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By John Laurie, Ph.D. and Stephen Buckman

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WiFi as a backend

ECONOMIC DEVELOPMENT DRIVER

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INTRODUCTION

Just as the advent of the internet allowed people, businesses, organizations, and governments to become globally connected and diminished the importance of place, wireless internet (WiFi) has the capacity to make location increasingly relevant. Cities have recognized this and in the drive for competitive advantage have begun setting up their own wireless networks – known as municipal WiFi – either wholly government owned or through public-private arrangements with telecommunications companies. It was thought that municipal wireless networks would generate money for cities; spur and enhance economic development efforts; and concentrate resources, information, and people in central locations.

If any city was poised to take advantage of municipal wireless, it was post-Katrina New Orleans. The need to rebuild the city after the devastation of the hurricane prompted various levels of support, both public and private, and also resulted in a number of innovative ideas and partners willing to carry those ideas out. Local government and business leaders recognized the opportunity not only to rebuild but to improve aspects of citizen-government relations, economic development, and disaster recovery effort. The city found a willing partner in the telecommunications company EarthLink, that would provide the required infrastructure in exchange for assumed frontend revenue in the form of user fees. New Orleans seemed poised to be a leader on the municipal wireless front.

Photo Credit: Morial Convention Center, New Orleans.

Since its inception, the Morial Convention Center has drawn over 10 million out-of-state attendees and New Orleans is the fourth largest convention destination in the US.

However, New Orleans, like many municipal wireless networks has fallen far short of expectations. Many cities have not necessarily considered the costs of wireless infrastructure, who should share their burden or how to maximize such infrastructure. In doing so, they have overestimated frontend revenue from citizen-customers and have not fully comprehended backend benefits, causing many cities, both large and small, to have overreached financially without reaping many of the hoped for benefits. In addition, private companies that have partnered with cities have lost money as well, resulting in a pull back and reassessment of

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THE FAILURE AND LESSONS OF MUNICIPAL WIRELESS IN POST-KATRINA NEW ORLEANS

Many cities have begun to view the use of municipal wireless internet (WiFi) as a means to enhance or spur economic development efforts, while at the same time re-establishing the importance of the city as a necessary location. However, most cities engaged in these ventures – whether wholly municipal networks or public-private partnerships – have tended to focus on frontend benefits such as revenue generated by service subscribers as opposed to backend benefits, that save the city money by increasing efficiency. The results have been largely unsuccessful. Using post-Katrina New Orleans as a focus area, this article explores the concept of municipal WiFi, the reasons for its failures, and also the future viability of such projects.

the viability of such arrangements by the telecommunications industry.

This article explores the concept of municipal wireless and the failures that have plagued most cities in undertaking such a venture. Using post-Katrina New Orleans as an example and drawing from similar efforts which have resulted in some successes, an examination of *backend* benefits as opposed to *frontend* benefits is used to demonstrate the viability of municipal wireless. In addition, this article points out some of the questions and issues which continue to be hindrances to viable, functioning systems.

THE DIGITAL CITY

As technology advances and becomes more integrated into people's lives, cities are increasingly becoming a digitalized, fragmented environment that results in a dichotomy of separation and togetherness. The advent and expansion of the internet, which has enabled the digital city to grow, accelerates both spatial concentration and decentralization[1]. In theory, the internet allows people to live and work wherever they choose and yet stay connected with society at large. However, it creates new spaces, either virtual or concrete, that concentrates technological influence.

The notion and idea of the city is inherently tied to place and furthermore the idea of community, although technology changes our understanding of what comprises a community. A community can generically be defined as a group of people with common interests who communicate with each other[2].

Communities have been traditionally defined by spatial parameters. The internet is dissolving these traditional spatial parameters, yet it could be argued that Wireless Fidelity (WiFi) internet is actually helping to reestablish traditional spatial communities.

While cities are continually being impacted by the internet, the influence of technology on the changing face of the city is not a new phenomenon. For instance, the invention of the telephone helped to redefine the city.

The telephone was viewed as a device that would break apart the standard social norms of society. Like the internet, the telephone not only centralized cities but it also spread them apart. It enabled people to live further away from one another, which increased sprawl but it also increased density by creating centralized office centers[3]. The telephone, in part, helped to define the modern centralized city by making high rise office centers practical. The telephone enabled businesses to freely communicate with each other across town and up and down buildings.

What was seen as a device that would potentially fragment the city became one that also helped to center industrial and office activity within the city. The inherent infrastructure demands of the phone and the ability to build vertically helped to increase the density of cities.

