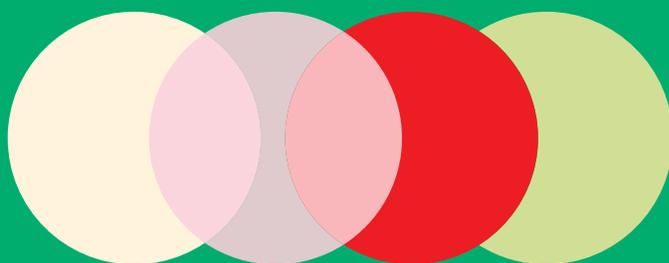


Growing Digital Equity:

the Origins and Promise of Community Internet in Detroit



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Executive Summary

In a digital age where our lives, politics, and economies are increasingly negotiated online, digital equity is central to fair and inclusive cities. As a baseline, digital equity requires that all members of society have affordable access to reliable, high-speed Internet. But more than that, it requires the ability of communities to understand, know how to use and drive technology and its outcomes to solve local problems and support local innovation.

We do not live in a digitally equitable world. Existing social and economic inequalities also mean digital exclusion of marginalized communities. Digital inequities stem from a toxic stew of residential segregation and redlining, as well as outsized power in the telecommunications industry (Mabud and Seitz-Brown 2017). In Detroit, over 40% of the population lack access to home-based Internet and, as a result, have fewer tools to participate fully in our society, democracy, and economy.

While cities with more resources than Detroit have approached the problem through public infrastructure investments and public-private partnerships, we argue that deep community engagement and leadership in deploying technology and solving community problems is critical in achieving digital equity. Municipal governments, especially ones with limited public resources, should consider investing in hyper-local, community-scale work that ties together infrastructure, digital literacy, and extensive community engagement.

In this case study, we focus on Detroit and the predominantly Black and lower-income neighborhood of the North End as an example of innovative, community-scale projects that are locally generated. In the North End and two other communities, the Detroit Community Technology Project (DCTP) (sponsored by Allied Media Projects), have launched the Equitable Internet Initiative (EII). EII exists in partnership North End Woodward Community Coalition in the NorthEnd and Grace in Action and Church of the Messiah in Southwest and Southeaste Detroit respectively . EII has three components: 1) train residents, known as “digital stewards” to build and maintain a gigabit speed wireless network; 2) provide share gigabit speed service to fifty households in each neighborhood, including the North End; and 3) create neighborhood-based Internet service providers (ISPs) that explore alternative sustainable economic models to the private sector.

Exclusionary market-driven broadband alternatives are the norm (Mabud and Seitz-Brown 2017), but DCTP's approach provides an experiment to challenge the for-profit models of expensive service that price communities out, while also providing communities with tools to consider how to make use of the technology. Sustainability of these networks remain a challenge but is a worthy part of the experiment. In the absence of government support and private investment, nonprofits, community services agencies and community-based groups have worked to support meaningful broadband access and digital literacy (Byrum & Gangadharan 2012). Building on the knowledge produced over the past two decades, we provide the following recommendations for local government support for efforts like EII:

Introduction

Papillon Dzień,¹ a resident of the North End neighborhood in Detroit, says that since residents started building a local broadband network, the conversations among his neighbors have been changing. People are no longer only talking about sports or the latest news cycle. Instead, his neighbors say things like, "well I'm getting 68 dBs and 128 mbps."² Wireless broadband networks require towers and routers that allow radio signals to get connected to the internet. It requires "line of sight." If a tree or a building block the towers from their routers, it will affect the Internet speed. Most people don't have reason to know this, but thanks to the North End's Digital Stewards—local residents trained in designing, installing and maintaining wireless broadband networks—the conversation is shifting. They not only install community-driven wireless broadband networks, but also maintain them and talk to their neighbors about getting on-line.

The Internet is not simply a valuable service. It is a necessity for full participation in society. We rely on the Internet to access government services and health care, apply to jobs, and perform everyday tasks such as banking, finding information, or connecting to friends and family (Rideout and Katz 2016). Digital equity is more than just access to broadband. Broadband should be understood as a tool to shape community driven projects to impact economic development, education and civic life. In today's knowledge-based economy, the Internet produces roughly 6% of the GDP (Hooton 2017). And the growth of the Internet economy has not only benefited affluent segments of the population. It has also boosted new small business opportunities for minorities, which have been excluded in other traditional economic sectors. For example, the Internet has been revolutionary for small business since it has become a crucial tool to generate more exposure. (see, for example, Simon 2017). According to

1 Name has been changed to protect the privacy of the subject.

2 "Db" and "mbps" both are commonly used indications for Internet speed. "Mbps" stands for "megabits per second" and "dB" stands for "decibels."

Forbes, 52% of small businesses nationwide are now home based (Carbajo 2015) and the internet is one reason for this. Businesses owned by Black women have grown by 322% since 1997 and are the fastest growing group of entrepreneurs in the U.S. (Dandy 2015). Internet platforms like Etsy support small business owners to participate in today's economy without an enormous burden. Moreover, the Internet has also raised social awareness about buying locally to keep money within historically marginalized communities and has generated an incentive to create more economic opportunities.

That's an opportunity for Detroit. The story of Detroit, like many other cities around the country, is one of systemic exclusion along racial and class lines. The result of decades of housing segregation, white flight and underinvestment by the private sector has resulted in a city that suffers from concentrated and racially identifiable poverty. In Detroit, the population is over 80% Black and has amongst the highest urban poverty rate in the country: 40% of the population.

The racial exclusion so prevalent across the city includes digital exclusion—differential access to high-speed and high-quality broadband services, as well as the opportunities that such access enables. 40% of Detroit residents do not have access to home-based broadband Internet as defined by the FCC (25 Mbps download/3 Mbps upload) (Kang 2016). This is due to a combination of factors that range from the lack of infrastructure as a result of redlining (see, for example, Marcus 2018); deficiency of services offering low speeds (as we demonstrate in our spatial analysis below); and the high cost of subscriptions due to limited competition, forcing low-income communities to prioritize other utilities and basic needs over the Internet (Reisdorf et al. 2018; Goss 2017). To access the Internet, many Detroiters rely on their smartphones which do not provide the same opportunities as home-based subscriptions (Reisdorf et al. 2018). For a population desperately in need of government services, jobs and all the educational and civic opportunities broadband brings, it means that far too many Detroiters lack access to a service that is as essential as having heat or water (Reisinger 2016).

Equal access to reliable, high-speed Internet has to be understood as the foundation (though by no means the end result) of digital equity. Broadband generally refers to stable service that is faster than traditional dial-up access. Yet, the term is politically contested and definitions vary according to sources. While some define broadband based on modes of access, others define it based on speed levels. In 2015 in a move to update the term to current service standards and consumer needs, the Federal Communications Commission, under Chairman Tom Wheeler, adopted the following definition: “access to actual download speeds of at least 25 Mbps and actual upload speeds of at least 3 Mbps” (FCC 2015). For the purpose of this case study, we adopt the FCC's speed based definition of 25 Mbps/3 Mbps.

As the Roosevelt Institute and The New School previously demonstrated in *Wired: Connecting Equity to a Universal Broadband Strategy* (Mabud and Seitz-Brown 2017), the racialized digital inequity we find across the country is the result of two forces: deregulation of the telecommunications industry and a long history of segregation and disinvestment in communities of color. Today's monopolized Internet service provider (ISP) landscape has allowed ISPs to upgrade digital infrastructure in the most profitable areas first. They are not obligated by law to provide universal access to Internet connectivity, unlike telephone service, where the federal government must support universal service, as it has with electricity and water. In a racially segregated city like Detroit, this means that low-income neighborhoods of color are less likely to get infrastructure investments and upgrades that the white suburbs receive – and even when they do, the residents of the urban core may not be able to afford the services that the ISPs provide.

While some cities have resources to provide broadband infrastructure and services for low-income residents (e.g. New York), cities like Detroit often do not have the public resources to invest in large scale infrastructure projects. In Detroit, the lack of financial stability was deepened in 2011 when the city faced financial emergency and filed municipal bankruptcy in 2013 (see, for example, Turbeville 2013). In *Wired*, we highlight the role that local government can play in building infrastructure and providing free services to low-income residents that the large telecommunications firms on their own would likely not provide for free. In New York City, the De Blasio administration took an approach towards digital equity that started with creating a free, high-speed wireless corridor in the largest public housing community in North America. In this case study, we turn to a different model of community broadband: Detroit's move towards digital equity via community engagement and unique partnerships.

After all, cities like Detroit will only achieve true digital equity when historically disinvested communities have both the infrastructure necessary for affordable broadband, and enjoy the ability to use that broadband access to solve community problems and increase opportunities. Like many cities, Detroit has historically lacked a municipally coordinated strategy to get residents broadband at home and the skills and opportunities to use it for community change. As a result, over the last two decades, local communities and non-profit and university partners have incubated hyper-local strategies in low-income communities around the city. These hyper-local strategies have been transformative in bringing neighborhoods together and engaging residents across the city.

As we demonstrate in this case study, one of the local community efforts created by the Detroit Community Technology Project (DCTP) adopted the Digital Stewards training, which teaches local residents to design, install, maintain and support residents to use wireless broadband. Digital Stewards have been changing the broadband landscape in their communities, building and sustaining the digital health of Detroit's low-income neighborhoods, while ensuring its long-time residents participate in shaping their own opportunities and are able to be a part of a "revitalized" Detroit.

This case study begins by defining digital equity as positive impacts on economic, educational, civic and other opportunities for communities. It highlights some of the socio-spatial inequalities that exist in Detroit around broadband access and its causes. It examines the history of digital access and inclusion efforts in Detroit dating back to the mid-1990s to understand the broader context of efforts underway in the North End. As a result of disinvestment, and building on the tradition of organizing, Detroiters worked in some neighborhoods to increase broadband access and use ("adoption") to improve their opportunities in a 21st century economy. Turning to the DCTP's EII and the North End neighborhood as a current example of a hyper-localized initiative that is shifting the way the community engages with broadband. We close this case study with recommendations on how municipal, state and federal government can support local grassroots initiatives such as the EII to work towards digital equity.

Community-driven initiatives have an especially important role given today's political climate. Congress and the FCC have rolled back Net Neutrality and other provisions of the 2015-2016 Open Internet Rules,, community broadband can be an important strategy of countering traditional internet provision models led by market driven ISPs. Through organizing and building community power, they are not only connecting people within and across neighborhoods but also sending a bold message that communities are willing to address the failures of the market.

DEFINING DIGITAL EQUITY

The National Digital Inclusion Alliance (NDIA) has crafted a definition for digital equity that is widely used by scholars, practitioners and politicians. NDIA defines Digital Equity as "a condition in which all individuals and communities have the information technology capacity needed for full participation in our society, democracy and economy. Digital Equity is necessary for civic and cultural participation, employment, lifelong learning, and access to essential services." (NDIA n.d)

Marginalized communities having the ability to engage in technological and social innovation is a critical part of achieving the goals of digital equity. Based on the work of other scholars and practitioners, this case study builds upon the NDIA definition to include a sense of agency in gaining digital skills and undoing systemic injustices and other inequities surrounding ICTs (Byrum 2017). This case study also considers the ability of communities to participate in the creation of these technology systems and to collectively determine their applications and impact, not only as consumers, but also as creators (DDJC n.d). In defining digital equity this way, we recognize that digital inequities are a replication of socio-economic disparities that were themselves constructed from policy decisions that failed to meet the needs of traditionally marginalized residents.

