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COMMON SENSE: AN EXAMINATION OF THREE LOS ANGELES COMMUNITY WIFI PROJECTS THAT PRIVILEGED PUBLIC FUNDING OVER COMMONS-BASED INFRASTRUCTURE MANAGEMENT

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At a time when internet access is increasingly perceived as a basic utility—on par with necessities such as water and electricity—the commercial market has failed to bring broadband to low-income, urban communities in the United States. About 30% of Los Angeles residents lack a broadband connection at home. While this statistic is in-line with national broadband adoption rates, Los Angeles is unique among U.S. cities in another aspect. Both local and state agencies have made attempts to expand residential internet access by subsidizing community broadband networks.Specifically, the city of Los Angeles and the state of California have funded three peer-to-peer network initiatives in geographically and ethnically diverse L.A. communities. Using a public goods framework, this study examines the role public agencies played in implementing these community broadband projects. The research found that the amount of support and types of resources made available to each project varied considerably—exposing a lack of strategic planning when it comes to expanding internet connectivity. All three networks proved unsustainable over the long-term. The study analyzes the challenges faced by these community mesh networks and offers recommendations for future efforts.

Keywords: community broadband networks, public good

INTRODUCTION

Research overview and background

Several high-profile incidents involving entire communities cut off from broadband access—the result of natural disasters such as Superstorm Sandy in the Northeastern United States in 2012, to totalitarian governments in Egypt and Tunisia shutting down infrastructure in 2011—have raised awareness of the vulnerabilities inherent in a centralized internet. Policymakers are increasingly interested in the potential of community mesh networks (Harvard University, 2012), which use a decentralized architecture. Still, government agencies rarely fund community WiFi initiatives in U.S. cities. Three grassroots mesh networks in Los Angeles are distinct, however, as both local and state agencies subsidized their efforts. By comparing a public goods framework with theory of the commons, this study examines how government support impacted L.A.-based community wireless projects.

A commons is defined by bottom-up participation, with minimal reliance on the state. Community mesh networks grounded in a commons-based model of social production include a wide base of volunteers who not only use bandwidth provided by the network, but who also contribute time and skills to sustaining it. Network participants strive to create an independent entity that stresses creativity and collaboration (Benkler, 2006; Benkler and Nissenbaum, 2006; Krowne, 2005; Lessig, 2001). By contrast, wireless infrastructure projects that primarily seek to achieve institutional goals, such as expanding broadband and internet use, are grounded in a public goods framework. The amount and type of public goods must be determined by

political choice, as governments are making the decision to supply them (Stretton and Orchard, 1994).

This study focuses on Little Tokyo Unplugged; Open Mar Vista; and a cluster of mesh networks spearheaded by the non-profit Manchester Community Technologies. Each of these initiatives faltered, despite a combined $700,000 in government funding. The research analyzes the consequences of depending on government support, while neglecting to include network participants in efforts to design and sustain grassroots wireless projects. The findings suggest government grants and subsidies are inadequate substitutes for the sharing of individual resources.

The remainder of this article is arranged as follows: The subsequent section explains the rationale for the research. This is followed by an explication of the theoretical frameworks used to analyze three L.A.-based community WiFi networks. The next sections detail the research methodology and research question, and the researcher applies them to each Los Angeles mesh project. The article's concluding section discusses the implications of the findings for community WiFi networks, as well as for policymakers funding them in the future.

Rationale for the research

Los Angeles film studios such as Paramount Pictures, Universal, and Twentieth Century Fox possess enormous fiber capacity. Yet about 30% of Los Angeles households do not have a broadband connection at home (CityLinkLA, 2016), which often leads to other inequalities (Shapiro, 2015; Pepper and Garrity, 2015; Howard, Busch and Sheets, 2010). A federal appellate court recognized this reality in June 2016, when it upheld a Federal Communications Commission rule classifying the internet as a utility, on par with electricity and landline phone service. In 2007, then-Mayor Antonio Villaraigosa also acknowledged the importance of broadband when he proposed deploying a municipally owned wireless network covering all 500 square miles in Los Angeles. However, a feasibility study concluded that the city's budget shortfall, combined with technical challenges, made it impractical to build a citywide WiFi network (Citivum, 2008). Soon after, local and state agencies subsidized three community mesh initiatives. Public funding for similar projects in the United States is rare—despite that these networks are comparatively low-cost to deploy, and that a peer-to-peer model of connectivity has been found to foster community and boost civic engagement (Shaffer, 2011). Recent developments, though, signal a shift in attitude toward government support for grassroots wireless networks. In 2015, the New York City Economic Development Corporation (2015) awarded the Red Hook Initiative several million dollars to expand its community WiFi network in Brooklyn. And the U.S. government has awarded more than $7 million to the Open Technology Initiative to build secure mesh networks in Tunisia and Cuba (Brandom, 2014).