The internet society is but another technological innovation that will realign the city and create new spatial relationships. Castells has defined the spatial structures of cities in the information age as being either a space of flows, which accelerate the domains of trans-local and trans-national technological movement and flow, or a space of places, which represent geographic spaces and communities of everyday life in cities, with each being not a reflection of society but rather an expression of society.

Additionally, these spatial dynamics are centered on three bipolar axes of function, meaning, and form that define the urban structure: 1. function, centered around the opposition of the local and the global; 2. meaning, being composed of the struggle and balance between individualism and communalism; and 3. form, representing the fight between spaces of flow and spaces of place.

These spaces and urban forms are being further transformed in the digital city as wireless connectivity becomes widespread. Where before, the consumer was anchored via wires, a wireless internet allows urban spatial dynamics to be further realigned in that it becomes more difficult to define areas of activity. Wireless internet represents the next step in the digital city.

Photo Credit: Somewhere in AK (flickr).

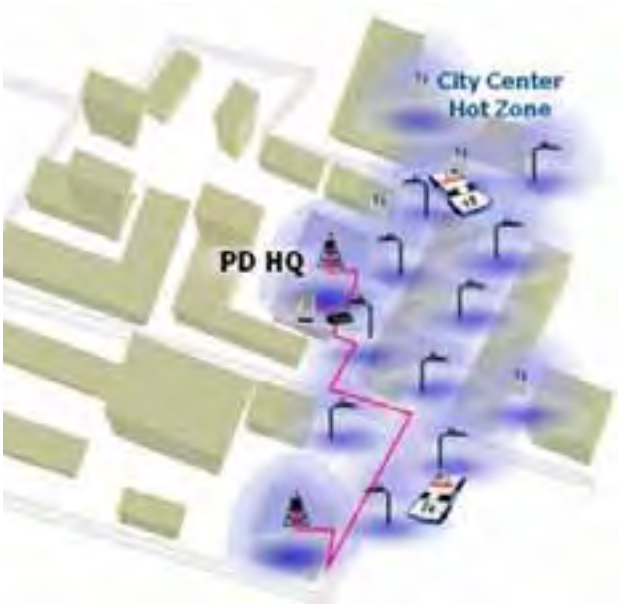
Coffeeshop Wireless Hotspot.

WIFI AND CITIES

Wireless Fidelity (WiFi) could be considered the most significant and popular advancement in internet connectivity. By enabling people to connect to the internet in any location, WiFi has the potential to dramatically affect urban structures. Essentially, there are two significant types of WiFi that are affecting urban areas: zones and clouds. A zone is an "aggregation of cooperating hotspots sharing a single management system"[4]. These represent the structures most often seen in coffee houses and other public/private areas. A cloud on the other hand is much larger in scope. A cloud "offers continuous coverage over a significant portion of a city's or town's geographic area, usually within multiple hot spots.[5]" Unlike a zone, a cloud offers continuous and unified coverage. Because of their size, clouds are typically built by large entities such as municipalities.

The freedom and growth of WiFi has become a topic that many cities are further examining to enhance or encourage economic development. Cities are looking to establish their wireless network clouds that can be used by businesses and individuals alike. This concept has become known as 'Municipal WiFi' and has created a firestorm of controversy regarding the role of municipalities in business.

Specifically, who should pay for infrastructure costs and the potential of municipally run wireless networks unfairly impacting free enterprise? While a number of smaller cities and towns have moved forward with wholly municipally-funded WiFi and are generally below the radar of telecommunications companies, large cities have begun public-private partnerships with the telecommunications industry, avoiding lawsuits and spreading the burden of infrastructure costs.



Municipal WiFi allows for instantaneous transfer of critical information between police headquarters and officers.

Cities see the popularity of WiFi as a way of generating increased economic development activity within decaying downtowns and hope to benefit indirectly from additional business that wireless services will attract[6]. There are four major reasons that cities seek to establish WiFi networks: economic development, better government, digital inclusion, and inexpensive public access[7]. Moreover, a March 2004 study by the University of Georgia's Mobile Media Consortium showed that 26 percent of WiFi clouds that were instituted were done in the name of economic growth, while 43 percent of WiFi zones were created for this desire. The study further showed that because municipal governments are geared towards providing coverage for more than just one segment of the community, they are much more involved in creating clouds than zones: 40 percent of clouds vs. 21 percent of zones.

When instituting a WiFi network, cites are as much interested in the marketing aspect as they are in the actual structural design. When a city establishes a WiFi network, it may become labeled as being a "cyber, silicon, digital, etc" city. This label has an extremely positive effect on business expansion and relocation[8]. Along with structuring the actual WiFi network, cities must account for marketing themselves to the outside world.