Disinvestment and Structural Racial Exclusion in Detroit

For Detroiters, digital exclusion is an ongoing expression of systemic inequalities stemming from a history of discriminatory urban policies such as redlining and “urban renewal,” and urban planning projects such as highway construction that disrupted African American neighborhoods. “Redlining” refers to practices in which financial services, including banking and insurance among others, are denied based on the racial composition of neighborhoods (The Fair Housing Center of Greater Boston, n.d.^a). In the 1930s, the federal government created incentives that expanded such explicitly discriminatory practices in the private banking and housing sectors. The New Deal National Housing Act of 1934 made available federal mortgage guarantees that ensured banks would lend to homebuyers in particular areas, but downgraded the credit-worthiness of racially integrated neighborhoods and Black neighborhoods (Massey and Denton 1993). The Federal Housing Administration (FHA) used color-coded “residential security maps,” to guide real estate investments in 239 American cities (The Fair Housing Center of Greater Boston, n.d.^b). Black neighborhoods were color coded red and given the lowest grade of D, deemed as “hazardous” areas for investment (“redlined”). Over a quarter of Detroit (28%) was redlined and only 6% of neighborhoods received a green coding and grade of A (Nelson et al. n.d).³

This residential redlining contributed to White residents moving to the suburbs, where investments were flowing, and minority populations within the city limits were left with a shrinking tax base and disinvestment. Yet during the post-World War II period, “urban renewal” policies became the strategy to reverse this policy-based urban decline. Redlined areas were designated as “blighted,” bulldozed and redeveloped.

³ 51% of the remaining areas were rated as C or yellow-lined (“definitely declining”) and 14% as B (“still desirable”), according to the University of Richmond’s Mapping Inequality project (Nelson et al. n.d.).

As a result, black neighborhoods such as Black Bottom and Paradise Valley were decimated, black populations dispossessed and displaced, and economic centers of Black culture diminished (Goodspeed 2004, 27). Thousands of Black residents of the Black Bottom neighborhood were displaced and not provided any replacement housing—all in order to make way for the Chrysler highway to aid the commute of those who had left the city for the suburbs (McGraw n.d). Along with redlining, urban renewal worsened racial inequality by accelerating white flight to the suburbs and blight designations of black-owned property.

DETROIT NEIGHBORHOODS

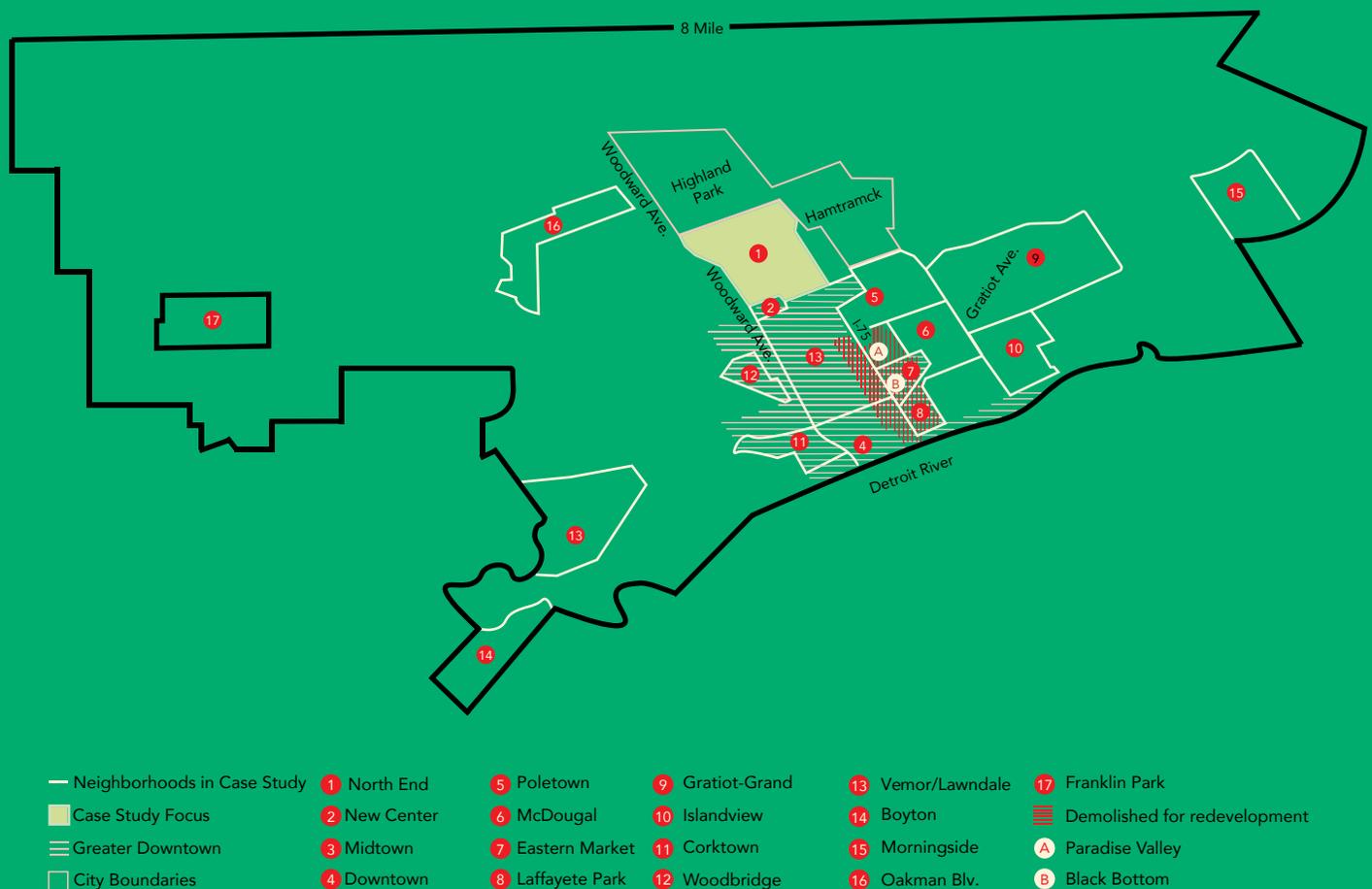


Figure 1. Detroit Neighborhoods mentioned in this case study. The New School 2018.

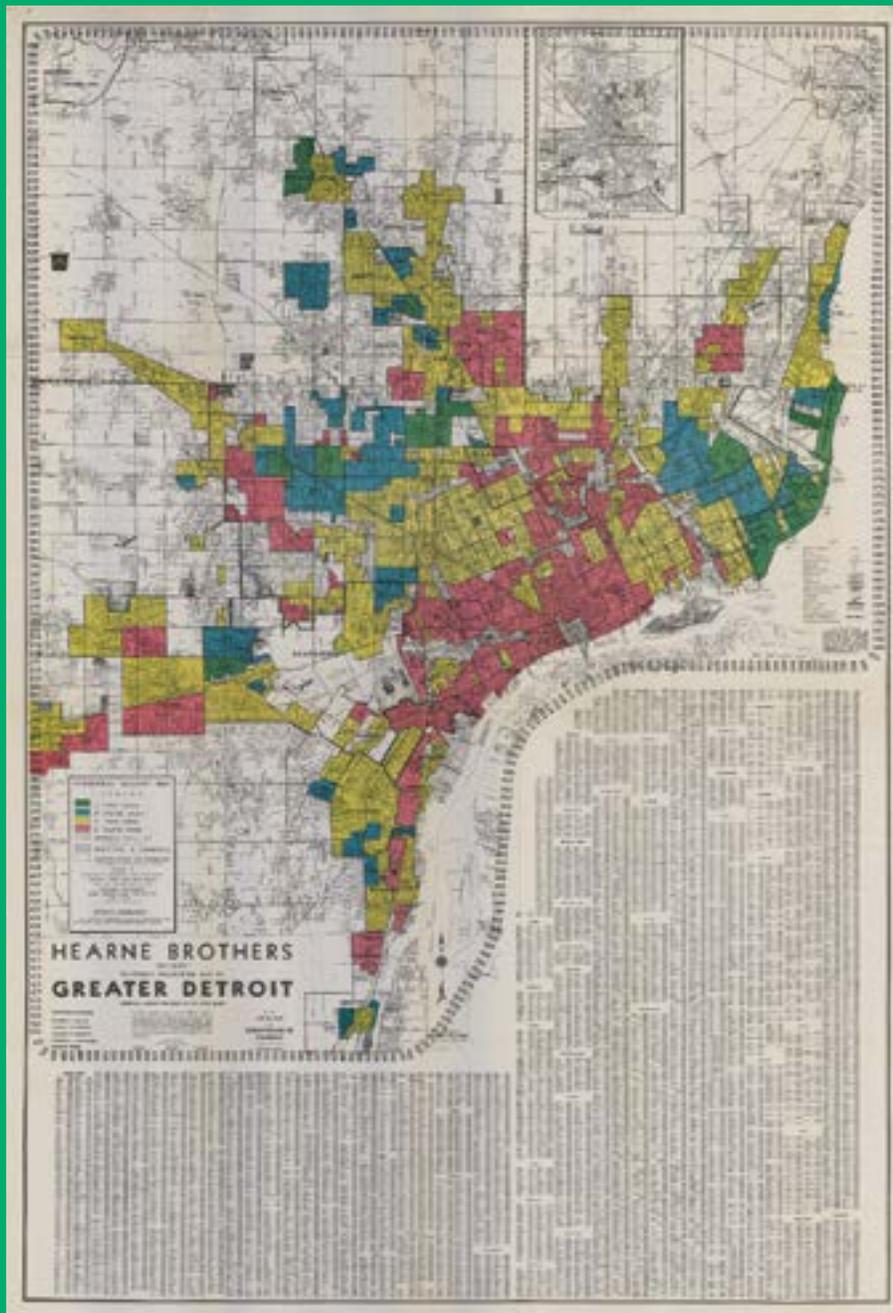


Figure 2. Redlining Map of Detroit. Source: Nelson et al. n.d.

Rev. Joan Ross, a long time community leader in the North End, tells the history of a once-booming neighborhood, home to prominent families like the Fords and Skillmans. It later became the place to live for prominent black families who moved into the Boston-Edison area, and the North End was home to many Motown legends. The same discriminatory urban policies described above affected the North End. About half of North End was designated as D/Red and half as C/Yellow. In the 1960s the neighborhood was separated from the downtown area by the construction of I-75, which also cleared the main cultural and business stretch called Hastings Street. This project destroyed Black centers of culture and commerce, divided areas that were tied to Paradise Valley, and dispossessed homeowners (MacDonald 2012). These deliberate actions and the larger processes of deindustrialization led the North End into decline.

In Detroit, cycles of de-industrialization and uneven reinvestment meant jobs and people moved to the suburbs, and contributed to the precarious financial situation in which Detroiters now find themselves. In 1960, 56 percent of the jobs in the Detroit metropolitan area were within Detroit proper. By the late 1990s, only 18 percent of the jobs were in the city. When mostly White Detroiters began the exodus from city to suburbs in the 1950s, the city was 75 percent White. Now it is 83 percent Black (Data USA n.d.). The 1970 census showed 838,877 White residents of Detroit. By 2010, only 75,758 remained.

The legacy of redlining, urban renewal, and other planning schemes in Detroit has resulted in a median household income that is about half that of the state of Michigan as a whole (\$25,980), and median housing values at less than half that of the state. The city's tax base has been decimated: nearly 40 percent of its residents live in households with income below the poverty level, and the unemployment rate is the highest amongst the 50 largest cities in the U.S (Eisenbrey 2014). This was worsened in 2013, when Detroit filed a historic bankruptcy petition with the largest debt of any municipality in US history at \$18 billion.

