open to African ICTs faces very real threats to its realization.

The institutions at the core of Africa's representation on and through the internet, at a technical level, include some relatively new bodies. For example, AfriNIC, the African Network Information Center, only came into existence in 2001. They serve as the Regional Internet Registry for the continent, similarly to ARIN in the Americas, or other (Asian-Pacific, European) RIRs. These take over from the global ICANN registry to distribute IP addresses for their specific regions. [35] More geographically focused, the DNS and related naming services, including country-code Top Level Domains (ccTLD), must be distributed by accredited registrars.[36] So, during the rapid recent growth in host name registration in the region, not to mention as a matter of policy, the role of national interest finds a direct window into the technological elements of internet making.[37] Each country possesses a unique two-character ccTLD, and each is administered by a separate entity, making the hierarchical bureaucracy of the domain name system quite fractured at more localized levels. Benin (.bj) domains must be registered through Benin Telecoms S.A.; Cote D'Ivoire's (.ci) must come through the INP-HB Institut National Polytechnique Felix Houphouet Boigny. Ghana (.gh) domains are assigned by Network Computer Systems Limited; Togo's (.tg) by Cafe Informatique et Telecommunications, and Nigeria's (.ng) by the Nigeria Internet Registration Association. The importance of nationalism in the management and regulation for these core pieces of infrastructure cannot be understated. It is why the AfriNIC established a working group, the AfGWG, to help resolve such issues.[38]

As for Internet eXchange Points (IXPs), we find a burgeoning on par with the rise of broadband cabling landing points along the region's coastline. The APNIC explains how the regional IXPs came into existence, for the purpose of wholesaling bandwidth from those mainline cables into smaller networks.[39] In Accra, Ghana, the first IXP for the region, the Ghana Internet Exchange (GiX), along with its operational organization, the Ghana Internet Exchange Association, has set a precedent that other newer IXPs now follow.[40] In Abidjan, Cote D'Ivoire, the CIIXP has faced a rocky beginning; meanwhile, Nigeria boasts two IXPs, one in Ibadan (the IB-IX), and one in Lagos (the IXPN).[41] For IXPs, the issue of nationalism is expressed through ownership and distribution of bandwidth along with the impact of foreign commerce (not just investment) in the infrastructure and wholesale distribution of information themselves.[42] Because these IXPs tend to locate themselves at internet hubs, they do not often address the pressing concerns of other parts of their nations, such as the upland areas for these

five countries. Those areas' telecommunication concerns are raised by the infoDev Rural Toolkit for ICT development.[43] And other organizations also play a role in this recurrent theme of representation at various scales.

One such group is The African Network Operators Group, or AfNOG. This informal group provides forums and conferences for critical influencers of wide area networks: ISPs, IXNs, RIRs, and security groups. It operates continent-wide, to allow the exchange of technical information, and a forum for the promotion of community and network service providers' cooperation in keeping services stable and improving discussion about putting new ventures into place. As a result, significant parts of the setup, construction, and maintenance of internet networks continent-wide currently relies on this non-governmental group's functioning.[44]

At the state level, specific internet policies, institutions, and architectural issues are remarkably thin. Ghana leads this charge, in particular because it has established a National Communications Authority to regulate the communications industry and to advise the government on its creation of policy.

Alhassin has described this body's regulatory responsibilities in detail, as well as the history of its formation.[45] He shows the influence of the United States, Canada, and the UK in the nationalist logic that forms this agency, highlighting how the government frequently referred to the FCC, CRTC, and Oftel as its models while formulating the bill. Later, though, he argues that an ongoing, critical opacity in policymaking “raises suspicion on the motivation for state actor’s choices in the entire process of privatizing GT, the licensing of operators and service providers, the setting of penalties, and the process of resolving conflicts.” [46] Ghana's regulatory environment battles against this corruption.[47] Yet the nationalism pointed out in its political endeavors has a correlate in Ghana's special role in the continued promotion of Pan-Africanism on the continent, upholding a perceived legacy from Nkrumah. [48] In short, Ghana provides a clear model against which to compare the other cases here, because it fosters new media practices in a way that others cannot yet match. [49]