These developments suggest that policymakers, motivated by a desire to generate public goods, are poised to provide additional funding for community WiFi initiatives. Therefore, it is critical to understand the successes and failures of projects that previously operated with government grants and subsidies. This research focuses on Little Tokyo Unplugged, Open Mar Vista, and the Manchester Community Technologies projects because they represent the only community mesh networks in Los Angeles to receive public funds, totaling more than $700,000 between 2008 and 2015. The networks were situated in geographically and socio-economically diverse neighborhoods, further making them ideal for this study.

While community WiFi networks are scarce in the United States, a handful of projects are thriving. For instance, PeoplesOpen.net (2017) is a community-owned and operated mesh network in Oakland, Calif., with about 120 active or potential nodes. The Detroit Community Technology Project (2017) has trained local residents to deploy three mesh networks, and four more are planned. The Personal Telco Project (2017a) launched in 2000 and now

includes about 100 active nodes in Portland neighborhoods. A team of volunteers for NYC Mesh, a community-run network in New York City, has deployed more than 40 access points. According to the project website, network participants add nodes weekly (NYC Mesh, 2017).

By examining public investments in peer-to-peer networking initiatives, this study aims to better understand how substantial cash infusions influenced network design and implementation. Stronger community ties, self-reliance and opportunities for democratic deliberation potentially emerge when neighbors share bandwidth. In this sense, WiFi signal sharing is more than a promising "last mile" technology able to reach every home for a fraction of the cost required to lay fiber, DSL and cable (Martin, 2005). In fact, grassroots mesh projects aim to create "a radically different public sphere" (Burnett, 1999) by situating themselves outside of commercial interests. Typically, one *joins*, as opposed to *subscribes to*, the services. As Lippman and Reed (2003, p. 1) observed, "Communications can become something you do rather than something you buy." For this reason, the economic theories of both public goods and the commons provide an ideal analytical framework for examining three community WiFi project in Los Angeles. The following section presents an overview of relevant literature.

BROADBAND IN THE CONTEXT OF PUBLIC GOODS AND THE COMMONS

Treating broadband as a public good when crafting policy

In his landmark 1954 paper *The Pure Theory of Public Expenditure*, economist Paul Samuelson (1954) defined public goods as entities "which all enjoy in common…" (p. 387). Specifically, public goods are non-rivalrous, meaning that one person's use of a good or service does not detract from another person's use of the same product, and nobody can be prevented from using it. Public goods are also non-excludable; therefore, it is impossible to pinpoint which aspects of the commodity benefit individual members of the community. For example, an infinite number of people can pick up an over-the-air broadcasting signal for a particular radio program, and it does not undermine anyone else's ability to hear the same program. Public goods often produce positive externalities, or beneficial side effects, that are not reflected in the investment cost. News broadcasting is characterized as a public good because it informs the public about current events. But positive externalities emerge from the news media's function as a watchdog over elected officials; as a forum for the exchange of diverse views; and as a source of information for voters (Pickard, 2014).

Communication scholars have urged policymakers to conceive of broadband access as a public good, "just as essential as access to affordable housing and health care" (Smith, Rhea and Meinrath, 2012, p. 54). Democratic participation is intertwined with internet access. More than 60% of Millennials report getting political news on Facebook (Mitchell, Gottfried and Matsa, 2015); community issues are deliberated on blogs; City Council meetings are live-streamed; and public comments on legislative proposals are submitted electronically. Regulators attempt to ensure a competitive telecommunications market by, primarily, enforcing anti-trust laws. However, governments also subsidize infrastructure projects (freeway construction is a key example) because these initiatives are public goods that create jobs and stimulate long-term economic growth. In July 2009, President Obama allocated more than $4 billion for broadband grants and loans, as part of a massive economic recovery package (The White House, 2009).

The government-subsidized community broadband networks examined here have the potential, arguably, to function as public goods. Assuming adequate physical infrastructure—including fiber, switches and routers—is deployed, and that

protocols route and direct traffic efficiently through the network, the internet is non-rivalrous and non-excludable. Chettiar and Holladay (2010) point out that the internet "produces billions of dollars of free value for the American public: information is shared, reused, and reconfigured without fees or penalties" (p. vii). Broadband networks generate external effects that enable the production of goods and services fundamental to a capitalistic economy. The technology is credited with creating jobs, positively impacting education, and bolstering public health and safety (Rodriguez, 2006; Federal Communications Commission, 2010).