Patterns of disinvestment continue. According to the Michigan Municipal League, Michigan is one of four states that reduced investments in its cities between 2002 and 2012, and was the only state where local revenues declined during that time span. During the same period, Michigan experienced the worst recession among states in the country. Detroit lost \$872.6 million in state revenue as a result. Multiple times, including in 2005 and 2006, Michigan was the only state in the nation that experienced a loss in economic output or gross domestic product (Oosting 2016).

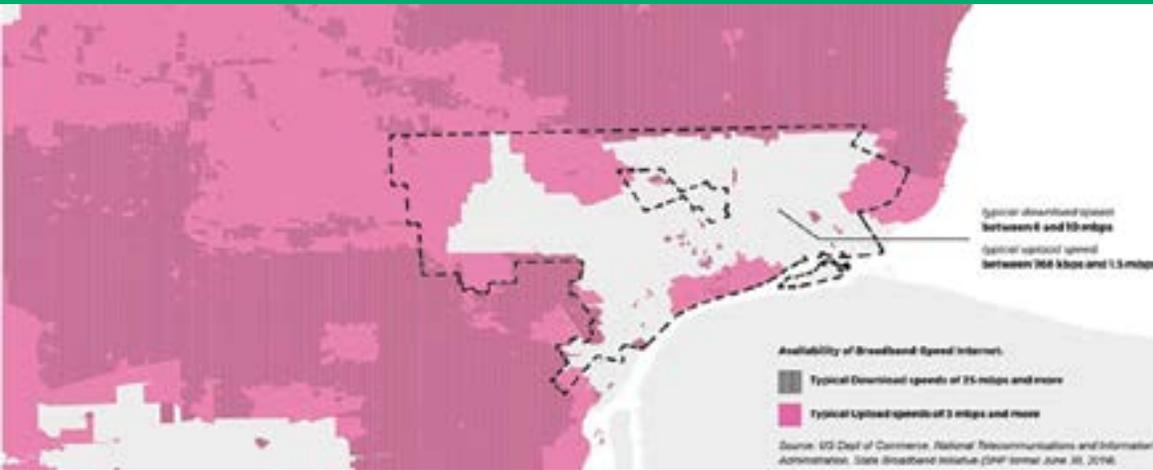
Digital Exclusion in Detroit

Low levels of broadband access and adoption in Detroit are intertwined with a history of disinvestment and deeply rooted in racialized poverty. As Reisdorf et al. (2018, 2) put it in a recent study on broadband access in Detroit, "digital divides (...) generally follow and reinforce social and economic divides, and therefore exacerbate inequalities in societies."

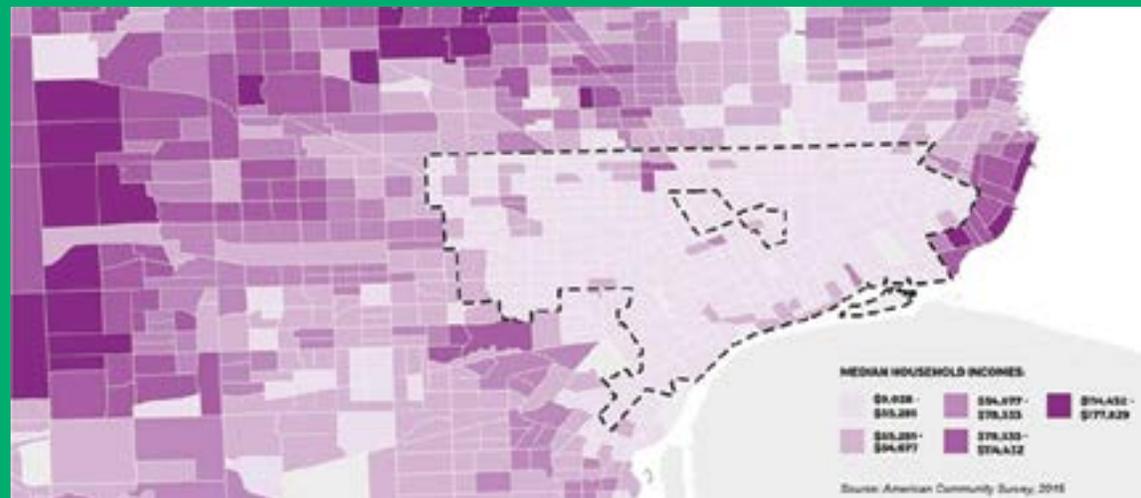
By analyzing typical Internet speeds within and outside Detroit, it becomes clear that availability of broadband Internet speeds (i.e. 25 Mbps/3 Mbps) correspond with household incomes and the racial composition of neighborhoods. As shown in Figure

3 below, availability of broadband-speed Internet is largely limited to the wealthier and whiter suburbs and urban areas outside of the city. Within the majority Black and low-income city of Detroit, typical download speeds are between 6 and 10 Mbps, and between 768 kbps (less than 1 megabit) and 1.5 mbps for uploads (US Department of Commerce/NTIA 2014). Data on typical speed levels are based on industry-reported availability of Internet, instead of actual speed tests. The data do therefore not accurately represent available speed levels, which might be even lower as reported. On the other hand, as detailed in the pages to follow, patches of Downtown and other areas served by Gigabit Internet service providers have speed levels well above the reported average.

Availability of Broadband Speed Internet



Median Household Incomes



Race-Dot Map

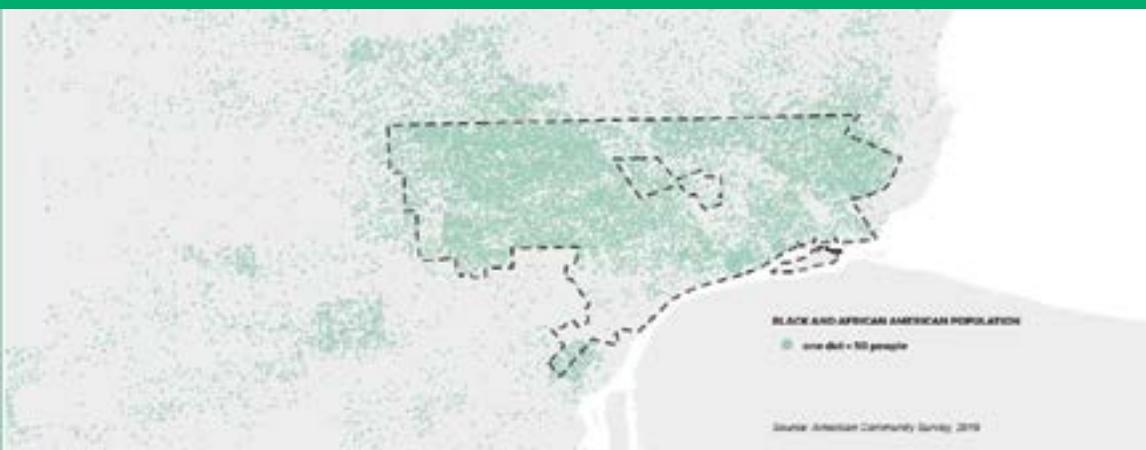


Figure 3-5. Higher typical Internet speeds correlate with higher incomes and fewer African-American residents, visualizing the uneven access to 21st century Internet in Metro Detroit.

Alongside the historical legacy of residential redlining, digital exclusion has historically been exacerbated by the profit-maximizing motives of monopolized telecommunications companies. Across the country, low-income neighborhoods of color studied have experienced systematic exclusion from 1990s investments in video dial tone technology, which facilitated the transmission of video, audio and data over telephone (digital subscriber lines or DSL) lines—as well as subsequent investment in coaxial lines, which could be used for internet carriage by cable providers. The lack of groundwork in these initial technologies made it much more expensive in later years to provide the high-speed broadband services wealthier communities take for granted (Mabud and Seitz-Brown 2017). A 2017 study by the National Digital Inclusion Alliance (NDIA) shows that AT&T, the major ISP serving Detroit besides Comcast, is following this pattern of “digital redlining” of low-income neighborhoods. It selectively offers its fast fiber-enhanced VDSL (very-high-bit-rate digital subscriber line) broadband service in higher income areas, skipping most of Detroit's census tracts with poverty rates above 35% (Callahan 2017).

Digital exclusion can be understood as a continuation of prior forms of disinvestment, with far-reaching consequences in the future. This relationship between residential redlining, the socio-economic status of neighborhoods, and more recent forms of digital redlining is visualized in Figure 4. Using FCC and ACS data, this spatial analysis shows that areas that were “red-” or “yellow-lined” in the 1930s to this day not only have significantly higher rates of poverty and unemployment and lower household incomes, but also a lower rate of residential Internet connections. In the North End, where residential redlining was especially prevalent, between 60 and 80 percent of households per of census tracts had residential Internet connections with maximum download speeds at or below 3 megabits per second (Mbps).

Relation between Disinvestment, Socio-Economic Disparities and Internet Access

Residential Fixed Internet Connections

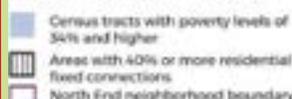
Residential Fixed Connections at least 3 Mbps downstream and at least 768 Kbps upstream per 1000 Households, 2013.



Areas with 40% or more residential fixed connections
North End neighborhood boundary

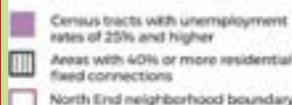
Source: FCC, 2013

High Poverty Areas



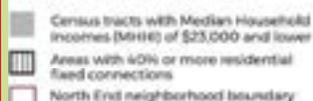
Source: American Community Survey, 2013

High Unemployment Areas



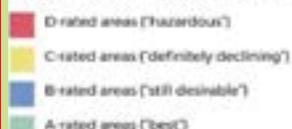
Source: US Census 2010; American Community Survey, 2013

Low-Income Areas



Source: US Census 2010; American Community Survey, 2013

HOLC "Residential Security" Maps, 1939



Source: Mapping Inequality n.d.