The comparable state in the set, Nigeria, faces similar problems with regulation and corruption.[50] Yet as its population, one of the most visibly diasporic in the world, build up on nationalist tropes in order to maintain a cultural heritage online while in diaspora, they exchange more information online than others in this group.[51] Institutions promoting this growth include the Nigeria Internet Group, a non-governmental organization that provides interactive space for the technical providers in

the state to converge.[52] This informal participation is critical, since corruption alongside swift liberalization of communications markets has deeply compromised much governmental oversight of the sector.[53] [54] Indeed, Nigeria outstrips even Togo in this group for corruption ratings.[55] Meanwhile, in Côte D'Ivoire, Togo, and Benin, much policy has taken a back seat to more baseline problems of technical implementation for internet usage.[56] [57] [58] Poor fixed-line network infrastructure and the high cost of international connectivity remain the critical roadblocks to ICT implementation, over and above national policies. Here, too, though, a weak regulatory environment extends from financial sectors through technology.[59] [60]Money laundering and DNSSEC-fraud schemes alike abound here. However, Cote D'Ivoire's establishment of a NIC may provide a step in the right direction on that score.[61] Bollou's cross-country evaluation of these environments has described this situation in great detail.[62] Other market research on the budding telecom sector has emphasized the potential for future investment, over expected returns on existing capital.[63] [64] In sum, the region continues to confront the challenges of sustainability, both in terms of its technological growth and in the way that its nations reconstruct their political boundaries online.[65]

In fact this challenge is not unique to the technological sphere. It draws down against deep internal conflicts in the historical roots of African nationalism, as demonstrated by Basil Davidson's study of the continent's states' long work to reconcile national cultures with post-colonial identities. [66] Crawford and Young's edited volume also explores the dualities of this identity, at once a matter of culture and one of governance. Their collection shows how the very concept of independence for African states depends on its definition as against colonial historical structures.[67] Jeffrey Herbst addresses similar problems in terms of power dynamics, comparing modes of state control across African countries through practices of authoritarianism, civil control, and governance against corruption.[68] An interesting essay by Daniel Kendie addresses a counter-narrative to these political-economic histories, that of Gramscian hegemony. He argues that the failures of orthodox Marxism to account for peasantry and artistry among the laboring classes, as well as the superstructural practices of cultural domination (not necessarily through violent means) indicate a need to reformulate Gramsci's theories in the context of these post-colonial states. He proposes that Africanists investigate questions of hegemony as conceived by Gramsci in questions, like this one, of African state-population relations.[69] The crucial caveat for such studies is to avoid predetermining their outcomes based on expected results of theories from another time and place.[70] Conversely, as Peter Evans and other have argued, this requires that researchers take full account of the role of the state in explaining daily life for

many Africans, an often undercredited role.[71] While the state does not control all aspects of life for those under discussion here, it remains a crucial element of the story. If hegemony, or for that matter colonialism, plays an important role in the configuration of culture, nation, and technology, it must be understood as a critical historical factor, rather than a decisive condition *sui generis*, of contemporary lives.

Case Studies

Benin

Of Benin's nine and a half million people, only about 336,000 use the internet, as of mid-2012.[72] During the Middle Passage present-day Benin's portion of the Bight of Benin coastline (along with what is now Togo) was known as the Slave Coast, due to the prevalence of the slave trade. It comprised the bulk of the Kingdom of Dahomey until the Scramble for Africa in the 19th century, after which French colonial authorities ruled the region. In 1960, Benin established its own democratic government. However, this democracy gave way to a dictatorship that lasted from 1972 through 1990, ending in severe economic crisis. Benin's present government and economy have been working through this tangled history over the last twenty years, and their ongoing struggle forms the backdrop for their economic and technological situation.[73] [74]

About a third of the population lives below the international poverty line, but growth continues in Benin's economy at a rate of about 5%. That growth focuses mainly on agricultural trade and exports for national-scale revenue, while the prevalence of subsistence agriculture mirrors the highly localized religious, linguistic, and ethnic demographics of the country. Beninois schools do not teach in the state's official language, French, until several years into a child's education. Benin also has one of the lowest literacy rates in the world. Systemic illiteracy extends to computer and internet use as well as reading and writing, persisting more acutely in the rural than urban areas.[75]