However, the means of achieving these market-centered government objectives can conflict with principles of the commons, a framework discussed in the following section.

Community WiFi as a commons

A separate approach to framing broadband connectivity acknowledges the internet's role as a massive commons. Yochai Benkler (2006) characterizes the commons as "an alternative form of institutional space," where people are unhindered by "the particular restraints required for markets," and where necessary resources are available (p. 144). Not only do community WiFi networks provide access to information, they create a virtual space for participation, creativity, and communication (Holman and McGregor, 2010). The software layer, encompassing non-proprietary protocols such as TCP/IP and open source software, is mutual property of the entire online community (Solum and Chung, 2004; Hofmokl, 2009; Lessig, 2001; Benkler, 2001). The content layer is comprised mostly of information anyone can access (Hofmokl, 2009; Lessig, 2001; Benkler, 2001). Finally, at the structural level, community mesh projects function as an information commons, in the sense that they empower members to create, produce, and distribute knowledge. The value of this commons is derived from the fact that no one owns or controls it—not people, not corporations, not the government (Benkler 2001; Lessig, 2001). The peer-to-peer architecture comprising community wireless networks provides ideal conditions for fostering civic engagement and eliminating the need to rely on telecommunications companies for connectivity. Instead of information passing from "one to many," it travels from "many to many." The primary internet relies on centralized access points and internet service providers (ISPs) for connectivity. By contrast, in a peer-to-peer architecture, components are both independent and scalable. Wireless mesh network design includes at least one access point with a direct connection to the internet—via fiber, cable or satellite link—and nodes that hop from one device to the next. As the popularity of these networks grows, new users add nodes. Signals then have shorter distances to hop and more redundancy is built into the system, ultimately strengthening the network (Rowell, 2007). Platforms such as Wikipedia and Amazon's Mechanical Turk exemplify the efficiency of producing work in the commons. Mesh infrastructure is similarly dynamic. The collaborative nature of the technology enables users to divvy production costs, while reaping benefits from others (Feld, 2005).

Multiple community mesh networks in Europe embody principles laid out in theories of the commons. Freifunk (2017), an open grassroots initiative based in Germany, encompasses 125 communities with more than 25,000 access points. Each node host owns an equal portion of the network. "The network is a concept, it is not an entity," a Freifunk volunteer told a researcher during a 2010 interview (Shaffer, 2013). Similarly, Guifi.net is a free and open network in Catalonia, Spain that primarily relies on mesh architecture. The network, comprised of 27,000 nodes, is self-organized and run by users (Guifi.net, 2017). When interviewed in 2010, a Guifi.net volunteer noted that everyone who joins the network is both a user and provider of bandwidth. "You can't be opportunistic if this is going to work," the volunteer said (Shaffer, 2013). Austria-based Funkfeuer (2017) maintains more than 220 nodes in Vienna, and operates smaller networks in several Austrian communities. Funkfeuer's commitment to functioning as part of the commons means that, as an association, it does

not legally own any nodes. Since thousands of distinct users control the access points, Funkfeuer can never sell the network to a commercial ISP.

The clash of public good objectives and principles of the commons

Local and state agencies provided money and resources to several Los Angeles community WiFi networks because they believed the projects would advance their own public good goals. Specifically, policymakers hoped to boost professional and educational opportunities through broadband adoption; to deploy internet architecture in underserved communities; and to spur economic growth. The research contrasts this perception of grassroots networking with the characteristics necessary to sustain a commons-based WiFi network—such as leadership from committed volunteers, collaboration, and an independent governance structure. The following section discusses the research methodology, as well as the research question that emerged following a comprehensive literature review.

METHODOLOGY AND RESEARCH QUESTIONS

Research methodology

Between January 2015 and February 2016, the researcher conducted interviews with 11 key stakeholders. Informants included network founders; network users; city of Los Angeles staff; a local mesh networking advocate; and a California Public Utilities Commission representative. The researcher's questions varied, depending upon each informant's role and relationship to mesh networking. However, each interview focused on how the three Los Angeles mesh networks were designed and implemented; public officials' motivations for supporting grassroots WiFi initiatives; and how government subsidies impacted each community WiFi network. Ten interviews conducted over the telephone lasted between 30 and 60 minutes. The face-to-face interview lasted 90 minutes, and took place in the informant's office. The researcher followed up with five informants, asking clarifying questions via email or during brief phone conversations. The researcher opted to conduct qualitative interviews because of the method's ability to illuminate questions involving the political and social realities of broadband use and policy. The flexible nature and depth of semi-structured interviews also made them ideal for this project. Finally, interviews provided a level of detail that shed light on the successes and challenges defining Little Tokyo Unplugged, Open Mar Vista and the Manchester Community Technologies project.