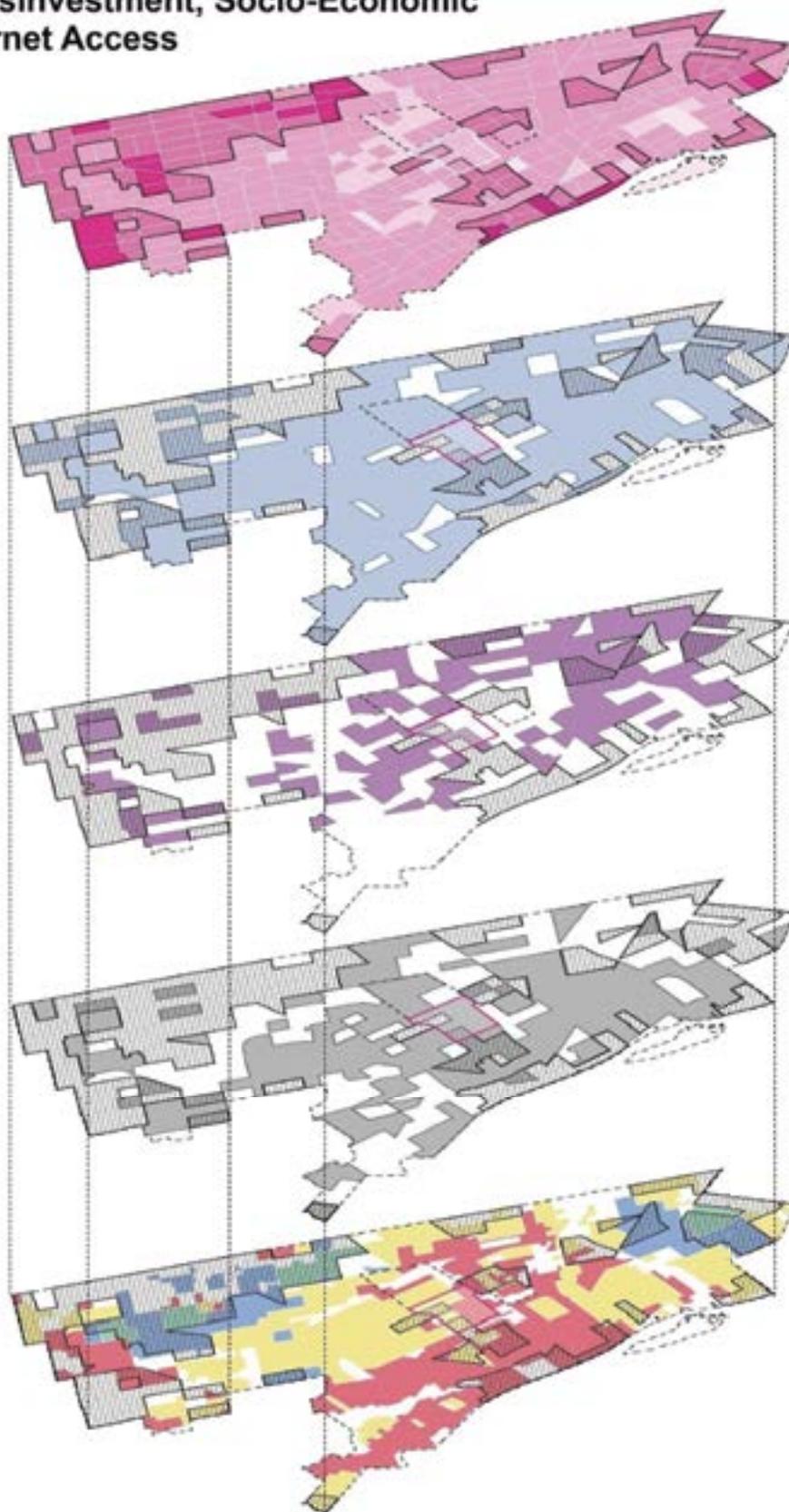


Figure 6. Digital exclusion reinforces existing socio-economic disparities, which are themselves reflections of prior forms of systemic disinvestment. Areas that were "red-" or "yellow-lined" in the 1930s to this day have significantly higher rates of poverty and unemployment, and lower incomes. Digital exclusion can be understood as a continuation of disinvestment, with far-reaching consequences in the future.

Detroit residents are among the most digitally excluded in the US. As of 2015, a staggering 40% of Detroiters lacked broadband (25 Mbps download/3 Mbps upload) at home (Kang 2016). That is a significantly higher percentage than the already embarrassing national minimum of 19% of Americans who don't have home-based broadband access (US Census Bureau 2015). This affects low-income households the most, 63% of which do not have broadband at home (Wheeler and Clyburn 2015). Detroit generally falls behind the national average in access to broadband when compared to other cities with similar populations in number and percentages of communities of color. White Detroiters' adoption rate is almost 65%. At the same time, only half of Black Detroiters and about 60% of Latino Detroiters have adopted broadband (Data Driven Detroit, cited in Rodriguez 2017, 45). As Detroiters are eager to participate in the digital world, smartphones are often used as a substitute for fixed home connections. However, only 14.3% of Detroiters have ongoing subscriptions to mobile broadband that guarantee consistent Internet connection over time. Additionally, research has shown that mobile broadband falls short of supplying the needs of true digital participation since a lot of crucial tasks cannot be performed on phones (Pew Research Center November 2015, 2). For a third of those with mobile broadband, it is their only way to access the Internet (Pew Research Center June 2019, 2).

Within metro Detroit, areas that have better adoption rates are usually wealthier areas in White communities with unemployment and poverty rates well below the city average, due in part to the involvement of private firms. The private sector has had significant power to determine where and how urban development takes place in the city. Dan Gilbert, businessman and founder of Quicken Loans, through his corporate entity Rock Ventures, has heavily influenced the redevelopment policy adopted by the City. Rock Ventures now owns and has redeveloped significant sections of Downtown Detroit. Redevelopment in Greater Downtown Detroit (encompassing Downtown, Midtown, Corktown, and Eastern Market) has increased broadband connectivity along with significantly higher speeds. This redevelopment disproportionately benefits white and affluent communities, pricing out the long-term and majority Black population of Detroit.

Along with redevelopment, Gilbert launched a local telecommunications company called Rocket Fiber in 2014. Building on the massive power of Rock Ventures, Rocket Fiber has shaped residential and commercial broadband adoption and its impact in other city planning systems. The company has laid fiber-optic cable throughout Downtown, Corktown, most of Midtown, and Woodbridge to offer

Current waves of private investment and urban planning practices are raising questions about their impact on inequities, as described in Detroit Future City's recent report "139 Square Miles," (2017). The report provides details on new job growth and its concentration in Downtown and Midtown. Housing values are increasing, but far too many Detroiters are paying more than they can afford, with rent-stabilization measures due to expire. The vast majority of low-income neighborhoods are not necessarily feeling the benefits of revitalization efforts currently, and the burgeoning technology boom in the greater Downtown area is not necessarily increasing job opportunities for poor Detroiters.

Digital Exclusion in the North End



The North End, a neighborhood just north of Midtown, is no different. Residents have considerably higher poverty levels, unemployment rates, and lower incomes⁴ as compared to the city-wide averages. While the adjacent Midtown and Downtown neighborhoods are experiencing major urban reinvestments, the North End faces the risk of gentrification that displaces residents everyday. Since 2010, the North End's population has declined (US Census Bureau 2015). Long-term residents are leaving, and new, more affluent residents are coming in. North Enders continue to face food insecurity, crime, as well as a lack of Internet connectivity.

The North End's socio-economic condition corresponds with comparatively low rates of Internet adoption, which further dampen economic development opportunities and residents' ability to revive the local economy, and to access jobs and crucial government services. According to 2013 data from the FCC, only between 20% and 40% of households within the census tracts encompassing North End had residential connections of 3 Mbps download speeds or higher and 768 Kbps upload speeds or higher (see form 477, FCC 2013).

Analyzing the North End on a neighborhood scale, as shown in the map below (Figure 5), it becomes clear that wealthier areas present higher adoption rates. In the Boston-Edison neighborhood, where 12% of the population is unemployed, 16% live below the federal poverty level, and the median household income (MHHI) is \$65,489 (US Census Bureau 2015), between 40% and 60% of households have fixed residential connections at the above speed levels (FCC 2013). In comparison, the North End



⁴ While the average Median Household Income (MHHI) for all census tracts encompassing North End in 2015 amounted to \$24,311, one census tract, Boston Edison, has an above-average MHHI of \$65,489, skewing its true income picture. The MHHI in North End census tracts excluding Boston Edison is \$16,076.

neighborhood, where about 34% of residents are unemployed, 47% live below the Federal Poverty Level, and the MHHI amounts to only \$17,168 (American Community Survey 2015), only between 20% and 40% of households have fixed residential connections at these same speed levels (FCC 2013).



Figure 7. On a neighborhood scale in the North End, socio-economic disparities correspond to broadband adoption rates. Areas with higher incomes like Boston-Edison have lower poverty and unemployment rates and higher density of fixed at-home Internet connections.

There are many reasons for lack of home broadband in the North End and other low-income neighborhoods in Detroit. Beyond common patterns of telecommunication redlining and exclusionary market practices (Callahan 2017), many Detroiters cannot afford the high costs of home computers, software and Internet subscriptions (Reisdorf et al. 2018). For those who can afford Internet subscriptions, often the only available services are slow, unreliable plans (Mondry 2017). Others have to rely on their smartphones with limited data plans (Reisdorf et al. 2018, 10), or seek out computer centers in libraries,

limited data plans (Reisdorf et al. 2018, 10), or seek out computer centers in libraries, community centers, or social service organizations (Goss 2017).

This is not to say, however, that Detroiters don't want broadband access or aren't aware of its benefits. It is a myth that low adoption rates in low-income communities are the result of lacking awareness and demand. A recent study shows that Detroit residents want to be connected and know the importance of being online (Reisdorf et al. 2018, 2). This case study and the sustained efforts by Detroit residents fighting for digital equity are another case in point.

Detroit's history is long and complicated, but the effects show up in both the struggles of municipal government to meet the needs of its residents and the energy and effort residents have invested in doing for themselves what government has failed to do. As a result, numerous coalitions have identified and taken advantage of government and foundation funding opportunities to overcome municipal disinvestment.

The North End's Fight for Digital Equity - A Case Study of Meaningful Broadband Adoption

Detroit may have the dubious distinction of being one of the least connected cities in the US, but it is rich in grassroots and non-profit digital inclusion efforts. In the absence of governance support or investment by the private sector, grassroots groups, nonprofits, and community-based organizations have developed programs to improve digital literacy and broadband access at home. This is an outgrowth of Detroit's history of social justice organizing. From the abolition of slavery through twentieth-century Civil Rights struggles, Detroiters have a long history of activism—including the work of Grace Lee and James Boggs, who played important roles at a national and local levels in the Civil Rights movement.

In the North End, this is reflected in the resiliency that residents demonstrate with creative and small-scale solutions to counter urban challenges. Residents, block groups, and churches are creating a solar street light system to make up for the City's failure to adequately light its streets (Ross 2017), starting Detroit's first black-owned food co-op along with food pantries and urban farms to overcome food insecurity (Ross 2017), and running neighborhood patrols so residents can safely live and move through their neighborhoods (Judkins 2017; Mixon 2017^b).

This ecosystem of grassroots organizing and community-building offers a strong base for more recent efforts to bridge the digital divide. Funding from the federal National Telecommunications and Information Administration (NTIA) of the U.S. Department of Commerce and philanthropic foundations, as well as institutional support from local universities, have played a crucial role in kicking off and guiding this work. Starting in the mid-1990s and amplified in 2009—when NTIA’s Broadband Technology Opportunities Program made available federal money for broadband adoption around the country—various groups have developed different frameworks to bridge the digital divide. Local digital equity efforts range from community organizing to programs to improve residential Internet adoption, trainings on building and maintaining wireless corridors, digital literacy and equipment access programs, as well as data transparency campaigns, advocacy for digital privacy, and organizing around how to use technology to advance community goals. Supporting ongoing advocacy work, active community members, grassroots organizations, and community service nonprofits, along with local universities, have linked these digital efforts with greater socio-economic issues such as food insecurity, unemployment and poverty, and access to social services.

This foundation of relationship building, collaborative experimentation, reflection, and learning has led to a unique approach to digital equity in Detroit, developed over the course of more than two decades. This approach starts with an understanding of digital equity as interrelated with other forms of social justice. Broadband, therefore, does not reflect an end in itself but a means for communities to achieve full and just participation in all aspects of society. Digital equity can be achieved by combining three equally important pieces of the puzzle: a) access to infrastructure with deep community-driven engagement, b) digital education beyond basic literacy, and c) meaningful broadband applications to community needs. Reflecting on the takeaways from Detroit, Byrum and Gangadharan in 2012 defined meaningful broadband adoption as existing ecologies of social support, or “a range of broadband-related activities and experiences that target populations and their supporters construct, and often define, for themselves” (Byrum and Gangadharan 2012, 2602). The progression of digital inclusion work in Detroit is now leading to a next level of engagement and innovation at the community level. The DDJC, which coalesced in 2009, and the EII, established in 2016 by DCTP director Diana Nucera, provide the most recent and holistic demonstrations of this approach.

