

Connecting to our Future: The Digital Livable City

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Abstract

Urban planners typically focus on the built environment with a goal of creating connected, healthy, prosperous cities. They should also pay heed to the importance of the Internet. The Internet is just as vital a part of a city's infrastructure as its roads, bridges, and electrical grid. Access to the Internet has become essential for full participation in society, yet many communities are not integrating broadband Internet infrastructure, access, and training into local plans: many cities and their citizens are on the wrong side of the digital divide, which separates those people who have access, devices, and digital skills from those that do not.

Ubiquitous, affordable high speed Internet via fiber and wireless can be transformative in creating the healthy, equitable, responsive cities of the future. For example, high speed Internet is a necessary prerequisite for telework and telehealth applications. Both benefit the environment and reduce greenhouse gases by lowering auto emissions. Telework can reduce construction demand for office space, road maintenance and related energy use. Telehealth patients can consult with specialists using high definition interactive video from their own homes. These and a wide range of other broadband-based applications have enormous potential to improve the sustainability, wealth, and health of cities in the future.

Planners must also be aware of potential negative impacts of the Internet such as a more sedentary lifestyle and isolation due to too much time in front of the computer screen. Incorporating flexible communal gathering spaces in affordable housing complexes that can be used as Internet access and training classrooms and then transformed for other social activities like an exercise class can help address both issues. Given the increasingly digital world in which we live the benefits of being connected outweigh the drawbacks.

However, unless local communities develop targeted, collaborative solutions to address the digital divide, income disparities will continue to grow. It is going to take the whole community – providers, planners, architects, elected officials, non-profits and citizenry to address the digital divide. Author Jane Jacobs argued that “cities have the capability of providing something for everybody, only because, and only when, they are created by everybody”. Digital infrastructure will play an increasingly important role in creating more livable cities and combatting climate change but only if everyone has the opportunity to participate in the digital age.

This paper will explore strategies by which localities can provide or facilitate state-of-the-art broadband expansion to meet future needs, how the Internet is changing the nature of work, the importance of being a responsive (smart) city, observations on youth and the Internet, older adults and the Internet, and the necessity of addressing digital equity at the local level to ensure that the entire community has affordable Internet, devices and digital literacy to provide everyone with the opportunity to benefit in the digital age.

“If you don’t at least try to think digitally, the digital economy will disrupt you. It will drain your town of young people and leave your business in the dust. If you don’t have access to the technology, or if you don’t know how to use it, it’s similar to not being able to read and write.”ⁱ
Roberto Gallardo

“Everything wants to be connected”ⁱⁱ Sheldon Renan

Introduction

Ubiquitous, affordable high speed Internet via fiber and wireless can be transformative in creating the healthy, equitable, responsive city of the future. For example, high speed Internet is a necessary prerequisite for telework and telehealth applications. Both benefit the environment and reduce greenhouse gases by lowering auto emissions. Telework can reduce construction demand for office space, road maintenance and related energy use. Telehealth patients can consult with specialists using high definition interactive video from their own homes. These and a wide range of other broadband-based applications have enormous potential to improve the sustainability, wealth, and health of cities in the future. Yet affordable, state-of-the-art broadband is not a given in every community. Communities need to develop local broadband strategic plans that lay the foundation for understanding, embracing, creating and adapting to the digital economy. Broadband plans should define the values to ensure a safe, sustainable and equitable future with technology and connectivity as pervasive forces. By way of example, Portland, Oregon developed a community-driven broadband strategic plan focused on ensuring ubiquitous wireless and wireline connectivity, critical infrastructure to facilitating the use of technology and data to address urban challenges as well as digital equity.ⁱⁱⁱ Digital equity is having internet access, devices and training to successfully navigate in the digital world.

Peter Hirschberg, Chair of the City Innovate Foundation, says that the digital livable city is a city that “engages with citizens in acts of co-creation...in acts of democracy, care and ownership of the city.”^{iv}

Planning for Your Broadband Future: Role of Local Government in Facilitating Broadband Infrastructure

Are you broadband ready?

Communities in many nations recognize the benefits that stem from high speed broadband networks and have made tremendous progress in recent years in fostering their deployment. Nonetheless, many challenges remain in terms of how to enhance and expand these networks to meet the growing demands of an increasingly digital economy and society.^v This paper focuses on two models: public networks and public-private partnerships or “3P” networks where the risk of deployment is shared between the public and private sectors.