However, most Beninois live along the coastline, especially in the largest city and seat of government, Cotonou. The SAT-3/WASC submarine fiber optic cable, one of several present in the region, lands in the city, and the country depends heavily upon it for internet access. This is supplemented by satellite service, which has excellent coverage in the country and serves at least two million Beninois. While those subscribers can select from a wide range of satellite service providers, their choices in broadband (if they can afford it) are more limited. Competition in this sector was not

liberalized until the late 1990s, when the national telecom company began to allow private firms to provide internet access through the single national gateway.[76]

Policy in this subject area has indeed remained strained in the decade since then. However, the interventions of non-governmental advisory groups such as the Benin Internet Society have provided governance in the absence of cohesive national policy. And the annual Internet Week sponsored by the government and third-party institutions has also provided an outlet to discuss the feasibility and importance of national architectural development for the internet. Benin's national sector is seeking the implementation of an internet exchange point over the next few years, to supplement those in Nigeria, Ghana, and Cote D'Ivoire. So the continual work on internet policy here may shift into the hands of the state more definitively than in its current arrangement.[77]

Togo

Comprised of about seven million people (including only about 325,000 internet users), Togo represents one of the least-developed countries in Africa – and perhaps in the world. It therefore demonstrates one of the most intractable problems of technological governance and development, but here this problem can be observed at its earliest stages and against severe economic and political stressors. The nation gained independence from France in 1960. While the official Togolese language is French, a number of local languages are spoken, and the majority of religious practitioners observe local religions, with Christianity and Islam retaining minority presences.[78]

Togo’s slow introduction into global marketplaces, population flows, and cultural interactions recalls its seventeenth- through nineteenth-century history as a major slave-trade hub, as well as its struggles after colonialism. Seven years after its independence, Gnassingbé Eyadéma took over leadership of the country in a coup. He proceeded to remain in power until he died in 2005 – when his son took over. Recent and ongoing political unrest has accompanied economic uncertainty in the country. Contributing to this uncertain environment has been the lack of a cohesive national policy on ICTs.[79] Though it lacks a unified policy, the Togolese government insists that access to ICTs (especially to mobile telephony but *excluding* broadband internet) a political priority. Meanwhile, despite the continuing efforts of smaller institutions such as the national universities and international schools that have roots and programs in Togo, popular demand for broadband service has not established a foothold in mainstream discourse.[80]

About half of the population lives below the international poverty line (subsistence on $1.25/day or less). Only about 5.4% percent of the population are counted as internet users by the ITU (meanwhile, the average rate in Africa is between 12-13%). These users can connect through one of two ISPs. The capital and largest city, Lomé, is a landing point for several of the major submarine cables at the coast, which may lead to more and quicker ICT development down the line.[81] Indeed, hundreds of cybercafes dot the city's streets. However, broadband internet subscription remains entirely unaffordable for that impoverished majority of the population, especially in the upland rural areas away from the coast. Although it hosts a monopoly on landline and broadband services, Togo's market for satellite services is partially liberalized.[82] This allows a measure of competition, one outcome of which is to drive down costs. That change can be observed in the adoption of mobile telephony, where nearly 40% of the population now keeps a cell phone with service, up from only about 6 percent eight years ago. Togo's location on the Bight of Benin places it in the middle of a dense field of satellite signal coverage, and this strengthens the potential for mobile phone internet access to continue to grow.[83]

Togo's outlook for internet governance and infrastructural growth is increasingly tied to its representation in international bodies.