The importance of place promotion and marketing is a major aspect of the post-industrial city and is a necessity when instituting a wireless city. Stephen Ward has pointed out that for cities to compete, they must promote themselves as a destination center by adopting multiple methods of place promotion which include: the marketing approach, treating the city as a cultural phenomenon, and the promotion of the public interest and welfare.

As marketing becomes a key aspect of the post-industrial, entrepreneurial city, the use of city owned and operated WiFi becomes an important marketing tool. In this respect, Jessop argues that the distinctive feature of the digital city is one based on competition. He sees the distinctive feature of a city is the way that they must promote "the capacities of their economic spaces in the face of intensified competition in the global economy"[9]. It can be further argued that cities are relying increasingly on marketing themselves to create and change their image with the intended goal of attracting business, tourists, and residents.

The marketing and implementation of wireless internet is generally done through public-private partnerships. The sheer cost alone is one that most municipalities are not able to absorb. Private companies offer their expertise along with set up, equipment, and maintenance. The city of Tempe, Arizona, for instance, which has wired the entire city of 40 square miles and 160,000 residents, did so by partnering with the telecom company MobilePro. In partnering with MobilePro, Tempe provided the permit and access points on electricity and utility poles, while MobilePro invested an estimated $3 million to get the program running, then the telecommunications company handles the day-to-day operations[10]. The minimal investment by the city will not equal returns from a usury standpoint, as the fee to tap in will be taken by MobilePro, but rather it will see greater citizen activity and revenue coming from cursory sources such as advertising.

For a citywide WiFi system to work, the city and its citizens must realize it is not a free service. While the city of Philadelphia has put forth a seemingly free service partnered with Earthlink, that its citizens can tap into at no cost, it will actually cost the city $40,000 to $60,000 a square mile at a total cost of $10 million for the entire city[11]. It is these costs, beyond infrastructure, that make partnering with a service provider so important. Once again, Tempe and its partnership with MobilePro, while providing internet access to the entire city is not providing it for free, as MobilePro is charging $29.95 a month, $8.95 a day, or $3.95 an hour to use it[12].

It is important for cities to realize that the endeavor of wiring a city is not a free one. As Craig Settles points

out, nothing is free with municipal wireless. Someone at some point in time is going to have to pay something for this network. When a city provides the idea of going wireless, it must determine who will be using the WiFi system and for what purpose, as this will determine the partnership and fee structure.

THE CASE OF NEW ORLEANS

Before Hurricane Katrina, the city of New Orleans attempted to narrow the gap of the digital divide. Beginning in 2003, newly elected Mayor Ray Nagin began to coax New Orleans into the 21st century. The hiring of Greg Meffert, the city's first ever chief technology officer, preceded massive computer system and infrastructure upgrades for the city government. These improvements allowed citizens to access city information and to a limited extent perform tasks online, such as applying for business licenses and registration and paying parking tickets, as well as taxes.

In the months following Hurricane Katrina, the city established a small, free wireless network (WiFi) encompassing the Central Business District and the French Quarter, running at speeds of 512 kbps – about eight times faster than dial up[13]. This enabled many businesses in New Orleans to operate from coffee shops and even bars, without having a viable physical presence.

While many cities across the U.S. are enamored with WiFi, an exciting hi-tech way to spur economic development and market themselves as a 21st century city, conflict involving who should pay for the required infrastructure (public vs. private) and intense resistance from the existing telecommunication industry has resulted in only limited WiFi areas in many major cities. Cities with wholly municipally owned WiFi networks tend to be those that are small and below the radar of the telecommunication industry, such as Cerritos, California, (pop. 51,000) and Chaska, Minnesota, (pop. 17,000)[14]. If there was a silver lining for the economy of New Orleans in the wake of Hurricane Katrina, it was that the city was able to embark on a free, city-wide wireless network without having to battle the telecommunication industry or abide by Louisiana state law prohibiting municipally controlled WiFi, due to the need to rebuild.

Photo Credit: CDSC Hotspot Installation

Wireless Network Hardware.

On May 26, 2006 the city of New Orleans announced that it was partnering with EarthLink Inc. to provide a free WiFi zone for 20 square miles of the repopulated city by December 2006, making it one of the larger city-wide coverage areas in the United States. EarthLink estimated that infrastructure costs for the initial 20-square-mile area would be $4 million, and wireless infrastructure for the entire city could have cost as much as $20 million[15]. Additionally, EarthLink agreed to pay the city of New Orleans $25,000 per year for the initial square mile area, and $500 for each additional square mile, with a cap of $100,000 per year.