Public Network/Anchor Institution

Although private investments have been the overwhelming source of finance for high speed networks, municipal networks have been successfully deployed in the US and Europe.^{vi}

Every network deployment involves a number of components – design, constructing, operating, marketing, and financing, to name the major ones. The question is: what role should the city play in the project? As cities approach this question, the basic trade-off involves risk and control.



Cities can assume the whole risk by serving residents with a public network. Another option is for local governments to directly build or finance a network that connects the anchor institutions such as libraries, schools, and local government offices, but not serve the public directly. SandyNet^{vii} in Sandy, Oregon, is an example of a local government-run network that serves the entire City. SandyNet’s story is told in this video produced by The Institute for Local Self Reliance: <http://muninetworks.org/content/gig-city-sandy-home-60-gig>. An example of a publically-owned anchor institution network is IRNE^{viii}, established in 2000 by the City of Portland to serve government offices.

Public Private Partnership

Another model is the public private partnership (3P) where risk and control are shared. One model has the City building and owning the infrastructure with services over the network being provided by the private sector.^{ix} This is the model in Westminster, MD^x, which partnered with a private company, TING.

Private: Incent a Competitive Broadband Market

The strategies that local governments can pursue to advance private broadband deployment fall into three general categories: (1) facilitating access to key assets such as fiber, conduit, utility poles and real estate; (2) making useful information available; and/or (3) streamlining, accelerating and/or publicizing essential local processes.^{xi}

Access to key assets

All local governments own or manage real estate assets of varying value. Policies like “dig once” and “one touch make ready” for pole attachments facilitate deployment.

“Dig once” policies require that whenever a project involves digging up streets, fiber should also be installed. For both political and administrative reasons, this is easier said than done—cities often lack full knowledge of all ongoing or planned projects, and complying with the policy requires funding, coordination and knowledgeable staff both in connection with the applicant and the government licensing entity. But such policies are significant cost-savers and constitute an investment in a city’s future. Such policies also protect roads and sidewalks from frequent, life-shortening cuts and minimize traffic and other disruption from utility construction.^{xii} Before a

pole may be used for a new attachment, ‘make-ready’ work is usually needed — the existing attachments on the pole have to be rearranged so that it is ready for a new attacher. Often times, there are multiple attachments on the pole already (e.g., telecommunications, cable etc.), and, currently each is moved sequentially — which can create delays and multiple disruptions in a neighborhood. In the case of “one touch make-ready,” companies that own poles agree on one or more common contractors that could move existing attachments on a pole (‘make ready’ work), allowing a single crew to move all attachments on a pole on a single visit, rather than sending in a unique crew to move each attachment sequentially. Sending in separate crews is time-consuming and disruptive to local communities and municipal governments. One-touch make-ready polices would ease this burden.^{xiii}

Access to Buildings

One significant barrier to new network providers is the need to gain entry into a building or development. Cities can improve services to residents and businesses if City code or other applicable requirements create an incentive for developers to build additional pathways from the public rights-of-way to a demarcation point in the building, and then requires internal, standards-compliant building cabling or cable pathways in new construction or major renovations.^{xiv}

Make data available wherever possible

Many communities have robust GIS data including everything from centerlines of streets to home locations to demographics to city-owned fiber, conduit and poles. Making GIS data available to potential partners’ localities can enable providers to consider leasing public fiber and conduit as part of their network designs and business plans. Access to this essential information can both attract and speed new construction by private partners, while enabling the community to meet its goals for new, better broadband networks—and potentially to realize revenues for use of the assets.

Streamline and publicize procedures and timeframes for permitting and inspections

Efficient and streamlined processes can be one way in which broadband projects may proceed expeditiously, whether the entity building the broadband facilities is the locality itself or a private entity that seeks to deliver services to the community. All processes required for a broadband project should be formalized and well publicized. These range from rights-of-way access to permitting to final inspection and approval. Full transparency about these processes is the single most effective means by which to enable the communications industry to expeditiously plan and deploy networks.^{xv}

Public Wi-Fi

Communities that provide or facilitate free WiFi in schools, libraries and other local government buildings are becoming more common. Free WiFi can be implemented incrementally, over time to spread the cost. Approximately 90% of City of Portland buildings have free WiFi. WiFi can also be expanded outward from the schools and libraries to provide connectivity for the surrounding neighborhoods.