Côte D'Ivoire

Côte D'Ivoire gained its independence from France in 1960. Through 1993, Félix Houphouët-Boigny ruled the country, after which a coup by Robert Guei, popular protest to install Laurent Gbagbo, and two civil wars (with one ongoing today) have deeply shaken the presidential republic. A French colony in the early twentieth century, Côte D'Ivoire maintains French as its official language. Meanwhile, its largest ethnic group is Akan, similarly to its neighbor Ghana. Today, about 21 million people live in the nation, including about 300,000 internet users. That 1.4% of the population mainly live in and around the major coastal city of Abijan, the country's largest, where several major fiber optic submarine cables land. Still, there persists a discernible gap between the Abidjan hub and the agricultural upland regions in terms of access to and adoption of the internet and other ICTs. While use of the internet has risen at a steady pace over the last decade, it remains a future endeavor for many.[84]

However, foreign investment and internal diversification have lessened recently, in part due to political violence, and in part due to corruption and competition in key markets. Côte D'Ivoire's major export has traditionally been cocoa, of which it is the world's largest exporter. In the region, only Nigeria surpasses the country for the amount of goods exported. Indeed, Ivorians enjoy one of the

highest per capita incomes in the region. Their telecommunications infrastructure is also well-developed by African standards, with over four million mobile phone users. [85]

Though Côte D'Ivoire was among the earliest Sub-Saharan countries to achieve full Internet connectivity (beyond telephony and television), though, its infrastructure has been maintained by very few entities. There are five ISPs in the country, including the two largest, Afnet and Arobase Telecom, who provide most of the fixed-broadband access available. The effects of limited competition in the marketplace for ISPs and other telecom companies — along with the anticipation of complete liberalization of the Voice over IP (VoIP) markets — have been tied closely both to the state's intimate economic relationship with France (which provides the bulk of foreign direct investment) and to the slow process of political restabilization since 1999′s coup.[86] Cocoa exports to France have been met by French investment in ICT infrastructure. Meanwhile, the advent of national policies and their enforcement has been slow to congeal.[87]

Complications in the Ivorian technoscape extend to its smaller-scale institutions. In the absence of cohesive, overarching technology policy, governance in the sector has fallen largely to a mix of international standardization bodies and to local organizations.[88] The international groups, such as the ITU and ISO, implement both open and proprietary standards, while the local groups, which include public and private universities along with business development groups and professional associations, tend to foster practices geared towards the growth of ICT access and use on the ground. For example, cyber-cafes have proliferated in Côte D'Ivoire since 2003, allowing those who can afford the equivalent of fifty cents per hour to get online conveniently.[89] Freedom of speech is taken seriously in national legislation here, though the abiding pragmatic constraints on expression, such as the nebulous degree to which professional standards for journalism other than broadcast radio are enforced, predict that further development of ICTs and their governing institutions will remain slow and difficult through this decade. If the internet exchange point in Abijan can return to operational status, it will provide a serious boon to localized connections and networks.[90]

Ghana

Ghana borders Côte D'Ivoire and Togo along the Atlantic coastline. Its people include a majority of English speakers among nearly eighty language groups, ethnicities that include Akan as well as four other major groups, among at least 100 different groups overall, and practitioners of

Christianity, Islam, about fifteen other globally dispersed religions, and myriad local belief systems. Ghana was the first sub-Saharan nation to gain independence from 20th century colonialism, when in 1957 it overthrew nearly eighty years of British rule as the Gold Coast. Under the regime of Kwame Nkrumah, Pan-African endeavors led to the foundations of the modern-day African Union. The country underwent fifteen years of political instability after Nkrumah's overthrow in 1966. The stable, democratic transitions of power that Ghana has enjoyed over the last few election cycles came after many years of authoritarian rule. The establishment of new fiscal and social policies in recent years, including a new constitution in 1992, has led to increased economic and political freedom for the country's 25 million people.[91]

Ghana now claims the world's fastest growing economy, at a rate of over 20% in 2011. Much of its economic growth is fueled by foreign investment, including in the telecommunications sector. Internally, textiles manufacturing comprises a huge part of market capitalization. The transition from Nkrumah's socialist-leaning policies through authoritarian state capitalism into a more modern national economy has led to partial liberalization and competition among ICT providers. In this expansive environment, the ability of individuals and small groups to get online has blossomed.[92]