In addition to conducting interviews, the researcher analyzed relevant documents. These included reports submitted to state grant-making agencies; news media coverage; and neighborhood council meeting agendas and minutes. Documents can help "uncover meaning, develop understanding, and discover insights" (p. 118) germane to research questions (Merriam, 1988). Information extracted from documents helped the researcher contextualize data collected during informant interviews, and provided useful background facts.

Research question

After conducting interviews with stakeholders and analyzing pertinent documents, this primary research question emerged:

> **RQ**: By accepting or pursuing grants and resources from public agencies, did Little Tokyo Unplugged, Open Mar Vista and Manchester Community Technologies relinquish the ability to function as commons—which are neither owned nor controlled by anyone?

In an effort to answer this research question, the following sections describe Little Tokyo Unplugged, Open Mar Vista and the networks planned by Manchester Community Technologies. Each network is analyzed through public good and commons-

based frameworks.

LITTLE TOKYO UNPLUGGED

Community WiFi as a much-needed resource

The Little Tokyo section of downtown Los Angeles is a significant center of culture and history for Japanese Americans. Little Tokyo's population of 5,800 residents skews older (Local Initiatives Support Corporation, 2013) and poorer than Los Angeles as a whole. The community's annual median household income is about $17,500, compared to the citywide median income of more than $48,400 (City-Data.com, 2016). The Little Tokyo Service Center (LTSC)—founded in 1979 to serve Asians and Asian Pacific Islanders—provides social services, job training, youth programs, and mental health counseling. It also partners with other non-profits to develop affordable housing.

When the LTSC launched a community WiFi network in 2008, no cable companies offered broadband connectivity in Little Tokyo and many residents could not afford the available DSL service. In addition to enabling area residents and businesses to get online, the LTSC envisioned Little Tokyo Unplugged as an "outreach tool," according to an informant who worked on the project from its inception. After logging onto the network, users landed on a splash page with information about events and issues impacting Little Tokyo. "We wanted a way to connect people and help them feel they are part of a community," this informant said.

As Little Tokyo Unplugged transitioned from concept to reality, multiple public agencies offered support. The L.A. Department of Water and Power gave the LTSC access to its dark fiber (fiber it owned but did not use), which provided high-speed connectivity, an informant said. The L.A. Community Redevelopment Agency subsidized a commercial ISP subscription that provided a "gateway" to the internet, according to the informant. The redevelopment agency also footed the bill for about 10 mesh nodes, which the LTSC placed on rooftops of buildings it owned. Mesh repeaters extended the network signal throughout the community. Finally, the LTSC (2010) generated revenue by providing bandwidth to a network of L.A. Police Department security cameras in Little Tokyo and adjacent Skid Row.

But the most significant public support arrived in 2008. This is when a non-profit corporation established by the California Public Utilities Commission, called the California Emerging Technology Fund, awarded the LTSC a $250,000 grant. The California Emerging Technology Fund viewed the free broadband connectivity and digital literacy classes hosted by Little Tokyo Unplugged as an opportunity to achieve multiple public good goals. Specifically, the network served as a key element of the fund's comprehensive strategy to increase home broadband adoptions; to help community residents land jobs in technology-related fields; and to integrate broadband use into routine activities (McPeak and Chong, 2015), such as banking and communicating with doctors. The public good characteristics of Little Tokyo Unplugged included the fact that anyone living within reach of a wireless signal could access it, without costs creating a barrier. While the California Emerging Technology Fund subsidized dozens of public technology centers across the state, this model required people to wait in line to use a computer and to conform to restrictive hours of operation. By contrast, Little Tokyo Unplugged made it possible for hundreds of local residents to access the internet simultaneously, any time of day.

The LTSC spent a year planning and deploying networks in an area that ran for about 3 blocks east and west, as well as 3 blocks north and south. "The node locations were dictated by where we had access to rooftops," the informant said. Ultimately, multiple wireless networks built with the grant money reached 2,479 housing units (LTSC, 2010). Of those, 321 households took the steps necessary to connect to the network. By 2010, the free mesh networks served as the primary internet connection for businesses and non-profits in Little Tokyo, the

informant said, adding that it was “not unusual” for about 100 people to log onto the network daily. Ultimately, more than 2,200 unique users accessed the center’s 12 free WiFi networks (LTSC, 2010), and “Little Tokyo Unblogged” (2014) evolved into a valuable source of community news.

