

LEADING THE FIELD

Forward looking thoughts on
Urban Tech and Innovation

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In 2014, a building explosion in New York City's Harlem neighborhood killed seven people and was attributed to a leak in the gas main leading to the building. That gas main was 127 years old and one of many gas mains in urban cities over 100 years old. Since the 2008 financial crisis, rents have increased by 22% while incomes have decreased by 6%. In almost all cities, including New York, San Francisco, Los Angeles, Philadelphia, Washington DC, Boston, Chicago, Atlanta, Miami, Dallas, and Houston, there is a significantly larger renter population than available rental units can support. In San Francisco, the renter population (33%) is more than double the available rental units can support (15%). Urban innovation addresses concerns and hazards such as these and has driven the change to make community living possible for centuries. Think about some of the earliest innovations that made living in urban communities possible at all - sewage systems (500 BC)¹, elevators (1853)², and the NYC subway (1904)³.



Flash forward to today, hundred-year-old infrastructure is not holding up, rents are rising faster than wages, and affordable access to jobs is not a reality for many people. Coupled with these issues is the unfortunate truth that public confidence in the government's ability to relieve these problems has reached an all time low.⁶ In 2017 roughly 83% of our population lived in urban areas, and by 2050 that number is projected to increase to 90%.⁵ People's greater desire to live in urban areas is forcing urban technology to advance at a greater rate than ever before.

Urban Tech Verticals

Cities are built on thousands of seen and unseen moving components that allow it to function. Given this complexity, urban tech naturally has many verticals within it. Although investors and entrepreneurs may group urban tech into slightly different verticals, we will address four verticals in this deep dive - built environment, mobility, smart energy, and cleantech.

The built environment vertical includes anything that can improve the way we build, what materials we use to build, and tools to manage buildings. This vertical includes technologies like 3D printing, robotics, and modular construction. Mobility includes anything that is helping people and things get from place to place more efficiently. It has become a relevant category due to the emergence of autonomous vehicles. Smart energy technology involves the management and deployment of energy sources. There are two types of smart energy technologies that have been fighting for the stage, localized energy sources and smart grid solutions. Cleantech involves any technology that decreases the environmental impact of our growing urban cities.

Challenges for Urban Technology

One of the biggest barriers to entry, specifically for smart city technology, is the lack of open data. Urban data is critical to developing smart traffic solutions, transpor-

tation technology, energy regulation systems and much more. Much of the data in demand is owned by private entities who are reluctant to share it. In 2014 it was estimated that only about 22% of city datasets were open, but by 2016 that number had more than doubled to 54%.¹¹ Dr. Christopher Mitchell is an NYU alumnus and the founder of Geopipe, a company that applies machine learning and other algorithmic approaches to produce semantically rich, immersive, interactive-ready models of the real world. Dr. Mitchell explains that

“...putting the real world into virtual space is vital to many verticals, but creating these models today takes thousands of dollars of data collection and weeks to months of painful, manual modeling.”

Another big challenge is the collaboration required to launch an urban technology. Collaboration is required between urban tech companies, private entities (ie. energy and gas companies) and local governments to actually launch a product in an urban market. Dr. Mitchell explains “urban tech founders face particular challenges in deploying and testing solutions before they have the resources to scale to the geography and population of entire cities. We’ve found that with the growth of interest in urban tech and smart cities, however, that a support system has been equally rapidly springing up to support it.”

In some cases, finding workarounds, making adjustments to fit regulatory requirements, or changing regulatory requirements are a big part of this collaboration. Think about Uber. For companies such as Uber, every city the company expands to precipitates an uphill legal battle that does not guarantee success. Shaun Abrahamson, Managing Director of Urban.US, explains, “We don’t mind regulatory issues but like to have a sense of how regulators are engaged.” For urban technology there is also a high cost of abandonment. Think about replacing an energy grid, putting sensors across a grid of hundreds of thousands of water pipes to monitor functionality, or replacing gas busses with electric busses.