There are about 1.3 million internet users accounted for in the country, comprising only about 5.2% of the population. This proportion is growing rapidly, however, due to both the falling cost of access here as well as the presence of the major submarine cable landing site at Accra, several satellite and microwave relay stations such as Panaftel and Intelsat, the Ghana Internet Exchange (or GIXA, a major routing and switching station), and related infrastructure. Well over six million of Ghana's inhabitants subscribe to mobile phone use, and although a strong correlation between this and internet access rates remains unproven, the government has already adopted a national broadband policy. It seeks to standardize the availability and use of the internet across the country. To that end, public works and private firms have fostered the development of terrestrial fiber optic networks that follow waterways, rail lines, and roadways, making inroads and condensing the networking infrastructure upland from the coastline.[93]

Meanwhile, political and cultural actors have sought inroads into the potential unlocked by digital communication ranging from SMS and email to broad scale web interactions. Local and regional politicians campaign on technological ties to Nigeria, among their other issues. This Anglophone tie across geographical divide – a claim to solidarity or neighborliness between the two

former British colonies of the region – speaks to the impact that the Internet can have on international relations and trade. However, this does not adequately account for the potential impacts of Ghanaian nationalism on the further formation of the internet and its uses. Nkrumah's legacy of anti-colonial struggle, Pan-African ideals, and Marxist-derived socioeconomic policy still looms large in contemporary policy. At the same time, burgeoning competition and incentive structures in the telecommunications markets are made possible and enforced by changing ideas of Ghanaian nationhood, which are expressed in documents such as the national broadband policy, which seeks to balance economic progress with socially equitable distribution of information technology.[94]

Nigeria

Nigeria is the largest and wealthiest of the nations in the Bight of Benin. After Nigeria's independence from Britain in 1960, it quickly developed into a military state, which maintained its OPEC status and fought civil wars and coups to maintain power for nearly forty years. Over the last ten years, democracy has returned in fits and starts to the nation, along with increased economic stability and growth. The economy is strong and growing quickly around Nigeria, at a projected rate of about 8% this year. Along with its oil production and financial markets, Nigeria fosters a burgeoning telecommunications sector.[95]

This includes the production and development of space telecommunications, especially the country's three satellites. The country's largest city, Lagos, houses landing points for several of the largest submarine fiber optic cables in the region, including the two newest ventures. Lagos is actually the third-largest city on the continent; its close to eight million people are also on average the wealthiest in the country and the region. Much Nigerian capital concentrates here, due in part to its ports from which crude oil is exported. With about 155 million diverse citizens of over 250 ethnic groups, speaking English, Yoruba, Igbo, and Hausa, practicing Islam and Christianity in addition to many local religions, Nigeria also has the most internet users of the region, both raw and per capita. About 44 million, or 28.5% of its population, are online. In fact, this is one of the highest penetration rates in Africa, much closer to the global average of about 30%.[96]

One interesting development of Nigerians' broad access to internet communication has been the prevalence of "419″ or "yahoo-yahoo" fraud organizations, the infamous Nigerian letters (now emails) that ask the recipient to forward money to the sender under the promise of receiving more back later.

Beyond this organized criminal activity, though, the infrastructure in Nigeria supports a vast network of service providers and users, including European and American satellite and broadband cable elements.[97] Nigeria's internet connectivity has drawn other investment and infrastructure development to the region. The impact of that investment on its neighbors, and on Ghana, seems minimal, though, since other countries have to seek their own internet investments. Among ISPs, too, the embrace of liberalization has led to full competition for business. Another outcome of the approach taken by Nigeria and Nigerian firms is the development of substantial terrestrial fiber optic lines along waterways, rail lines, and roadways, strengthening upland communication networks.[98] The fuller picture of post-colonial and national subjectivity in relation to both cultural artifacts and broader socioeconomic developments in Nigeria depends on a recognition of this interconnection between the spontaneous cultural developments that drive phenomena like Nollywood forward and the other cultural outreaches such as diplomacy and international relations and trade agreements that concentrate on the impact those cultural developments have on other nations and diasporic communities.