In September 2007, EarthLink abandoned plans for citywide expansion, calling the business model 'unworkable'[16]. By May 2008, EarthLink announced it was planning to sell the wireless network in New Orleans, believing that business based on free, municipal wireless services was not viable.

While it seemed that New Orleans had been able to remove the barriers other major U.S. cities face in becoming wireless, this did not necessarily translate into economic advantage or success. In the case of New Orleans, WiFi could have made a difference in accelerating the city's long term economic recovery and viability and been a model for disaster recovery for cities across the country. The following section demonstrates how WiFi could have addressed many of the post-Katrina economic development issues in New Orleans from a backend perspective and how it can provide lessons for other cities.

PUBLIC SAFETY AND DISASTER MANAGEMENT

A primary area component that enables economic development is a safe environment. A safe environment is a result of the three components of public safety– police, fire, and medical – being able to do their jobs efficiently and effectively. The New Orleans Police Department, along with most sectors of city government, suffered budget cutbacks in the wake of Hurricane Katrina. The NOPD budget dropped from $124 million in 2005 to $96 million in 2006, a 22 percent cut[17]. Even though over 95 percent of the NOPD budget was allocated toward salaries, the total number of officers decreased from 1,668 to 1,486 from the previous year[18].

While the city population and crime was initially at lower levels than prior to the hurricane, crime increased past pre-Katrina levels in 2007, while the NOPD was still faced with manpower shortages. WiFi had the capacity for the NOPD to function more efficiently with decreasing resources.

Having a citywide WiFi zone or cloud in place enables officers to quickly access DMV records, gang databases, booking photos, virtual lineups, criminal records; monitor wireless video surveillance (which was instituted in New Orleans pre-Katrina); access fingerprint databases, Megan's Law information, computer aided dispatch; and file police reports from the field through a secure link[19].

Morrow County, in eastern Oregon, is a primary example of how WiFi can translate increases in police efficiency into realized monetary savings. In the past year, the 23 police officer force in Hermiston, Oregon,

estimated that it saved approximately 2000 man hours by using WiFi – or 86 hours per officer[20]. In terms of the NOPD, this would translate to over 100,000 police officer man hours saved per year. In a city that led the nation with a startling 72.6 murders per 100,000 people in 2007, this would have allowed the NOPD to operate more efficiently and effectively, even with a reduced and still shrinking force. While cutting down on overtime hours, the high speed collection and transfer of information would result mainly in backend savings, with quicker response times, more arrests per officer, and ultimately, greater safety and security for the citizens of New Orleans.

Coverage areas have an ever greater reach.

Disaster management, which had become a priority in post-Katrina New Orleans, would also have become far more effective. New Orleans quickly descended into chaos in the days after Hurricane Katrina when communications and power were lost. Hospitals, police, fire departments, and the city government were reduced to relaying messages in person or through short range walkie-talkies.

With technological advances in hardware, it is now possible for police and other city vehicles to be mounted with Mesh Enabled Architecture (MEA) radio modems. These vehicles are known as 'ruggedized units.' These units detect other units, and an ad hoc network automatically forms between them when in range of one another[21]. If confronted by another disaster, natural or man-made, emergency coordination among the mayor's office, police, fire department, and hospitals would be possible with even severely limited communication capabilities.

PUBLIC WORKS

A city's economic development capacity and success is affected by the ease in which the city government can interact and provide services to its citizens and businesses. Specifically, city government services in the public works sector – those that deal with construction and utilities – are vitally important. One of the most vital processes involved in the city's recovery (economic as well as physical) is the reconstruction of homes and businesses. However, this process requires the cooperation and interaction of a number of groups involving regulation, inspection, and permitting.

In a city such as New Orleans, with 18 local and national historic districts, regulations tend to be more numerous and restrictive than other cities. Delays in the already complex permitting process mean that developers and property owners are waiting increasingly longer for project approval, hampering the city's recovery efforts.

Building inspection in particular can be a time consuming effort. Typically, building inspectors must make a site visit and then return to their office to file a report. A city-wide WiFi zone would allow this process to become more efficient.

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The city of Greensboro, North Carolina, accelerated its building inspection process by enabling inspectors to access databases and file reports from building locations. Greensboro officials estimate that each of the 32 building inspectors saves an average of two hours per day by using WiFi[22]. That translates to 320 man hours per week that are saved by building inspectors. Even with a limited wireless network in place in downtown New Orleans, officials from Safety and Permits were performing more functions on-site, averaging 3,000 permit related inspections of storm damaged property per month in the months after the storm[23].