As the network’s popularity mounted, however, so did its challenges. The increasing prevalence of smartphones meant more mobile devices accessing Little Tokyo Unplugged. This required the LTSC to deploy additional access points, leading to signal interference. Network users overwhelmed LTSC staff with complaints about everything from lost connections to computer viruses. “We ended up being IT support for the entire community,” the informant said. Around the same time, the economic recession sapped foundation funding (LTSC, 2010). In addition, the L.A. Community Redevelopment Authority discontinued providing resources after the California Legislature moved to dissolve redevelopment authorities statewide.

Money, yes. Meaningful participation, no.

Despite its popularity, the center shut down the WiFi network in 2010. “The decision was made that we couldn’t sustain it,” the informant said. While the LTSC (2010) invested nearly $3 million in broadband-related initiatives, the center neglected to seek meaningful participation from the wider Little Tokyo community. The LTSC basically functioned according to a traditional ISP model. In a commons, it is imperative that a fair relationship exists between contributions made and benefits received (Commons Sommerschule, 2012). However, the LTSC neither expected nor asked network users to contribute to Little Tokyo Unplugged in exchange for free broadband access. As a result, individual network users did not feel they had a stake in ensuring the stability of the network. Network users lacked opportunities to develop software protocols, or to weigh in on decisions regarding the installation of new nodes, or help recruit participants. By contrast, successful community WiFi networks—Freifunk, the Red Hook Initiative, and Personal Telco, to cite a few—adhere to commons-based principles, with users playing a critical role in infrastructure management. Rather than paying cash in exchange for the costs incurred for providing connectivity, social norms serve as currency (Liebenau and de Fontenay, 2006). This personal investment means network participants are less likely to hog bandwidth and more willing to help neighbors fix a broken node. The commitment to sustaining a larger system eclipses the desire to act in one’s own self-interest. Instead of fostering grassroots support, though, the LTSC counted on the $250,000 state grant and other government resources to keep the project alive. Seemingly, the center did realize the flawed nature of this approach in 2009, more than a year after Little Tokyo Unplugged launched. An AmericaCorps volunteer trained residents living in the center’s affordable housing developments as “network caretakers” who could provide technical assistance to Little Tokyo Unplugged users, the informant said. While the effort demonstrates an ideological shift toward a commons-based structure, the trainings involved just a handful of network users. And soon after volunteers completed their training, the LTSC determined it could no longer support Little Tokyo Unplugged, the informant said.

The following section focuses on Open Mar Vista, another community WiFi project initially defined by commons-based principles. The network culture transformed, though, as the network’s co-founders directed energy toward the pursuit of government funding.

OPEN MAR VISTA

Using technology to build community, at the beginning

In 2008 two social entrepreneurs living in Mar Vista—an ethnically and economically diverse neighborhood in Los Angeles with about 37,500 residents (L.A. Times, 2016)— identified a need for a

social media platform dedicated exclusively to community issues. Their concept of using technology to connect neighbors was a precursor to the model popularized by NextDoor (2017), a social media platform that launched three years later. The site, dubbed Open Mar Vista, quickly caught on. Users posted on topics ranging from local art exhibits to concerns about proposed construction (Open Mar Vista, 2008). At the time, nearly 100,000 San Francisco residents were participating in a community WiFi network called Free the Net (Churchill, 2008). The co-founders of Open Mar Vista viewed Free the Net "as the new library," and aspired to emulate it, according to an informant. They "recognized the challenge of trying to meet both civic and corporate needs and wanted to create a broadband network for the greater good," the informant said. The Open Mar Vista co-founders transformed their ideological commitment into something tangible by developing a plan that focused on recruiting community businesses and residents to host nodes.

In addition to grassroots support, the network co-founders received help from the Mar Vista Community Council, a civic association with an annual budget allocation from the city of Los Angeles. Specifically, the neighborhood council purchased multiple $200 outdoor wireless antennas. Open Mar Vista deployed mesh routers to extend the antenna signals, creating a continuous network along Venice Boulevard. Businesses lining this main corridor contributed bandwidth in exchange for publicity on the network's splash page. In spots where no host could be found, Open Mar Vista's co-founders purchased bandwidth themselves, according to an informant. By mid-2009, more than 8,000 people had accessed the free internet service, and an estimated 1,000 users logged on weekly (Argonaut, 2009).