The Changing Nature of Work Relies on Broadband Infrastructure

“Work in the future will be organized in ways that are far more decentralized.”^{xvi} Work is no longer confined to a specific time and place. Networked Internet (including mobile) technology blurs the lines between work and home and between work and personal life. Tens of millions of people now work at home offices, telecommute or participate in “virtual companies” whose workers are scattered across the country or the globe. Many others work for startup firms in improvised settings. Open platforms for the “crowdsourcing” of work mean that work is becoming an activity that can occur anywhere, and at any time. The implications of this transformation affect our urban architecture (Who will occupy high-rise buildings?), tax structure (What is the correct structure for taxing business when its location is on the Internet, not the City) and our economic development strategies (How can leaders attract companies to locate in their city, if they are in fact virtual rather than physical?)

As mobile and wireline broadband becomes essential for daily life, more people participate in an information-driven economy, more and more people will not go to work, but the work will go to the people – wherever they might be, including home. This has already led to a decreased need for office space. Cisco Systems found that it needed 40% less office space per employee because of broadband-based tele-work and collaboration tools. There was also a significant reduction in energy use and greenhouse gases.^{xvii} Urban policy must adapt to this new world and urban planners must re-think the assumptions that guided a society where work, home and shops were apart.

Work, even in large organizations, is increasingly dispersed and decentralized among people who connect by broadband networks. We are now in an era where people are able to work from anywhere and be paid well. So for those people, the question is not necessarily where the jobs are, but where the quality of life is highest for them as long as there is good internet access.

Responsive (Smart) City & Playable Cities

What is a responsive city? According to the International Telecommunications Union (ITU) “A *smart sustainable city is an innovative city that uses information and communication technologies (ICTs) and other means to improve quality of life, efficiency of urban operation and services, and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social, environmental as well as cultural aspects.*”^{xviii}

Anthony Townsend goes a step further asserting that we need to empower ourselves to build future cities organically, from the bottom up, and do it in time to save ourselves from climate change. He goes on to say that the smartest city in the world is the one you live in...if that’s not worth fighting for...what is.^{xix}

What sets a responsive city apart is that it intentionally collects and uses better data and fewer resources and empowers residents with information and resources to improve their quality of life.^{xx} Open data and equity are key components of a responsive city.^{xxi} Open data is data that can be freely used, re-used and redistributed by anyone - subject only, at most, to the requirement to attribute and share alike.^{xxii} The underpinning of the responsive city is that

individuals can monitor how their actions impact their environment in real time and make decisions accordingly.

Some “responsive” city initiatives from Portland, Oregon:

- Vision Zero - Originating in Sweden in the 1990’s, VisionZero seeks to reduce traffic fatalities to zero. Achieving Vision Zero requires a comprehensive approach that engages diverse partners and utilizes a wide range of education, enforcement, as well as digital and engineering strategies.^{xxiii}
- Portland’s new bike share program, called BikeTown, is a collaborative partnership with Nike. Nike is providing some funding and will oversee the design and branding of the system’s logo, stations and digital presence.^{xxiv}
- Ubiquitous Mobility Portland or UB Mobile PDX envisions a single all-purpose “marketplace” that would let smartphone users find a BikeTown bike, hop on a Tri-Met bus, rent a bike through Spinlister or call a Lyft driver or whatever. The app could also integrate parking payments and even a potential pay-per-mile fee. The app would let users weigh their mobility options based on personal needs such as cost, travel time and other factors like carbon emissions. The concept is to create access to the myriad transportation options that is so integrated that everyone can easily plug into it.^{xxv}

Using “smart city” data to prove Jane Jacobs’ points

In the Death and Life of Great Italian Cities: A Mobile Phone Data Perspective researchers gathered data from mobile phones to empirically test Jacobs’ concepts of the factors necessary for a city to be “livable”.^{xxvi} The research extracted human activity from mobile phone data, collected land use and socio-economic data from the Italian Census and Open Street Map and tested Jacob’s theories in six Italian cities. The empirical data supports Jacobs’ assertions of the factors that must be present for a city to be livable.

What is a playable city? A playable city takes the responsive city concept a step further, inviting residents and visitors to interact with embedded technology and connectivity in a playful way. A playable city requires the smart technology that is integrated in a smart city environment. Sensors, displays, smart tangible objects, and wearables, can be used to improve the efficiency of city management (traffic, public transport, security, public events, etc.), but they can also introduce playful elements. A city without smart technology embedded in its urban environment cannot offer people playful interactions with streets, buildings, street furniture, traffic, public art, and public events.^{xxvii}

An example of the playable city in Portland, OR is the Tilikum Crossing, the largest car-free bridge in the U.S., which features lights that change color and timing based on changes in the Willamette's river speed, height and water temperature. It is a way for people in Portland to connect more with the river.^{xxviii} The data is collected by a U.S. Geological Survey river monitor.