Discussion

Three issues have been raised by the foregoing reviews and descriptions of the relationships between culture, technology, and policy. First is network topologies' responsiveness to public policy issues. The implementation of specific policies has concrete effects on the networks' fundamental architecture, such as the location of bottlenecks and exchange points. Second, the role of nationalism stems from a complex set of historical, political, and ideological conditions ranging from colonialism to contemporary economics. Third, the impact of nationalist tendencies on policy-making conflicts with the interests of international bodies including financial and regulatory institutions. In the context of the internet architecture of the region, the impact of nationalist conceptions of the internet, as compared to internationalist, global, or commons views, continues to affect its development, but in a disguised form. Instead of the expression of national interest, technology sees nationalism's effects through the uses of the internet for specifically political ends, as well as the regulatory and incentive structures implemented by the state and other comparable institutional agents.

The ties between internet architecture and culture depend on what level of the internet stack one examines. At the physical infrastructure layer, networks are structured in this region both along and across national borders. Instead of taking those as an assumed outline, lines of communication tend to follow those of transportation, especially waterways and railways. In this region, these geographical

features cross national lines as often as they constitute them, especially offshore. Further, because the infrastructure has been built before national-scale webs of artifacts – whether linguistic, political, or otherwise constituted – have congealed, its structure does not reflect existing needs but future expectations. In this regard, the bandwidth capacity, switching points, and “choke points” seem to reflect the political exigencies of a region under the throes of a long globalization. That is, internet backbone connections between countries with stronger cultural, political, and economic ties are the on-ground practice. As an example, consider the direct connection at the transport and link layers between the internet exchange points in Nigeria and the one in Ghana, which allows direct routing of packets between the two countries rather than reliance on European routers.

As far as ownership and control of the infrastructure, the mix of national interests, international cooperations, foreign direct investors, multinational corporations, and bilateral investors reflects other sectors in the region such as older telecommunications networks and agricultural export subsidizers. However, the difference with this part of the technology sector appears along two lines with cultural significance. First, the extreme digital divide between local populations in the area and populations where the infrastructure's owners are based continues to problematize internationalist rhetoric that points to the internet as an uninhibited utopia free from worldly inequities. On the other hand, the deep absence of international internet regulations differentiates the sector from older economic parts, because it fosters a freer flow of capital and labor (with the attendant risks and costs) towards the African internet. New data centers and internet exchange points – the repositories and organizational hubs of a global-scale internet region – are under construction, supported by the massive cabling infrastructure being completed now. Whose interests are served by these large pieces of technological equipment and huge investments remains to be seen, but those with vested interests in their implementation draw on a logic of coordination and international interaction more prominently than on one of exclusion or national security.

Another curious interface between culture and technology appears at the naming and addressing layers. Here, the role of the Domain Name System and its attendant institutions has become a crucial matter of international policy. With the rise to operational stability of the Regional Internet Registry for Africa, AfriNIC, the continent has been able to allocate IP addresses and block space under a unique rubric. Approval for this institution required the deployment of explicitly Pan-African rhetoric and logic, demonstrating the hierarchical and organizational coherence of an often outmoded, misunderstood ideology for practical purposes. However, allocation of addresses via the country code

Top Level Domains remains under the authority of individual states, and depend deeply on the competence of national institutions. That competence varies wildly even among the neighboring nations examined here; three of these countries do not have a governmental agency established to coordinate this effort, and depend on a third-party contractor. As a result, the insular nature of domain naming becomes further fragmented, and consequently more fragile. Inconsistent registration and DNSSEC vulnerabilities plague domain name servers across the region. So while numerical addressing has benefited from a continent-wide, international institution, name-based addressing has suffered under its starker separation on national lines.

As demonstrated in the case studies above and by the literature reviewed on the topic, regulatory and investment structures also differ significantly across these countries. The question here is how the region's internet architecture responds to these public policy activities. Since the implementation of specific policies has concrete effects on the networks' fundamental architecture, such as the location of bottlenecks or interchanges for signal and information, the justification for these policies provides an instance of the impact of culture on technology. Here, we find that security concerns express nationalist interests. And, since none of the countries in this sample have sought isolation from the others in the pursuit of security, we have no example of an authoritarian government imposing strict firewalls through repressive policy. However, we see smaller, subtler changes take place, over extended stretches of time, based on policy and impacting the architecture. Increases in internet commerce have accelerated the approval of policies that foster deregulation. And the explosive growth of the region's semantic web along with orders of magnitude increases in multimedia content sharing have raised international copyright issues for serious, ongoing debate in each government. Finally, free speech laws that draw on appeals to both nationalist values and human rights have come to the fore repeatedly.