The network co-founders also recruited residents to participate in the WiFi project. One informant said she paid $200 for a mesh router, which Open Mar Vista installed on the roof of her home. She retained her ISP subscription and contributed bandwidth to Open Mar Vista. The informant said personal conviction—the belief that she could help solve social challenges by participating in this networked commons—motivated her involvement. "It meant a lot to me to be part of Open Mar Vista. Even here, where homes can sell for $5 million, some people lack internet access," the informant said. She noted that "there's always a wait for computers at the Mar Vista library" and that "a broad spectrum of people" use the public PCs. The entire concept of a commons is predicated on scenarios such as this. Volunteers contribute bandwidth to the community WiFi network, and in exchange build an infrastructure beyond the control of corporations and regulators. As Tapscott and Williams (2006) observed, people who participate in peer production communities feel passionate about their choices and "revel in creating something new and better" (p. 70)

The pursuit of public funding

In 2010, L.A. City Council appropriated $45,000 for each of Los Angeles' nearly 100 neighborhood councils (Kercher, 2010). The Open Mar Vista co-founders determined that if each of these neighborhood groups chipped in, they could deploy "50 to 100 mesh networks in key locations" and expand into "Open Neighborhoods," an informant said. The co-founders began pitching the idea and, in 2011, the Hollywood Studio District Neighborhood Council (HSDNC) voted to allocate $6,500 of its budget toward the purchase of high-power antennas. When strategically placed, the equipment would beam wireless broadband signals to nearly all 30,000 people living within the Hollywood Studio District boundaries, the informant said. More than 65% of these residents are Hispanic, and the neighborhood's median household income of $35,300 (Find the Home, 2016) is significantly below the citywide median income of $48,400 (City-Data.com, 2016). HSDNC board members believed free WiFi would facilitate more efficient communication with their constituents, coupled with "the main issue" of digital inclusion, according to an informant. "The reality is that poor, working class Latino members of our district have limited access

to the internet. A lot of people have cell phones, but we see gaps," this informant said. These comments exemplify how the pursuit of public funding began to usurp social-production principles associated with a networked commons. While closing the digital divide and informing the public about community issues are laudable goals, they are clearly institutional ones.

Pushing ideology aside

Initial plans for a mesh network in the Hollywood Studio District quickly gained momentum. Paramount Pictures agreed to contribute bandwidth and Mayor Eric Garcetti—then an L.A. City Council member representing the Hollywood Studio District—offered to host an antenna on his office roof, an informant said. A non-profit pledged to donate refurbished laptops so that low-income students could take advantage of connectivity provided by the mesh network, this informant added. Open Mar Vista could not purchase the antennas, however, until City Council sanctioned the HSDNC's $6,500 budget allocation for the project. "The normal process was for council to approve the expenditure and write a check," an informant said. In this case, the city of Los Angeles responded with a series of concerns. The Department of Neighborhood Empowerment insisted its rules required neighborhood councils to undertake a competitive bidding process before spending money on an ISP—despite that this guideline was ignored when the Mar Vista council purchased antennas for Open Mar Vista in 2009, according to an informant. City legal staff raised liability concerns: Did the neighborhood council have insurance to cover potential damage caused by equipment sited on private rooftops? How would the HSDNC prevent network users from downloading child pornography and pirated music? The highest hurdle to clear, though, involved lobbyists from the incumbent Time Warner Cable. The telecommunications company pressured L.A. City Council members to reject the HSDNC's $6,500 spending request, according to two informants.

In addition to pursuing financial support from the City of Los Angeles, in 2010 the co-founders of Open Mar Vista applied for a $796,950 grant from the federal Broadband Technologies Opportunities Program (National Telecommunications and Information Administration, 2017). Ultimately, Open Mar Vista co-founders spent three years pursuing government funding, which they perceived as crucial for fulfilling their vision for a citywide WiFi network. "The problem with the system is too many layers," reported an informant who pushed city officials to fund the initiative. "Other interests have more clout—there are developers and big business concerns, and an undercurrent that the city contracts with a cable company with a sanctioned monopoly," this informant commented. These realities would be rendered irrelevant, however, had Open Mar Vista adhered to a commons-based model that exists outside the realm of government regulation. Neither bureaucratic rules nor political pressure can harm a community WiFi network fueled by a base of volunteers committed to a meaningful project. This is what distinguishes a commons from privatized and profit-driven enterprises, where policymakers or corporations dictate how things are done. In 2014, after both city and federal agencies rejected requests to fund "Open Neighborhoods," the project co-founders abandoned hopes of deploying community WiFi networks throughout Los Angeles. They also quit maintaining Open Mar Vista's nodes. Although thousands of people connected to the internet through Open Mar Vista at the time, no core group of volunteers existed to step in and keep the network operational.