While many low-income Black neighborhoods have a history of digital inclusion

work, this case study focuses on the North End for two reasons: First, the North End, which is majority lower-income and predominantly Black, exemplifies patterns of digital exclusion in Detroit. Second, the North End is at the forefront of a ground-up digital revolution (Mixon 2017a) and exemplifies the efforts of residents and grassroots groups fighting for digital equity.

Digital inclusion is not a new issue in the North End. Prior to EII, the neighborhood has been home to three other major digital inclusion initiatives led by different coalitions since the mid-1990s: the EZLink Collaborative, the Detroit Connected Community Initiative (DCCI), the Detroit Connect Your Community project (DCYC). Although these initiatives were not directly connected to the development and ongoing work of EII, this case study narrates the history of the ecosystem of Digital Equity work that took place in North End to place EII in a historical and spatial context. We synthesize both the challenges faced and lessons learned from these initiatives and aid in identifying recommendations to support current initiatives such as the EII.

Early Efforts of Broadband Adoption in the North End: The 1990's

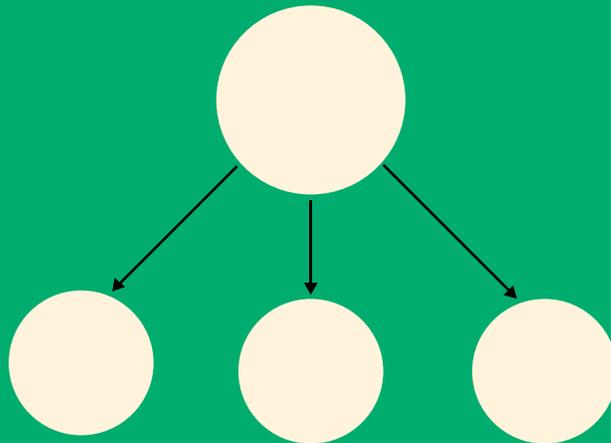
Digital equity initiatives in the North End started emerging in the mid-1990s, when the University of Michigan started and funded action-based research projects aimed at bridging the digital divide. The EZLink Collaborative partnered with established community organizations and faith-based organizations to create ten 'Community Technology Centers' (CTCs) throughout Detroit to provide computer training and Internet access in their neighborhoods.⁵ In North End, EZLink worked with Family Place, a child care institution embedded in the community (Gant 2017).

Building on the existing social fabric of established anchor institutions, EZLink's digital literacy and Internet access programs provided precedents for meaningful broadband adoption by "integrat(ing) the benefits of broadband adoption to individuals' and groups' daily routines" (Byrum and Gangadharan 2012, 3). Family Place showed that even though it was a successful CTC filling a gap on computer and Internet access in the neighborhood, residents needed fast Internet at home in order to compete in a digital world. As a response, EZLink piloted a program experimenting with mesh networks to provide urban Wi-Fi to the neighborhood surrounding CTCs (Akmon et al. 2009, 13). Its mesh network served 200 residents and consisted of WiFi receivers that were installed on houses to pick up a core signal from a central broadcast antenna on the rooftop of Family Place.

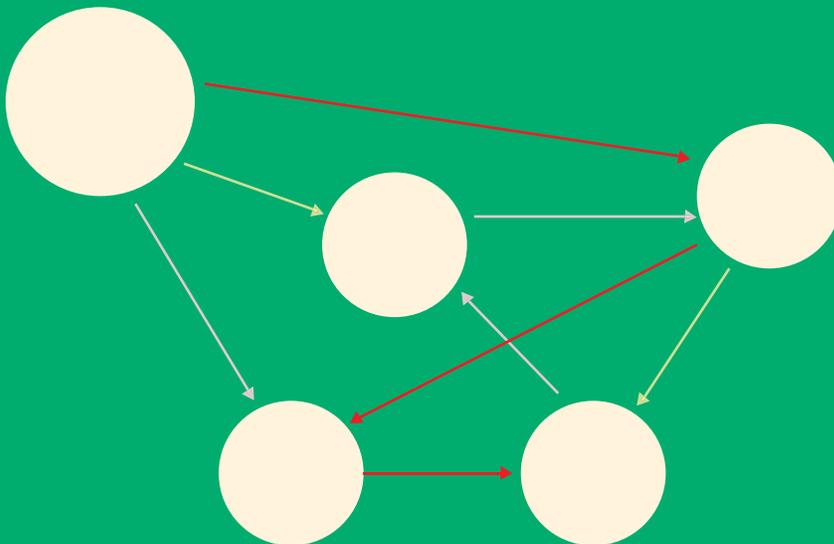
⁵The 10 CTC's established throughout Detroit served about 300 to 400 residents. These centers were located in community institutions including faith-based organizations, community centers like Youthville in New Center, non-profits like Don Bosco - St. Suzanne in Franklin Park, and child care services like Family Place in the North End.

What is a mesh network?

The Community Technology Project (2012) explains that "networks are groups of connected devices that move information or messages from one place to another". Hierarchical networks, which are the common way ISP's provide service to homes, send information from one central point to several others. If that central point disappears, the whole network stops functioning.



Mesh networks on the other hand have a particular configuration that allows nodes to transfer connections to and from each other. "You build a mesh network by installing ... mesh software ... on wireless-enabled devices, and then connecting them to other nearby meshing devices" (Community Technology 2012).



Aiming to scale this model within Detroit and reach out to other communities who could learn from and replicate this process, EZLink created “DetroitCONNECTED,” a manual that shared what EZLink did and what it learned so that others could replicate it. It provided policy recommendations and informed other communities on action-based strategies to achieve digital inclusion (Myers and Gant 2004).

EZlink understood the role of community anchor institutions and faith-based groups as important partners on which to base digital inclusion. Their work showed the importance of partnerships between community institutions and the university. Without the active role of Family Place, the initiative would not have been able to integrate community needs in the programming around youth education in such a nuanced and relevant way to the local community. EZLink touched on some of the key components needed to solve digital inequity but also found challenges that did not allow the initiative to continue. As with other initiatives, the reliance on outside funding streams did not make this initiative economically sustainable. This was also an issue of scale as collaborators had limited connections to philanthropic organizations to fund the project and allow it to scale to a larger segment of the population (Gant 2017). Furthermore, the capacities and responsibilities of maintaining the technology were assigned to a few community members and non-profit staff with no plan to replicate knowledge among other members in the community.

Broadband Adoption Efforts in the North End: 2000-2013

Family Place kept running its CTC after the EZLink initiative ended through participation in the Detroit Connected Community Initiative (DCCI). Partnering with the Knight Center of Digital Excellence (KCoDE) and two other nonprofit service providers—Focus: HOPE and Matrix Human Services—, Family Place was able to continue their digital literacy programs and improve the community wireless corridor. The DCCI included a community outreach process to identify strategies that would expand the network’s capacity and digital tools available to Detroit organizations. Targeting low-income populations, DCCI sought to bridge the digital divide by offering Internet access, devices and digital literacy programs (Callahan 2017). The literacy programs connected to the existing areas of expertise of partner organizations (Warner 2012, 10).

During the same period of time, the Community Telecommunications Network

(CTN), a partnership of educational institutions including Wayne State University, various NGOs and a local public access television station using Educational Broadband Spectrum (EBS), collaborated with DCCI to offer Internet access points at Wayne State University, Focus: HOPE, and Matrix Human Services. CTN leased out spectrum to a private ISP, Clearwire (later purchased by Sprint). In exchange Clearwire provided the spectrum for internet service and WiMAX infrastructure in these locations and to adjoining households. The three organizations shared WiFi through three WiMAX towers⁶ and WiFi mesh networks to approximately 600 households.⁷ In the North End, the Wayne State WiMAX tower reached the south quadrants of the neighborhood.

This initiative set the ground and created the relationships that were leveraged for a follow-up project. In 2009, Focus: HOPE, Matrix Human Services and Family Place partnered with OneCommunity, a Cleveland based non-profit fiber-broadband developer, to apply for the federal stimulus (ARRA) grant dollars for broadband adoption designated as the Broadband Technology Opportunities Program (BTOP). With these funds, the Connect Your Community (CYC) project created digital literacy programming and provided access to refurbished, affordable devices to bridge the digital divide in seven US cities across several states. The Detroit Connect Your Community (DCYC) program reached over 6,000 residents and helped bringing approximately 3,000 new Detroiters online (Connect Your Community 2012, 4).

The DCCI and the DCYC experiences contributed to the evolution of meaningful broadband adoption on the following fronts. Like EZLink, DCCI and DCYC embedded their digital initiatives within community-based anchor institutions to strengthen and support ongoing social services. The digital literacy focus of these programs and the role of their partners was especially relevant in demonstrating how integral the Internet had become to daily tasks such as paying utilities, accessing information, media, and government services, and seeking job opportunities (Warner 2012, 10). These experiences set a ground for experimenting with building last-mile infrastructure in low-income neighborhoods as an alternative to market-based internet provision. The WiMAX towers and the mesh networks provided innovative strategies to access educational backhaul and aggregating demand within underserved communities to negotiate with private ISPs. As a result, their approach integrated residential access and equipment, affordable access to infrastructure, and digital literacy programs in a meaningful way.

⁶ WiMAX, which stands for Worldwide Interoperability for Microwave Access, can replace fiber, cable and even cellular networks to provide broadband access to homes at a lower cost than digging up roads to lay fiber or cable (Warner 2012, 4).

⁷ The WiMAX technology project was a partnership of educational institutions including Wayne State University and public television using Educational Broadband Spectrum (EBS). This coalition was created as a joint enterprise to negotiate the acquisition of spectrum from ClearWire.

These two initiatives were not without limitations. Sustainability of programs has been a central stumbling block to maintaining and expanding successful digital inclusion initiatives. When the federal BTOP funds ran out in 2013, Family Place and other Detroit organizations were unable to maintain the infrastructure and continue the programs. The private ISP that provided spectrum for the WiMAX towers was sold to another company that no longer supported this technology, nor the agreement with CTN. Within the North End, the mesh network service ended as well. Family Place didn't have the resources or expertise to continue the wireless services (Gant 2017). Without the federal and philanthropic grant money, there was no funding to pay the staff, and residents were not trained to steward the project themselves. Family Place ultimately went bankrupt (Callahan 2017). As a result, North End lost its—by this time—almost 10-year running CTC, its digital literacy programs, the free Internet access in the piloted mesh networks, and the expertise of the staff. Furthermore, the model did not account for the limited capacities of often under-resourced community-based organizations that were already struggling to fulfill their primary mission around poverty (Gant 2017). In hindsight, EZLink, DCCI and DCYC's biggest shortcoming was that it did not enable residents to use technology in a self-guided way to solve community issues and create a ripple effect of sustainable innovation. This meant that when funding for digital equity projects subsided, the neighborhoods were left without the capacities to continue this work.

These limitations lead us to EII as an initiative that, through its own iterative process, attempts to start addressing the key question of sustainability of meaningful broadband adoption. Without being directly related to EZLink, DCCI, and DCYC, the EII presents crucial innovations to challenges faced by these earlier digital equity initiatives. Most notably, it seeds capacities for technological innovation within communities and pilots solutions for more sustainable forms of meaningful broadband provision and adoption. This makes it a model worth supporting and evaluating to learn how grassroots groups can effectively overcome digital exclusion.