As a result of these challenges, urban innovation may first take place outside of the Americas and Europe, where regulation may be less strict. Some of these cities, like Sydney and Singapore, are megacities of tomorrow and have the potential to advance more quickly than existing cities like NYC and LA because these barriers to entry are weaker.

What the companies that control today’s world are doing

It is not surprising that Microsoft, Amazon and Google have each been playing their own role in the urban tech movement. The tremendous amount of financial resources they have can greatly reduce barriers to entry. More importantly, while most startups have to fight to capture the attention of local governments, these four industry leaders actually have leverage over city governments. Every growing urban area wants a piece of one of these companies in their neighborhood - think of the recent bidding for Amazon’s HQ2.

Google’s poster child for urban innovation is Sidewalk Labs, which they founded in June 2015. Sidewalk Labs is a startup run and funded by Google with the purpose of developing technologies to improve urban life by either building, buying, or investing in them. In October 2017, Google announced a partnership between Sidewalk Labs and

Waterfront Toronto to launch and test new urban technologies in the undeveloped area in Toronto. This project is likely to turn into an exhibit of the potential impact of urban technology on cities.²⁰

Over the past 5 years, Microsoft has pursued multiple initiatives and partnerships to promote and develop urban technology. In 2013, Microsoft launched CityNext, a global initiative focused on making cities more livable and sustainable.²¹ In 2015, they partnered with Chicago based UI Labs to launch CityWorks. CityWorks is more focused on testing and launching urban innovation that Microsoft has worked on than CityNext, specifically in Chicago.²² In early 2017, they announced their Smart Cities for All initiative, a toolkit for city leaders to help them align smart city initiatives with the needs of the disabled. In November 2017, Bill Gates announced an \$80 million investment to develop a smart city just outside of Phoenix.

Amazon has been slightly less active in urban innovation, but their delivery services stand alone as an innovation in mobility. Beyond that, their most notable contribution has been through AWS, which now powers many smart city solutions. They have an AWS IoT Competency Partner program, which promotes IoT solutions that have achieved technical efficiency and proven customer success.

The Impact of Emerging Technology on Urban Tech

Artificial intelligence is likely to have the greatest impact on urban technologies that require the analysis of large data sets, such as autonomous vehicles and mobility technology, and healthcare. As artificial intelligence improves, cars are likely to become better drivers than people. With that, as autonomous vehicles become more common it is more likely that people will live further from work, and potentially cities, causing a movement away from urban areas rather than to them. Artificial intelligence will also play a crucial role in transportation planning as cities are able to better understand mobility patterns.

We haven't spent much time talking about healthcare, but it is obviously one of the most critical industries in any urban area. As the population rises, healthcare services must keep up. AI applications in the healthcare industry have ranged from robotics to assist in surgical procedures, and mining social media for health risks. There is a massive amount of diagnostic data that artificial intelligence can finally bring to life and use in more efficient ways. Many of these technologies have been facing the traditional barriers for urban technology, such as FDA approval and customer buy in.

Blockchain will play a critical role in making data securely available for urban technology development. In fact, it is already starting to. At the end of 2017, four pilot programs of DECODE (Decentralized Citizen Owned Data Ecosystem) began in Europe. DECODE is a consortium of 14 organizations across the European Union that allows citizens to choose what data to openly share to be used to develop technologies to improve society.²⁷ This data will then be securely stored on a blockchain.²⁸

Blockchain will also play a critical role in energy tech. There are two trends fighting to define the future of energy - utility companies are focusing on "smart grid" technologies and new entrants are looking to provide renewable energy sources at the local level. No matter which one of these new methods prevails, blockchain will play a critical role in its development.

When thinking about AR and VR, recognize that growth is more about how smart city technology will help improve AR and VR, rather than how AR and VR will improve smart city technology. These technologies are most powerful when there are large inputs of data, which has been fueled by the increasing amount of data that is being made available by city governments and private sector companies. Dr. Mitchell explains that “the most notable trend we’ve seen in the urban tech landscape in the past few years has been an interest in semantic data about cities. We’ve seen this in cities’ increasing willingness to embrace open data describing everything from spatial characteristics to transportation usage”. Two examples of AR technology we are expecting to see in the immediate years ahead are urban exploration tools and safety applications, most falling within the built environment category.