Preferencing public good objectives

Rather than design Open Mar Vista/Open Neighborhoods according to commons-based peer production principles, the network co-founders sought ways to align the project with public good goals articulated by local and federal agencies. For instance, an informant stressed that community WiFi would enable neighborhood councils to send

email blasts and post information online. This argument is a direct response to the city's push for neighborhood councils to reduce paper correspondence with constituents (City of Los Angeles, 2010). Similarly, the grant application Open Neighborhoods submitted to the federal Broadband Technologies Opportunities Program—which exclusively funded broadband infrastructure and computer adoption initiatives—focused on the potential for community WiFi networks to supply Los Angeles' low-income neighborhoods with affordable internet (National Telecommunications & Information Administration, 2010). The proposal is void of references to concepts associated with the commons, even though this ideological space can transform broadband infrastructure from a conduit to the internet into a technology for empowering participants. It seems that, ultimately, the pursuit of public funding supplanted initial goals of creating a WiFi network that fostered inclusivity and collaboration.

The following section further delves into these concepts by examining a community wireless initiative spearheaded by the non-profit Manchester Community Technologies.

MANCHESTER COMMUNITY TECHNOLOGIES

Over-promising and under-performing

Income correlates with broadband adoption, and the 22% of Los Angeles residents living below the poverty line (U.S. Census, 2015) are least likely to have a home internet connection. In 2012, a small non-profit called Manchester Community Technologies devised a plan to address this challenge by installing free wireless internet along main corridors in low-income neighborhoods throughout Los Angeles. Specifically, Manchester Community Technologies promised a wireless "cloud" of networks that would benefit "underserved and unserved" populations, ultimately creating "a smarter more educated community" (South Bay Sub-Regional Broadband Consortium, 2012, p. 27). Manchester Community Technologies stressed the public good aspects of the project, asserting that it would boost the local economy by helping businesses attract customers (South Bay Sub-Regional Broadband Consortium, 2012). In addition to these public good goals, the proposed project encompassed multiple characteristics of the commons—from WiFi signal sharing to opportunities for community members to create and innovate. The California Public Utilities Commission awarded $453,000 to Manchester Community Technologies to implement its strategy over a 3-year period. The grant money came from a fund that collects $315 million in ratepayer surcharges for capital projects and broadband adoption efforts in areas of California that lack connectivity (California Advanced Services Fund, 2016).

In October 2015, as its 3-year state grant was on the cusp of expiring, Manchester Community Technologies submitted a quarterly report to the California Public Utilities Commission. In it, the organization claimed to have launched 16 community WiFi networks, with coverage areas ranging "from ¼ mile to 1 square miles, enabling over 100,000 community based unique end-users the opportunity to connect to the Internet" (South Bay Regional Broadband Consortium, 2015). The report stated that Manchester Community Technologies had deployed WiFi hot spots at 13 L.A. parks, as well as dozens of businesses, community centers and non-profits (South Bay Regional Broadband Consortium, 2015). For months, this researcher unsuccessfully attempted to get in touch with community organizations, local business owners, and residents about their experiences using the WiFi networks Manchester Community Technologies said it deployed. Potential informants repeatedly responded that they had never heard of the networks. The researcher conducted two phone interviews with a network informant during Fall 2015. When asked how Manchester Community Technologies publicized the initiative, the informant replied, "People who use the networks know." The

informant said she didn't "have time to get into" details of how the mesh technology was deployed, and she struggled to provide URLs to even one of the 16 network splash pages. The researcher also attempted to reach multiple organizations cited as "partners" in the original grant application (South Bay Regional Broadband Consortium, 2012). The websites and phone numbers listed for Family Love Outreach, United Latinos in America, ByParents4Kids, IACInc., and Making a Difference Together Foundation were non-operational.

In summer 2015, the researcher contacted the California Public Utilities Commission staff person overseeing Manchester Community Technologies' $453,00 award. An informant told the researcher "no one" from the commission could answer questions because it was "not involved in the grantee work." Soon after, *Los Angeles Times* journalist Doug Smith visited the wireless networks and hotspots Manchester Community Technologies claimed to have deployed in quarterly reports. Smith (2016) found that WiFi signals at dozens of these locations failed to work. Smith contacted the California Public Utilities Commission for comment, which prompted a commission staff member to visit these Manchester Community Technologies' sites in January 2016. The staffer determined that service was available at just two locations where the organization was paid to provide free WiFi (Smith, 2016).