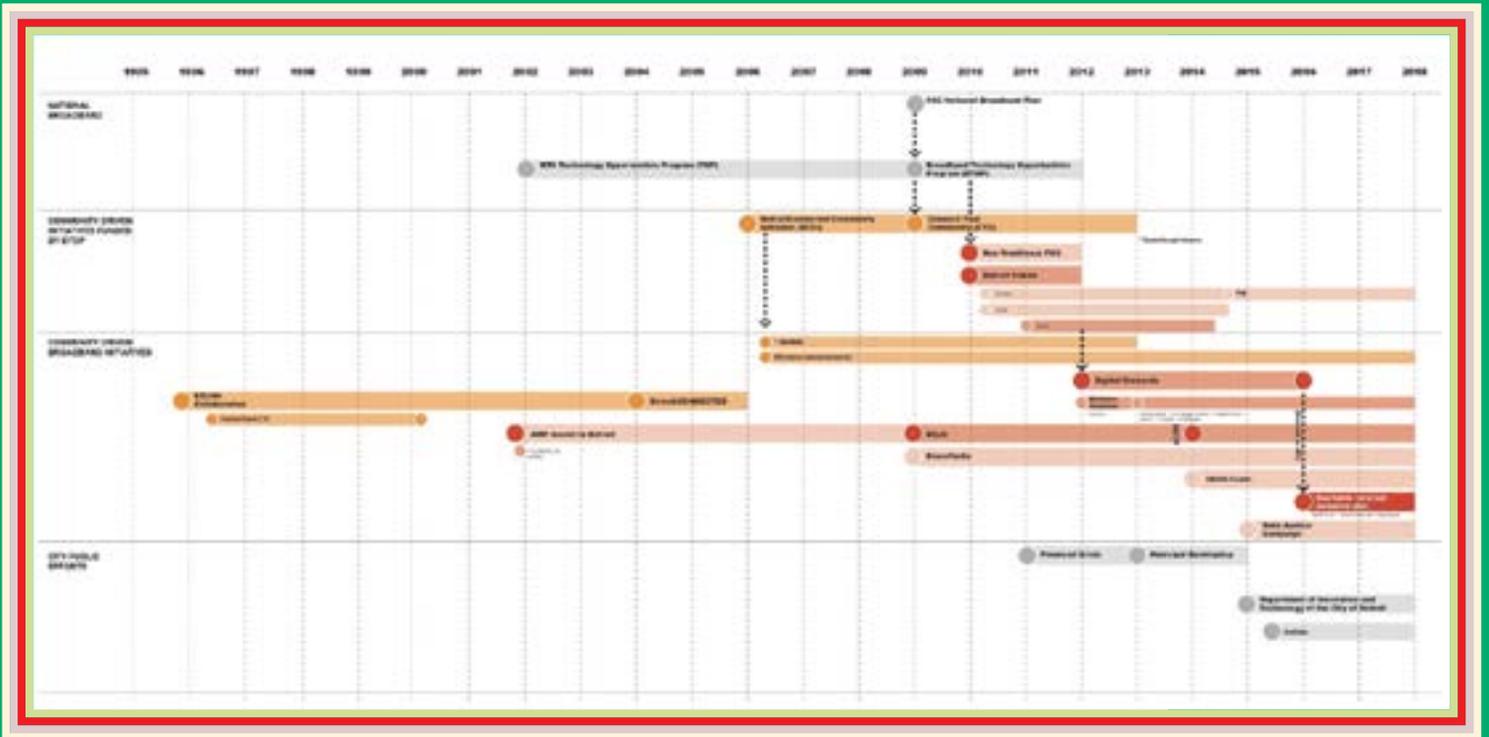


Figure 8. Timeline of initiatives relevant to this case study

The Equitable Internet Initiative in the North End

Committing to Digital Justice for the Long Haul

To understand the development of the EII, it is important to trace the development of the Digital Stewards program. In 2009 at the Allied Media Conference (AMC) in Detroit, a group of diverse grassroots groups, media organizers, and technologists strategized an approach to apply for BTOP funds that were being made available by the federal government at that time. With support from the Open Technology Institute (OTI) at New America, the AMC session focused on how to bring that money to more grassroots community-based organizations, as opposed to larger tech firms, where most funds were going (Lee 2017). Representative John Conyers from Michigan dropped by the meeting and promised to give his support to any BTOP applicant that emerged from the session.

This inspired a group of Detroiters to get together after the AMC session and talk about a “digital justice coalition.” With facilitation from the Allied Media Projects, participating organizations agreed to create a coalition that would transcend the immediate opportunity for funding to guide the members’ work. This commitment meant that digital equity would be incorporated into the ongoing work of neighborhood-based organizations, instead of being a separate body of work entirely dependent on outside funding.

The Detroit Digital Justice Coalition (DDJC) was created by thirteen member organizations,⁸ and partnered with the University of Michigan via the Allied Media Projects to apply to two BTOP grants for Sustainable Broadband Adoption (SBA) and Public Computer Centers (PCC). Many of the organizations coming together had a longer tradition of organizing together as part of other movements and struggles, including welfare rights and environmental justice advocacy (Lee 2017; Nucera 2017). This made for a distinct ecology of social support that viewed digital equity through a justice and human rights lens. This meant recognizing that there was historic and systemic injustices that were keeping people in marginalized communities from being able to access the technological world. It grounded this digital equity initiative in historic grassroots struggles and supported an intersectional approach that used technology as a means to address other issues faced by communities.

Borrowing from the environmental justice movement, the DDJC created a set of collaborative guiding principles for its work, enabling members to carry out digital justice work in different capacities, but grounded on shared understandings and values. A key theory of change for the coalition is self-determination—the idea that change can only happen when marginalized communities speak for themselves. The coalition developed its principles through interviews with members and based on the ways members were using technology and media for grassroots organizing (Allied Media Projects n.d.). The result was fourteen principles grouped into four categories: Access, Participation, Community Ownership, and Healthy Communities. These principles expanded from “broadband adoption” to encompass the equitable outcomes communities wanted—education, media and technology resources as well as entrepreneurial and job skills that could fuel localized economic development. DDJC coined the term “healthy digital ecologies” to describe a context “in which people not only had access to the Internet, but had the skills to use the Internet and other communication tools to transform their lives and their communities.” (ibid.)

From Media Making and Digital Literacy to Building Infrastructure

In 2010 DDJC was awarded two BTOP grants. The SBA funded program, called Detroit Future, focused on digital literacy and was comprised of three interconnected subprograms: Detroit Future Media, Detroit Future Youth, and Detroit Future Schools (Nucera 2018). These were run by DDJC member organizations Allied Media Projects

⁸ The coalition includes the following groups and organizations (founding members are indicated with the * symbol): Allied Media Projects*, Michigan Welfare Rights Organization*, Detroit Sierra Club*, The Work Department*, Kemeny Recreation Center*, 48217 Community Environmental Health*, Detroit Black Data Processing Associates*, Mt. Elliott Makerspace*, 5E Gallery*, The Ruth Ellis Center*, The Luella Hannan Memorial Foundation*, Bridging Communities*, The Detroit Community Technology Project, James and Grace Lee Boggs Center to Nurture Community Leadership, and the Foundation of Women in Hip Hop*.

(AMP) and the Eastern Michigan Environmental Action Coalition (EMEAC). Detroit Future's main goal was to promote broadband adoption with a more expansive view, conceiving of adopters not only as consumers of digital media but as the creators of it.

Detroit Future Media was a digital media production training program for organizers and activists, based on education, entrepreneurship and digital stewardship (Nucera 2017). Graduates from Detroit Future Media were paired with K-12 teachers as part of Detroit Future Schools to design and implement digital media arts-integrated curricula in Detroit schools. Detroit Future Youth, finally, created a network of youth organizations to advance best practices in youth leadership through digital media arts.

The second grant, in the PCC category, was used to create computer centers in 10 non-traditional anchor institutions, including an LGBTQ drop-in center, senior center, and environmental justice group. The idea was to ground digital literacy in the existing social networks among residents, and leverage this social infrastructure for broadband adoption. The DDJC simultaneously started hosting DiscoTechs (short for Discovering Technology), a sort of neighborhood science fair, aiming to demystify technology through interactive workshops where the community can engage hands-on with tools and equipment to build skills and better understand issues around broadband adoption, community technology, responsible use of data, and privacy and security concerns.

While these programs and the curricula successfully increased the capacities of communities to use media to identify problems and solutions and tell their own stories, there was still a missing piece to the puzzle. "We realized, well we want people to be producers and not consumers, but that's hard to do if you don't have a good broadband infrastructure" explains Diana Nucera, who created the Detroit Future Media program (ibid.). This prompted a partnership with New America's OTI, which had been experimenting with Commotion Software for wireless mesh networks and needed an adoption plan to test the software. Working with OTI, Nucera developed the "Digital Stewardship" curriculum that was tested and piloted as part of Detroit Future Media—first with a 10-week course in the fall of 2011 and then with a 22-week "Digital Stewards" program in the spring of 2012 that trained residents to design, install, and maintain wireless networks committed to DDJC's Digital Justice Principles. The idea behind the program was that local ownership, know-how and

control of last-mile networks would support long-term broadband access in Detroit where the private market had failed.

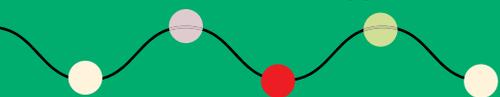
This work culminated in the creation of the Cass Corridor Wireless Testbed in the Midtown neighborhood, which is still running today. Through this process, the DDJC and Detroit Future Media, in collaboration with the OTI, developed a holistic and integrated model that recognizes a) digital literacy, b) community-owned infrastructure, and c) meaningful broadband adoption as equally important pieces to ensure digital equity. It also inspired other communities around the world and the country to follow their precedent.⁹

As the BTOP funds ran out in 2012, EMEAC, AMP, and the DDJC programs were restructured. Recognizing the importance of continuing digital equity work despite diminishing outside funding, Nucera started the DCTP in 2014 as a sponsored project of AMP with the goal to continue to build from previous Digital Stewardship programs. Since 2012, AMP has reorganized itself as an intermediary that facilitates long-term relationship and capacity building through a decentralized model. Along with continuing to organize the yearly AMC in Detroit, it now provides organizational backend support (including strategic planning, finances and fundraising, evaluation and communication) to over 70 sponsored projects (Lee 2017).¹⁰ AMP plays an important intermediary role in Detroit. Its restructuring as a project based organization has allowed it to seed capacities from the work DDJC created during BTOP into communities and ensured that programs like the Digital Stewards were able to continue (Byrum 2017).

Digital Stewards - Teaching Community Technology



Starting in 2011, Detroit Future Media and then its successor DCTP have used a popular education pedagogy¹¹ to build digital resources, teaching Digital Stewards both technology and community organizing skills. The goal was to teach residents



⁹ Building Community Technology projects stemming from the DCTP and OTI partnership were used to fund 11 seed projects in Argentina, Myanmar, Democratic Republic of Congo, Belarus, Nigeria, Namibia, India, Nicaragua, Brazil, Timor-Leste and modeled four more Digital Stewards Programs in Brooklyn, NY, India and Syria. Currently, Resilient Networks NYC, an initiative led by New America's Resilient Communities Initiative, has trained residents of five Sandy-impacted communities in Digital Stewardship to create community wireless networks as emergency response technologic resources (Allied Media Projects 2016).