These murals of “bots” below beckon passersby to take a photo and upload the photo with the answer to the question to the artist’s website. This is another example of playful public art and digital media.^{xxix}



Richard Florida writing in The Creative Class found that young people seek vibrant cultural opportunities, recreational institutions, walkable streets and transit. One important addition in today’s digital world is the need for ubiquitous, affordable high speed Internet. The concept of a playful city is attractive to young people who are seeking places to live, work, play and stay.

What is Digital Equity?

In 2016, many of us take our access to high-speed Internet and our use of digital tools for granted. We have a computer on our desks at work, a smartphone in our hands and a laptop or tablet in our briefcase or backpack. We grumble about the price, but we expect and pay for speedy broadband Internet connections that make it possible to work online efficiently and effectively.

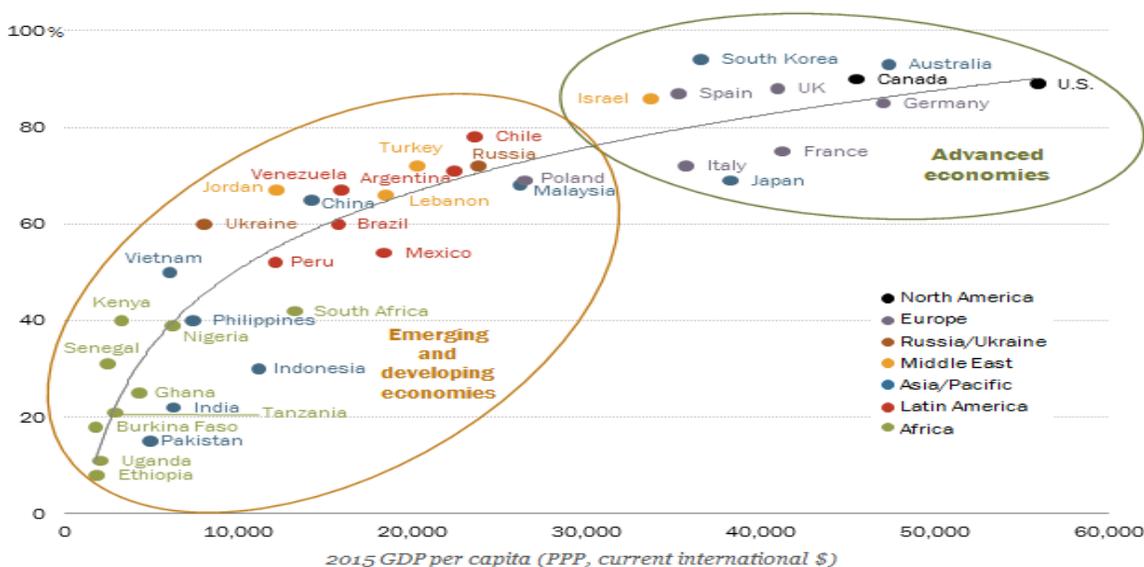
But what if you couldn't afford or didn't know how to use your device and your high-speed Internet connection? How would you apply for a job, find housing, get financial aid for college, communicate with your doctor or your child's school, do your homework or file your tax return? Too many people in our community are still excluded by poverty, language barriers, disability and a lack of training from the digital world the rest of us now inhabit.

The National Digital Inclusion Alliance defines digital equity as everyone having “daily access to the Internet, at speeds, quality and capacity necessary to accomplish common tasks, with digital skills necessary to fully participate online, and whenever possible on a personal device and home network.”^{xxx}

The social and external cost of digital exclusion is great. Without access, full participation in nearly every aspect of American society — from economic success and educational achievement, to positive health outcomes and civic engagement — is compromised.^{xxxi}

The strong relationship between per capita income and internet access

Adults who use the internet at least occasionally or report owning a smartphone



Note: Percentages based on total sample. IMF data not available for Palestinian territories.

Source: Spring 2015 Global Attitudes survey. Q70 & Q72. Data for GDP per capita (PPP) from IMF World Economic Outlook Database, October 2015, accessed Dec. 16, 2015.

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Why Create a Local Digital Equity Action Plan?

Local communities should develop targeted, collaborative solutions to address the digital divide or income disparities will continue to grow. It is going to take the whole community – providers, planners, architects, elected officials, non-profits, and citizenry to address the digital divide. Author Jane Jacobs argued that “cities have the capability of providing something for everybody, only because, and only when, they are created by everybody”. One way to start addressing digital equity is to gather local data on barriers to adoption. Portland, Oregon conducted five focus groups with historically underrepresented populations (Spanish, Chinese and Vietnamese speakers, people with hearing disabilities and African Americans).^{xxxii} Digital equity action plans target access and adoption gaps for excluded and disadvantaged communities, specifically people living in poverty, older adults, communities of color, people with disabilities, and those with limited English proficiency.