The challenge of community engagement

There's little doubt that Manchester Community Technologies accepted a $453,000 state grant in exchange for a "mesh cloud" it never deployed. These findings suggest an inherent conflict exists between the quest to fulfill the state's public good goals, and the commons-based community building necessary to sustain a grassroots WiFi network. One could argue that this reality should have prevented California officials from funding Manchester Community Technologies' proposal in the first place. Specifically, a successful community WiFi initiative cannot be predicated on a state mandate to strengthen digital literacy skills and increase broadband adoption. Local businesses and residents typically share bandwidth as part of a broader effort to create an alternative communications infrastructure, beyond the reach of government—not *dictated* by government. Grassroots broadband initiatives run smoothly when participants are committed to the success of a common enterprise and share a common purpose. The approach taken by Manchester Community Technologies does not reflect these principles. For example, an informant recalled that Manchester Community Technologies sent "technicians" to drop by local businesses and request that they host nodes. Potential network participants viewed Manchester Community Technologies contractors as "outsiders" when they approached them about sharing bandwidth, this informant added.

In order to convince Angelenos to participate, Manchester Community Technologies needed to engage in true community building, based on the understanding that each participant would play a critical role in the WiFi project's success. In order to sustain a peer-to-peer network, a core group of leaders must make the case that internet infrastructure should be a ubiquitously available common good (Fuchs, 2017). The Portland-based Personal Telco network is based on this model. Volunteers host weekly meetings, open to anyone, "whether you're a technology wizard or technically incompetent" (Personal Telco, 2017b). During these get-togethers, attendees share ideas and tackle network challenges. Similarly, NYC Mesh (2017) organizers present opportunities for volunteers during monthly meet-ups, where "all are welcome." As policy strategist David Bollier (2017) notes, the word commons is more a verb than a noun: "There is no commons without communing." In his examination of the communicative city, Nico Carepentier (2008) drove home the importance of volunteers. "If I disappear, the network will disappear" (p. 250), one WiFi activist told Carepentier. Similarly, Alison Powell (2008) found that "geek publics" served as catalysts for the Île

Sans Fil peer-to-peer network. These stakeholders bond with one another while developing software protocols, installing nodes and simply chatting about mesh technology.

The head of the California Emerging Technology Fund told the *L.A. Daily News* that the state erred when it approved Manchester Community Technologies "to do something that was maybe out of its league" (Reicher, 2016). More to the point of this research, though, is that signal-sharing communities make a deliberate choice to challenge the existing telecommunication model. By contrast, Manchester Community Technologies never attempted to create a network sustained by the community. Instead, it obtained a $453,000 grant in exchange for promising to help California officials achieve their own economic and social goals.

CONCLUSION

This research asked whether three Los Angeles community WiFi networks—Little Tokyo Unplugged, Open Mar Vista and Manchester Community Technologies—relinquished the ability to function as commons by accepting, or simply pursuing, grants and resources from public agencies. Interviews with key stakeholders, as well as a review of relevant documents, suggest the answer is yes. In exchange for government subsidies, these three community WiFi networks prioritized the public good goals articulated by policymakers—primarily, closing the digital divide in Los Angeles through infrastructure deployment. In order to fulfill promises made to granting agencies, these community WiFi networks had to treat wireless internet access as a commodity, rather than as a tool for community empowerment. Significantly, none of the networks developed a strategy to remain sustainable after public subsidies expired, or after government agencies rejected additional funding requests. Had these three L.A.-based community WiFi projects privileged a commons-based approach, they may have thrived. In a commons, communication systems are truly democratic—in the sense that community members themselves determine how the network is designed and deployed. Neither corporations nor policymakers get to influence those decisions. Little Tokyo Unplugged, Open Mar Vista and Manchester Community Technologies allowed institutional authority and financially driven decision-making to supplant the social-production principles that characterize a networked commons.

Public and private realms are defined not by natural law, but by "deliberate policy choices" (Kaul and Mendoza, 2003, p. 80). Therefore, it is certainly possible for community WiFi networks to partner with government agencies while continuing to manage infrastructure as a commons. City councils and municipal agencies provide funding, resources and even labor to Barcelona-based Guifi.net (De Fillippi and Tréguer, 2014; Shaffer, 2013), a network built on the ideals of free and neutral infrastructure. In 2010, the Detroit Digital Justice Coalition (2017) used a portion of its $1.8 million grant from the federal Broadband Technology Opportunities Program to launch community wireless networks in several neighborhoods. A guiding principle of this project is to "demystify technology to the point where we can not only use it, but create our own technologies and participate in the decisions that will shape communications infrastructure" (Detroit Digital Justice Coalition, 2017). In another example, Montreal's community wireless network, Île Sans Fil, has benefitted from grants awarded by Heritage Canada and the Canada Council for the Arts, among other government agencies (Crow and Miller, 2007). The network remains solidly supported by volunteers. Ultimately, the success of a community wireless project does not depend on its source of funding, or even whether it obtains funding at all. Rather, sustainability depends on a project design guided by camaraderie and the basic human instinct to give to others (Benkler and Nissenbaum, 2006).

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