¹⁰ While the BTOP federal funding was running, AMP built new capacities and shifted their mission to work on digital equity. However, when this funding stream ended, AMP adopted a smart strategy to compress itself and adopt a decentralized model in which the projects funded by BTOP became 'sponsored projects'. It is now providing organizational backend support (including strategic planning, finances and fundraising, evaluation and communication) to over 70 sponsored projects (Lee 2017).

¹¹ Popular education refers to a pedagogical framework that includes a paradigm shift in the concept of education. This concept was deeply explored by Grace Lee Boggs and other Detroit activists who adapted approaches by the Civil Rights Movement, above all the Freedom Schools and J. Dewey and P. Freire's ideas on education. For more information refer to: A Paradigm Shift on the Concept of Education. Republished with permission of University of California Press - Books, from The Next American Revolution: Sustainable Activism for the Twenty-First Century, Grace Lee Boggs and Scott Kurashige, 2011; permission conveyed through Copyright Clearance Center, Inc (Published in Detroit Community Technology Project 2016, 25).

how to design and build community wireless corridors¹² and at the same time organize the community to maintain and also use the infrastructure. Between 2012 and 2015, AMP and DCTP ran four 20-week sessions of the Digital Stewards program, training a total of 85 residents. Andy Gunn, OTI technologist working with DCTP at the time, explains that “... digital stewardship was not about building a wireless network, it was about building technical capacity in the neighborhood. So people have some level of self-determination on how their community was able to tell their story.” Along these experiences, DCTP recognized the importance of having spaces of experimentation that allow technology to be community-driven and the importance of finding allied CBO’s who lend their infrastructure to do it.

These mesh networks were designed as pilots to demystify technology and increase the agency of residents over it. Popular education materials played a crucial role in making technology more accessible.¹³ Topics covered in the training sessions range from how Internet infrastructure works, to community outreach, collaborative network-design, neighborhood mapping, site surveying and mesh wireless software configuration (Allied Media Projects 2012). Through the program, residents learn to deploy community infrastructure and maintain it, and then begin to teach the skills to other community members.

Diana Nucera explains that the approach is about “demystifying tech in a way that can change the face of who a technologist is” (Nucera 2017). This way, Black and Latinx Detroiters are able to create their own infrastructure and have agency and confidence when it comes to technology. “Relevance” of Internet use in people’s lives is often cited in research as a consideration increasing broadband adoption (Rhinesmith 2016). A recent study on Internet usage in Detroit provides evidence of the success of this approach. Reisdorf et al. (2018, 4) find that having access to digital support amongst peers increases people’s perception of the Internet as important and efficient, reduces the perceived cost of the Internet, and increases the overall likelihood of having a subscription. The Digital Stewards program addresses “relevance” by rooting technology in the DDJC principle of self-determination. For example, Co.Open, a media-making cooperative founded by leaders and alumni of the Detroit Future Media program, provides design services, training, and professional development for freelancers and media makers in Detroit with a focus on social justice

¹² These wireless testbeds used Commotion technology. Using WiFi equipment from ubiquity—a company specializing on wireless Internet provision in rural areas—the stewards installed access points in allied organizations and other dishes or antennas pointing back to these equipments to offer WiFi. The technology was fairly affordable with approximately \$100 per access point, allowing the program to install numerous equipments along different rooftops.

¹³ See, for example, the DCTPs Teaching Community Technology Handbook from 2017 or the series of zines published by DDJC in 2009, 2010, and 2011.

(AMP n.d.). Similarly, TransTech is an incubator for LGBTQ+ Talent who focus on providing members with graphic design, web development, social media management, multimedia production, and other services to expand their skills to participate in today's economy (Ibid.).

The DCTP's novel approach to fighting the digital divide was not to incorporate a large scale project. Instead, it managed to transfer the skills and know-how of designing, building, and maintaining networks to those most impacted by digital exclusion—low-income Detroiters in disinvested neighborhoods. Unlike with prior digital equity efforts, when funding for a project runs out there is still digital knowledge and skills that remains in a neighborhood. Though questions of financial sustainability remained, this constituted a major improvement in terms of sustaining broadband adoption as compared to earlier digital equity work in Detroit.

The effectiveness of these networks, therefore, should not solely be measured by the number of connections it helps provide, but rather by the number of stewards and the qualitative relationships that provide avenues for meaningful broadband adoption. The impact of the training extends beyond adoption. The value of the Digital Stewardship program includes teaching communities how to respond to pressing social challenges through technology. In the case of the mesh networks, Digital Stewards have created new neighborhood assets such as an online community forum and an emergency communication network that runs on the local mesh intranet (Rogers 2017). These new social platforms increase neighborhood communication without dependency on private ISPs or on the community's capacity to pay a monthly Internet subscription. Instead, local services are hosted on an independent and secure community server.

While the Digital Stewards approach provided important innovations, it also faced serious challenges. On the community end, the wireless mesh networks were struggling with maintenance. Since maintenance relied exclusively on volunteers, community members in low-income neighborhoods could not handle the time commitment to keep it running. The other major challenge was the effectiveness of mesh networks as small-scale solutions to the access problem. The Commotion software, the mesh technology used for these networks, could not provide stable broadband connections to each connected household and was therefore not easily scalable. The challenge here was quality of connections as well as the ability to scale to get much larger numbers of people online. Furthermore, mesh network

hardware, which still had to be replaced periodically to maintain the network, was affordable, but still out of reach for low-income communities who are struggling to meet basic services and finding funding for it was a challenge (Gunn 2017). The mesh network model created a good training ground but if the DCTP was to expand its reach to solve the infrastructure problem there was a need to move to use a more traditional internet provision model.

AMP and DCTP, with community partners Grace in Action, Church of the Messiah, and North End Woodward Community Coalition, developed EII in 2016 as a way to expand learnings from the work DDJC carried out and to address the challenges that had emerged through the Digital Stewards program. One the main ones being that long-term sustainability and expansion of the infrastructure required a more traditional internet provision model that held onto the community empowerment principles. EII's goals included a more sustainable model of internet provision at the local level, including reliable 21st century technology with gigabit speeds, paid maintenance of networks by community members, and more community projects that result in workforce development.

Equitable Internet Initiative - Aiming for a sustainable neighborhood network

EII re-envisioned Internet provision as a decommodified community service in three historically disconnected Detroit neighborhoods: the North End, Vernor/Lawndale in Southwest Detroit, and Islandview in Southeast Detroit. The EII radically changes the model of traditional Internet provision as it helps incubate neighborhood-based ISPs run by churches and CBOs that are deeply anchored in their communities. Unlike for-profit providers that are run nationally and have no direct investment in the communities they serve, these local actors are not motivated by profit and integrate the provision of Internet in their community work.

DCTP won a grant from several foundations including the Ford Foundation, the Knight Foundation, and the New Economy Initiative to initiate the project in partnership with three established "anchor institutions" in the communities. While anchor institutions typically refer to larger entities like hospitals or universities that are rooted in a place and are unlikely to move, DCTP worked with small CBOs and church-based groups that have a more intimate relationship to their surrounding communities. The grants pay for Gigabit-speed backhaul at wholesale prices that was negotiated with the local for-profit ISP Rocket Fiber. Additionally, the fact that DCTP

successfully used aggregated demand to negotiate with a private ISP directly enabled them to build “net neutrality” provisions into the contract, including preventing content blocking and content discrimination, which became more important once it was clear that the federal government would roll back protections included in the 2015 Open Internet Rules.

Both the local anchor partnerships and a for-profit backhaul provider are consistent ways of starting projects based on a long history of Detroit’s digital equity work. What is new is the introduction of a gold standard infrastructure and speeds in low-income neighborhoods. As demonstrated in Figure 3, low-income, Black neighborhoods in Detroit generally have average speeds well below what is considered market-standard broadband. The new Gigabit speed is a rarity for homes in Detroit, even in higher income areas, and now these three neighborhood pilots will be offering it. Improving prior pilot iterations, Ell’s technology will offer homogenous speeds to all their users.

This backhaul is distributed in the neighborhoods via gateway nodes installed at neighborhood anchor institutions, which extend wireless connections to reach residents who do not have broadband speed Internet in their home. Local residents are trained and hired as Digital Stewards to install and maintain the networks. Using their relationships within the community, Digital Stewards get the word out by knocking on doors and attending community events, helping identify neighbors who would benefit from getting online. Unlike the mesh network corridors that developed out of the Digital Stewards program, the Ell networks will be owned by the CBOs and not the community per se. However, DCTP established protocols ensuring that the networks will be driven by deep community engagement. In the coming year, community residents will form resident advisory boards in the three neighborhoods, and envision and design sustainable business and expansion models for the future. This provides the engaged community members with a space to think about sustainable models of neighborhood-based and affordable Internet provision beyond the initial funding through philanthropy.

Ell in the North End

Strengthening and Building on Existing Social Ecologies



EII partnered with the North End Woodward Community Coalition (NEWCC). NEWCC has a long history of organizing in the North End, maintains a broad network of community members, and had already adopted an equity lens to work on different community initiatives. Reverend Joan Ross runs NEWCC as well as Storehouse of Hope, supporting the social fabric of North End by providing “emergency food, personal care services, referrals, needed resources and specific education and development activities designed to enhance human dignity and sustain families and individuals living in the North End” (Storehouse of Hope n.d.).

NEWCC was born out of the struggle for equitable transit through residents already working with Storehouse of Hope. To support transit-dependent residents, the coalition was advocating for a rail line project that would have connected North Enders to job centers across the city and all the way to Detroit’s northern boundary at Eight Mile, where they could have accessed jobs in the suburbs as well. While this proposal never came to fruition, the QLINE streetcar now only connects Downtown and Midtown, with its final station at the southern end of the North End (Felton 2017). The QLINE therefore does not meet the transit requirements of North End residents, particularly connecting them to existing jobs in the suburbs. Nor does it service most North End residents, since many passengers would have to walk several miles to access its North End terminal (Ross 2017). Instead, the QLINE exacerbates the possibility of gentrification that could price residents out of the community with little immediate benefit.

With its local advocacy, NEWCC is thus a catalyzer for community building, and it works by engaging residents around building equity and relationships. Other projects that NEWCC is working on include a Community Land Trust, a solar street lights initiative, and WNUC, a community radio station that focuses on local journalism. As an EII community anchor, NEWCC owns the infrastructure and is undertaking the community outreach for the Digital Steward programs and households that will become part of the network. Building on the existing trust relationships between residents and NEWCC, EII increases the possibility of meaningful participation of the community in broadband deployment, adoption and use for community building.



Figure 9. Reverend Joan Ross. Activist and community leader in North End's community Garden. Featured in Northern Light. Hour Detroit

In the North End, Monique Tate, a long-time Digital Steward and DDJC member, is EII's Network Manager. She has recruited a diverse group of residents through community meetings and the Storehouse of Hope. The program is intentionally focusing on diversity to challenge the notion of who a technologist might be and provide residents with skills relevant to Detroit's growing tech economy. As a result, the North End's Digital Stewardship curriculum includes additional technical skills, such as hands-on intermediate and advanced technology capacities to advance wireless technologies by increasing speed, enabling high-level management of a community ISP, and increasing the monitoring capabilities of mesh networks, all strategies for neighborhood resilience planning and participatory community organizing. Another change from previous Digital Stewards programs is that EII Digital Stewards are hired as apprentices through grant money to support their participation.

EII has hired five paid Digital Stewards (former apprentices) to design, build and maintain EII's gigabit speed network. For Uri 'Heru' House, one of the Stewards, EII has created a new sense of innovative power at the personal and community level.