The Internet provides access to jobs, healthcare, education, banking, culture and civic engagement. The Internet is a top resource for many of today’s job hunters: Among Americans who have looked for work in the last two years, 79% utilized online resources in their most recent job search and 34% say these online resources were the *most* important tool available to them.^{xxxiii}

It is important to remember, however, that technology is a just a tool; it amplifies existing human capacities. Technology can make things better when there is a deliberate intention—economically, politically, culturally—to push against the gradient of inequality.^{xxxiv}

Youth and the Internet

The Organization for Economic Co-operation and Development (OECD) research shows that too much computer and Internet use – particularly unsupervised and unstructured – crowds out real learning, socializing and intellectual development in children.^{xxxv} Certainly an unhealthy relationship with technology can have negative consequences. However, research from danah boyd’s book, *It’s Complicated: The Social Lives of Networked Teens*, shows that most teenagers go online to connect to the people in their community. Some older adults believe that their own childhoods were better than the ones young people experience in today’s digital world associating the rise of digital technology with decline. The research presented by Danah Boyd suggests that the opposite is often true. What is different today is that teens’ use of social media is public by default and private through major effort. Facebook and Twitter are providing teens with new opportunities to participate in public life which is what concerns many anxious adults.

Many public spaces where adults gather, such as bars and clubs are not available to teens. Teens have fewer places to be together in public than they once did. Planners should include teens in creating the vision of the future city. Teens would rather meet up in person, but heavily scheduled daily lives and lack of physical mobility makes it challenging. The Internet mirrors, magnifies, and makes more visible the good, the bad, and the ugly of daily life.

Older Adults and the Internet

In an era when everything, from personal health records to nursing home quality ratings, is online and the best way to stay in touch with grandchildren may involve Facetime or texting, internet connectivity and digital literacy are essential. Yet many older adults, especially those with low incomes, are not online.^{xxxvi} Older adults may have additional challenges such as physical limitations or cognitive impairment that serve as barriers to adoption. There are two model programs that are blazing the trail for older adult connectivity. Older Adult Technology Services (OATS)^{xxxvii} uses technology to empower older adults to live successful, independent, connected lives. The many program offerings are holistic addressing the unique needs of older adults. The CareWheels^{xxxviii} program empowers people to age in place with a variety of technology/services tailored to individual needs.

In a study to examine how Internet use affects social isolation and loneliness of older adults in assisted and independent living communities, researchers found that using the Internet may be beneficial for decreasing loneliness and increasing social contact among older adults.^{xxxix} Older adults need access, devices and age-appropriate training to realize the benefits of connectivity.

Conclusion

The full potential of the digital livable city will not be realized until cities assume a leadership role in ensuring ubiquitous, state of the art broadband throughout the community and provide a pathway for everyone to be connected, have a device and understand how to engage in the digital world. Some cities are moving in a deliberative fashion to design their digital future. The digital economy is helping to create new attitudes about the role of local government and leadership that aims to facilitate and empower, not dictate and control residents.^{xl} However until everyone is online, a collaborative, citizen-engaged creation of community in the digital age will not be realized.

Local officials need to convene a diverse set of stakeholders, be transparent and inclusive, listen and engage, and then follow-through with implementation. Broadband is critical infrastructure. Demand for broadband is growing. Ubiquitous affordable access to fiber and wireless Internet as well as devices and culturally-specific training should be part of a community-developed broadband plan.

One thing that hasn't changed in the digital era is the need for urban policy to ensure cultural and educational opportunities as well as inviting gathering places for people to meet face to face so that cities are vibrant areas to live. Even in a digital world research shows that in-person interactions are an essential part of being human. Sherry Turkle in her book Reclaiming Conversation demonstrates that children develop better, students learn better and employees perform better when their role models take time for in-person conversations.

Intelligent infrastructure can help make all the other infrastructure – roads, energy, water and waste – work better and operate in a greener way. Urban planners will need to understand how the design and form of the built environment will become dramatically changed by these

broadband transformations. Urban policy makers and urban planners must face the changing world and changing requirements on urban life that broadband networks will necessarily impose. In person social systems - community gathering places and engaged citizenry are vital to the successful transformation. CES Wood, one of Portland's respected early leaders said, "*Good citizens are the riches of a city.*" That is as true or more so in the digital livable city.

ENDNOTES

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