TOURISM

For the last 15 years, tourism has been the lifeblood of the New Orleans economy. As of 2004, the hospitality industry was the second largest employer (79,700) behind the state and local governments (88,567) in the New Orleans metro area[24]. While the city looks toward economic diversification in the future, rebuilding the city's tourist economy is viewed as a vital step toward recovery.

New Orleans occupies a unique place in American history. The combination of history, architecture, music, art, natural landscape, celebrations (both big and small), and multi-cultural overlap makes New Orleans a popular tourist destination. By using WiFi, New Orleans had an opportunity to not only achieve previous levels of tourism but exceed them by enhancing the city's attributes through the organization offered by the city's WiFi portal. This is essentially a detailed homepage of all the city's businesses, organizations, and activities.

A critical area of the tourism sector that New Orleans relies upon is from conventions and trade shows. New Orleans has historically been one of the dominant convention center cities, ranking fourth behind Las Vegas, Orlando, and Chicago[25]. The Ernest N. Morial Convention Center attracts an average of 95 conventions per year and event activity has attracted more than 10.3 million out-of-state visitors, generating a statewide economic impact of $13.52 billion in direct spending, $22.32 billion in secondary spending, and $1.93 billion in new tax revenues for city and state coffers from 1985-2004[26].

As WiFi is quickly becoming the popular addition for any city's marketing cache, with more than 300 cities and other public entities launching their own versions, certain questions and concerns need to be raised. First and foremost is WiFi practical for all cities? Not every city is WiFi friendly or ready.

Like most cities with convention centers, the Morial Convention Center offers WiFi, as do a number of hotels in the downtown area. This does not present any type of advantage over other convention center locations. However, a WiFi cloud, as opposed to localized hotspots or zones, offers users (both visitors and locals) access to a 'portal' or homepage once they are logged on to the network. A portal essentially organizes the city's information, amenities, and events schedule.

While current visitors to the city will tend to congregate in areas they know to have functioning businesses (Bourbon Street), the portal will allow visitors to observe which businesses are actually open. This may be essential to newly re-opened restaurants, shops, museums, art centers, etc. that are struggling due to lack of visitor awareness. Additionally, a portal offers the opportunity to accomplish tasks, such as viewing menus, making reservations, ticket purchase, and event registration from anywhere in the city, saving time and enhancing the visitor experience. Such amenities would contribute to the New Orleans economy long after recovery has occurred.

CONCLUSION

As WiFi is quickly becoming the popular addition for any city's marketing cache, with more than 300 cities and other public entities launching their own versions, certain questions and concerns need to be raised. First and foremost is WiFi practical for all cities? Not every city is WiFi friendly or ready.

A number of cities have bought into the municipal WiFi concept, viewing it as a frontend cash generator – where the bulk of profits are derived from residents who choose to pay the city for the fastest WiFi available. Aside from the failure of municipal wireless in New Orleans, a prime example is that of Lompoc, California. The central California city with a population of 42,000 has spent over $3 million of taxpayer money building a municipal WiFi network. In order to break even, the city needs 4,000 subscribers. It currently can count only a few hundred. Because of this trend, larger cities such as Philadelphia and Portland have now begun to reassess the potential cost and profitability coming from the frontend.

The cities that will be successful are the ones that are willing to lose money in the initial phases by building a WiFi infrastructure that lays the groundwork for backend economic development opportunities first and frontend profitability second. It also means that cities will have to be willing to give up control to private entities to run systems for them to be successful. They also must be willing to ensure that private companies are able to be profitable, as companies such as Earthlink are either scaling down their municipal programs or are taking a much longer due diligence process to decide on which cities are the right choice. Previously, companies signed on with cities just to have the right to serve the city, but now there is a shift where companies are demanding much more from cities, such as making them contractually obligated to buy a certain level of service. This may prove to be too great of an economic stress for some municipalities to handle.

Secondly, cities must work with providers to limit the problem areas and competition in their own marketplace. Accessibility is a major issue confronting many cities that are enacting WiFi. The complaint most often cited is that users have difficulty in receiving service inside their homes. This will be an important issue that will have to be rectified. Also, cities might be pushed aside by the marketplace in that a common incentive for many coffee shops is free WiFi access, which will be detrimental to fee driven service which muni-WiFi must put forth to be successful.

Finally, WiFi will not be a panacea for New Orleans or any other city but rather will be one of many tools in an economic development tool kit. Municipal WiFi could surely help city services such as fire and police to stay better connected. It could also be beneficial to economic growth and in encouraging people and businesses to cluster in the city's core. Only time will tell if the municipal WiFi will prove to be a viable and profitable venture for cities and citizens alike.

ENDNOTES

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