“It makes me think about what we can deliver back to the world now, having access to [Information Technology]. Now I can make, I can create, I can generate. That adds the opportunity to generate income through the use of these tools that you’ve been given access to. We’ve got a few more pieces of information, some tools that you didn’t have before; it allows us to create something new, and from that our community can have leverage in this digital world and this digital economy that comes with it.” (House 2017)

EII is deepening the ways that underserved community members, not only get access, but also leverage their agency. “Last mile” infrastructure connecting homes to digital resources also increases the reach and impact of ongoing community initiatives. According to Candace Jones (2017), another Digital Steward, “the Internet makes these initiatives go further, it helps reach more people, get the information out more, giving to those who are giving to the community.” For example, Ms. Judkins, a resident now connected to the network, believes she will grow her community youth group and a neighborhood patrol. She values the potential to disseminate information more broadly and enhance communication between community members (Judkins 2017).

EII in the North End is advancing rapidly, as it has the resources to connect 50 households in each of its three neighborhoods in its initial pilot phase. As of October 2017, EII had connected fourteen houses in the North End, and the Digital Stewards have since identified thirty-six additional households as pilot sites that will receive the service with the intention of expanding the service into the future. The hope is to scale this model to reach more homes beyond this. To this end, EII is creating local community advisory councils to develop long-term visions for sustainable neighborhood Internet provision. The North End’s advisory council is currently under formation. In the meantime, the Digital Stewards and DCTP are developing ideas for sustainability, including the possibility of an education and training platform for young adults to learn application development. They are piloting a free twenty-student, four-week training course in coding and application development for the gigabit Internet environment called Next Gen Apps. The first phase of the program includes a four-week training in basic coding skills such as CSS, HTML, Javascript, and Node.js. A second phase will include a six-week training that will provide an opportunity for six graduates to develop advanced skills by prototyping an application that responds to their neighborhoods’ needs or desires. The aim of this program is to give youth marketable skills that increase opportunities to create or find jobs in the growing tech industry (Allied Media Projects 2017).

One of EII's other opportunities is residents' opportunity ladder development. Detroit residents in the North End and in similarly situated communities are desperately in need of greater job opportunities. Detroit is experiencing a "tech boom" and job growth in general, whether tech or non-tech, needs to benefit low-income Detroiters of all races and backgrounds. The investment in Digital Stewards creates the opportunity to more deliberately connect residents to a jobs ladder through partnerships with the city and private sector.

EII as a set of pilots worthy of development

EII is best understood as an impactful set of pilots advancing proven engagement strategies based on two decades of work by DDJC, AMP and DCTP, coupled with twenty-first century broadband speeds and meaningful access to support more equity and opportunity for low-income, Black and Latinx neighborhoods. It is also an experiment in developing sustainability models for the broadband connections and the community work those connections support. Collaborative reflection and built-in evaluation are crucial and replicable steps in developing hyper-local solutions where private models have failed and where municipal governments have not yet found alternative solutions.

EII has a unique opportunity to develop a new model of community driven internet provision. But there are also important challenges ahead. EII has envisioned a time in which each neighborhood, through the community advisory councils, will develop sustainable business models to keep their connections running. There is need to experiment with different financial sustainability models. A cooperative model, low - cost subscriptions, franchising or other forms of revenue generation are all options under consideration by EII and in other cities. Along with revenue models, EII also needs to figure out governance models of CBO-owned networks. If these are to replicate the benefits of community-owned mesh networks, mechanisms have to be designed to make sure CBOs are accountable to local residents.

In terms of scale, the EII can connect only a fraction of the households that need its network with the grant money DCTP has received so far. In Detroit, over 40% low income households lack broadband. For the 150 households that will receive EII's affordable gigabit speed broadband, an important opportunity exists to consider how to scale the network so that more residents can be connected and engaged in solving community problems in the future.



Figure 10. EII Digital Stewards in North End building last-mile infrastructure.

Finally, broadband adoption opens up economic opportunities, however, in the case of some underserved communities, other basic utilities, like water in Detroit, are basic necessities and very costly, leaving households digitally disconnected if they have to pay, even low-cost service. EII is proposing a model to govern Internet as an urban commons that can help provide long-term alternatives to exclusionary market provision.

Recommendations: How Municipal Governments can Support Community-Based Digital Equity Efforts

This case study has highlighted the impressive and innovative efforts of grassroots and community groups and their partners to create more digital equity. The ambitious experiments being developed through ELL, and based on other past successes and lessons, can help local and national government solve real problems by finding ways to support community initiatives and related efforts. Learning from Detroit, the following recommendations provide pathways for cities and federal actors to advance Digital Equity.

Partnerships matter: municipalities should be leaders in cross-sectoral relationship building

When municipal governments cannot do it all or have limited funding, their best asset is cross-sector relationship building. Cities can leverage their political leadership to:

- a) Stitch together a network of networks strategy to ensure greater community agency in broadband planning. Cities should develop long-term (e.g. 10 year, 20 year) digital equity plans that include infrastructure, training and community-prioritized outcomes. The planning should begin with both community and government assets and engage stakeholders in determining how to build from those assets;
- b) Facilitate the use of city-owned infrastructure to support ongoing meaningful broadband adoption plans within communities. This might include leasing out or permitting publicly-owned infrastructure to support community-run network equipment, such as light and electricity poles, or access to rooftops of public buildings. Where possible, cities should also think about sharing public Internet infrastructure such as public WiFi or educational backhaul;
- c) Support a better relationship between funders and communities by evaluating the results of projects in depth and assuring that communities are not neglected or leaving projects incomplete. Identify for-profit and philanthropic organizations that can support community-based efforts, redirecting funds to ongoing projects;
- d) Increase pathways for residents into the tech sector that lead to localized economic development in underserved communities. This can include STEM educational programs and municipal policy that advocates to hire local workforce;
- e) Leverage municipal political power to help communities in negotiating with the private sector (i.e. ISPs or tech companies).

Recognizing systematic exclusion is key

Local governments should recognize how certain communities have been systematically excluded from ICT's. They should create strategies to address digital exclusion in a way that seeks to address these systemic and institutional injustices. Strategies to close the digital divide should therefore prioritize access for those who the market has excluded the most: low-income communities of color and rural communities.

Cities should adopt a holistic approach of digital equity

Learning from DDJC's approach, adopting a holistic digital equity framework requires understanding a) digital literacy, b) access to infrastructure, services and devices, and c) meaningful broadband adoption as equally important aspects. Following this approach, Cities should implement broadband adoption strategies that:

- a) strengthen and expand educational programs that assure all residents possess the knowledge and means to use and produce technology;
- b) ensure equitable deployment of broadband infrastructure and affordable access to broadband services and devices; and
- c) support meaningful broadband adoption programs that build on existing social support systems to get people online by linking information and communication technology with community needs and desires.

Communities are experts on both the problems of digital exclusion and the solutions to overcome them

Especially in places like Detroit that are characterized by decades of disinvestment and a near absent government, communities are most likely self-organizing to fill in the voids left by the public sector. City governments should start by recognizing the social systems that are in place to overcome digital exclusion and recognize these as important assets. Even if there is no organizing in place, it is necessary to promote participation of underserved communities due to their unique understanding of the problems underlying exclusion.

Local governments should assist in experimenting with scale and revenue models for community-driven alternatives to market-based Internet provision

One of the biggest challenges of community-driven initiatives is to scale from small pilots to widespread solutions that bring broadband service to entire communities. Therefore, municipal governments should invest time and budget in incubating knowledge about alternative revenue and implementation models that can support grassroots and community based organizations.

Cities can be advocates for more equitable broadband policies at state and federal levels

In the current context, federal policy and many state legislatures advocate for deregulation, limiting cities' ability to innovate. Cities should therefore:

- a) Organize with other cities, towns and nonprofits in their respective states to advocate for increased municipal power. This includes lobbying state legislatures to repeal legislation that prohibits or impedes municipal broadband services. This would allow municipalities to create their own networks, more franchises that can be used as leverage with telecoms, and to ensure that low-income populations have access to more affordable options. On the national level, join with other cities to challenge the FCC to ensure cities still have power to regulate public infrastructure.
- b) Meaningful broadband adoption as discussed in this case study challenges the traditional way we measure adoption. Impact can't simply be measured quantitatively by the number of new Internet subscriptions. Instead, we should assess how residents engage with technology and how this impacts the social fabric in said community, i.e. qualitative outcomes. Cities, as the places in which these changes are experienced, should consider these metrics and advocate federal investments to do so as well.
- c) Cities should push the federal government to fund sustainable programs that seed capacities in communities and ensure that projects have a sustainability plan in order so they can continue after federal funds run out. Federal funding in the case of the BTOP/ARRA grants went to Detroit organizations to make the projects described here possible, but without explicit support or requirements for long-term sustainability.

Conclusion

In this case study, we have argued that systematic segregation and underinvestment in Detroit's communities of color, along with the deregulation of the telecommunications industry, have perpetuated a racialized system of digital inequity. As seen in the North End and in Detroit more broadly, past investments in infrastructure such as the highway system or large-scale "urban renewal" projects have not benefited the population evenly. On the contrary, while white communities' well-being has been prioritized, connecting whites-only subsidized homes in the suburbs to the urban center, communities of color have been displaced and dispossessed. The

way broadband infrastructure is currently employed is following this pathway. By leaving the provision of broadband infrastructure to the private sector, these for-profit investments follow places where wealth has been gathered and exclude historically disadvantaged groups. Digital exclusion is not only following prior forms of discrimination, but is also reinforcing existing structural racism by continuously denying groups fair and equal access to jobs, education, government services, and civic participation--all of which rely on access to broadband in the digital age.

Studying the ecosystem of CBOs and community-led digital equity initiatives and focusing on the case study of DDJC and its iteration to arrive at the EII shows how adopting a holistic approach to digital equity can start to reverse these unjust urban dynamics. Not only this, it shows how communities leverage their agency to fully participate in an increasingly technology-dependent society. This holistic approach includes the following indispensable and interrelated components to move toward equitable outcomes for communities:

- By using a meaningful broadband adoption approach, EII acknowledges the importance of supporting and expanding ongoing ecologies of social support, linking broadband access to greater issues of social justice.
- By aggregating broadband demand, EII leverages the position of historically underserved communities to negotiate with private ISPs and counter exclusionary market dynamics. This is used to develop 21st century local Internet infrastructure that is owned by local CBOs and driven by communities.
- The comprehensive Digital Stewardship curriculum developed by DCTP levels the playing field for communities that have been traditionally excluded from technology and increases opportunities through which youth and others can enter the booming tech industry.
- Last but not least, EII strengthens communities' ability to collectively envision how digital technologies can contribute to hyper-local social and economic development. EII proposes that Digital Stewards and community advisory councils inform and inspire their communities regarding how technologies can be shaped to investigate community problems and generate solutions.

The questions that remain to be answered exist within the realm of sustainability and affordable community based Internet provision models. How can municipal governments further intervene to support these community driven alternatives to

profit driven ISPs? What is the role of municipalities in aiding these initiatives to become scalable and economically sustainable and provide the space for experimenting on these two key factors? How do these community driven ISPs create surplus revenue to maintain the pilot and scale the model to reach more users? How do communities and municipalities experiment with different revenue models that don't compromise data sovereignty or use it as a commodity? Within a context where exclusionary market-driven broadband provision is the norm, we hope this case study provokes municipalities, policy makers, community organizations and practitioners to interrogate alternative Internet provision models that are grounded in community experiences to achieve digital equity.

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