This highlights the question of nationalism as such. That is, in order to examine how much of a national phenomenon the internet is, we must distinguish at a certain level between ideology, policy, and practice. The historical conditions that contribute to this distinction range from pre-colonial establishment of religious, ethnic, and linguistic groups to colonial structures of domination and violence through to the post-colonial and globalization struggles with the influx of economic and network logics into everyday life. Political conditions vary between countries, but each of the five governments in this sample demonstrate a commitment to their populations' wellbeing under the terms of neoliberal globalization; that is, by providing opportunities and security without necessarily

guaranteeing the welfare or traditions of any one group. And economic conditions vary wildly even with these countries, since the populations here include agricultural and industrial, networked and isolated, modern and antimodern groups. Throughout the region, though, the impact of both state and international money has had measurable impacts on the available resources for internetting. This leaves us with the presence of ideology and its shibboleths, such as hegemony. It would be a reduction to the absurd to locate the genesis of nationalism in culture as such, but in general we find that cultural values, as expressed through mass and popular media, political organizations, and creative work, tend to structure those values that are expressed by policy-makers, such as national ideals or human rights. Where the concept of nationalism feeds back to internet architecture, the structuration between them is slow and subtle; nationalism's relation to policy appears more immediate and it feeds back on itself on a 24-hour news cycle. It is not through the direct loops, then, but on their triangulation across one another that we see the mutual impacts of these three elements.

Conclusion

To specify the mutual effects of policy, culture, and technology on one another, we turn to their intensity and degree of influence as actors or agents rather than static structures. States are our primary unit of analysis, of course, but we also consider the role of non-governmental organizations and international regulatory bodies when it comes to the issues of governance and regulation discussed above. Financial considerations lead us to include multi-national corporations and foreign direct investors among the actors here. And both grassroots advocacy and coordinated lobbying hold their sways over the political process. In this light, we have tried to compare national interests to international ones through the rubric of technological policy. The messiness of this comparison has required a great deal of description and less by way of analysis, but this ratio will change in future studies as we grow more familiar with the grounds on which we stand.

This study does not provide a complete picture of its object, and room remains for further research. There is no ethnographic data in this study, an area that seems ripe for analysis, as the group of internet users in the region grows daily, and their input towards both theory and practice is sorely required. Further, this study avoided entangling itself with the chaotic wealth of quantitative data now available, instead focusing on the higher-level architectural, political, and cultural issues at stake. A robust quantitative approach would challenge traditional statisticians, because of the technical issues at stake in methodologies for big data analysis combined with social-science epistemologies can severely

complicate straightforward correlations. However, this approach might provide serious benefits to both ongoing research and future planning.

Finally, I will leave it to more able critics and theorists than myself to examine cultural expressions of nationalism online, or to assess the validity of digital critiques of policy and of online political movements. Analysis and understanding of the aggregate content of the internet is outside this essay's scope, but the importance of that undertaking ought not to be understated.

What this essay does demonstrate is the complex of ideas and practices that triangulate between culture, politics, and technology in order to place nationalism in contemporary context for Western Equatorial Africa's development of its part of the Internet. It places internet architecture in cultural context to show the impact of culture on technology. It places policy in architectural context to show the depth of complexity at stake in the processes of policy-making. And it places nationalism in the context of policymaking to examine the result of particular ideological positions on the real-world outcomes for millions of users, machines, and systems at the cutting edge of the Internet.

If this study has succeeded, it may shed some light on the complicated issues at its core, but it may also provide a way for further thought about the internet in West Africa to take account of the concurrently shifting relationships between states, people, and technology. At its most ambitious, we might even conceive, on this basis, of an explicitly internationalist internet architecture in its next generation.

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