Urban Tech Fundraising

Venture capitalists typically have a checklist to complete before they invest in a startup. Usually, clear go-to-market strategy is somewhere high on that checklist. In the urban tech space, many investors look first at the size of the problem the founder is trying to solve, and scalability shortly after. A variety of funding opportunities particularly for urban tech have gained popularity.

Shaun Abrahamson, Managing Partner at Urban.US, explains,

“Urban tech can be similar to sectors like life sciences in that there is initial funding that comes from the public sector (e.g. universities and governments) as their focus is to improve quality of life. The best way for urban tech companies to leverage these resources is to think of grant funding as a replacement for angel investments. Use that capital to prove out an initial business case and you can minimize dilution and future capital requirements (both areas of concern for investors down the line).”

In New York, the NYS Research and Development Authority (NYSERDA) has made countless investments and partnerships to invest and incubate urban technology. They gave a \$10 million grant to Powerbridge NY to identify promising early stage energy technologies, and also are one of the most active urban tech investors in the region. The NYC economic development corporation has also been actively investing in urban initiatives, such as the Urban Future Lab to incubate and provide support to urban technology and Urbantech NYC hubs at the New Lab and Grand Central Tech in Brooklyn and Manhattan, respectively.

Industry leaders also invest a large amount into urban initiatives relative to their business. For example, UPS has invested more than \$750 million into alternative fuel and advanced technology vehicles since 2009.²⁵ Abrahamson explains that “corporate VC used to be dominated by tech VCs like Intel and Google. People forget that most tech firms grow quite a bit via M&A. Now this approach is coming to other “non tech” sectors. This changes deal dynamics... many VCs dislike having corporate VC in seed stage deals - in our view this is mainly driven by fear of competition because corporate VCs are less sensitive to deal prices and therefore put pressure on traditional VC returns.”

Lastly, we have seen a variety of accelerators and venture programs putting an emphasis on providing advising in addition to financial resources. This actually helps to align the company and the investors interests, both want to succeed. Examples of this include

Sidewalk Labs, explored earlier, Dreamit Ventures, and Urban.Us.

Where VCs see opportunity

Many VCs are continuing to predict massive amounts of capital flowing into the mobility sector, mainly because of the continuing rise of autonomous vehicles. However, it is also noted that there are some trends hidden underneath this big picture. Abrahamson explains,

“Mobility is the area we expect will remain the biggest area of change in cities. It’s hard to think that Uber and Lyft might be rendered uncompetitive in a world of self-driving fleets, but this is very possible. But this also misses some big changes in logistics and reverse logistics. The problem in this area is where to invest - there is so much money available and this is typically not correlated with good investment returns.”

Brian Yormak, a partner at Story Ventures, explains some of the trends we may see related to the growth of mobility. “One interesting area to watch over the next decade will be the impact of autonomy on high-fixed cost transport (e.g., rail and plane). In a world in which people can sleep through rides (in vehicles designed for overnight transport) I imagine higher cost services will struggle. It’ll also be exciting to watch the work done for groups like the elderly, low-income, disabled and youth. All are currently mobility constrained by access and cost and all should benefit greatly from autonomous systems. Companies like RideHealth are already leveraging TNCs (e.g., Uber and Lyft) to provide better access to hospitals for specific groups -- this trend should only continue with autonomous systems.”

Looking Ahead at Urban Technology

Implementing change in any system as complex as a city is complicated. It forces industry leaders and innovators to develop answers for questions that didn’t exist before. For example, if a self driving car is about to get into an inevitable crash, towards which innocent pedestrian does it swerve? How will the decline of certain industries, like retail, spark urban innovation? What are the effects of urban technology on gentrification? How will parking spaces be repurposed once usage has been optimized by smart city data and technology?

Questions like these reflect some of the biggest challenges for urban planners and policy development over the next several years. Now it is up to urban founders, government leaders, and local citizens to determine the answers.