

Smart Cities at the Crossroads:

NEW TENSIONS IN CITY TRANSFORMATION

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SUMMARY

The Smart Cities movement has produced a large number of projects and experiments around the world. To understand the primary ones, as well as their underlying tensions and the insights emerging from them, the editors of this special issue of the *California Management Review* enlisted a panel of experts, academics, and practitioners from different nationalities, backgrounds, experiences, and perspectives. The panel focused its discussion on three main areas: new governance models for Smart Cities, how to spur growth and renewal, and the sharing economy—both commons and market based.

KEYWORDS: public sector, innovation, growth strategy

In recent years, the Smart Cities movement has completed an entire hype cycle. It is difficult to find a region of the planet where cities have not embarked on some form of Smart City initiative. However, this movement has been as widespread as it is diverse. Together with the enthusiasm for urban renewal and the focus on sustainability, a variety of themes difficult to categorize and evaluate emerged under the panoply of intelligent cities. “Smart Cities” is a concept that encompasses most of the areas where local governments operate: transportation, civic entrepreneurship, democratic transparency, clean energy, and services provision. One commonality emerges: the use of information technology (IT) as a transformative mechanism to make these areas “smart.”

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This diversity in both definition and objective, accelerated by the hype, has produced a thousand flowers in the ethos of urban renewal. Smart City projects can be found everywhere: attempting to solve traffic congestion, the creation of an army of civic techies working with Open Data, solving the energy crisis, or novel governance models such as participatory budgeting. All these projects had their own share of success, failure, unintended learning, and serendipitous outcomes. However, while some of them spawned new social meanings, governance models, or city interactions, others will be forgotten forever.

To understand some of the most salient questions, challenges, and insights that emerged from the Smart Cities movement, we enlisted a panel of well-known experts, academics, and practitioners representing different nationalities, experiences, and perspectives. We engaged with them in a discussion of some of the most puzzling and potentially transformative issues that the Smart City movements have rendered.

Our expert panel includes Carlo Ratti, Director of the Massachusetts Institute of Technology (MIT) SENSEable City Lab and one of the most recognized academics in the field; Jonathan Wareham, Dean of ESADE Business & Law Schools, very interested in Open Data in cities; Pilar Conesa, curator of the Smart City Expo World Congress, probably the largest congress in the field; Francesca Bria, Chief Technology and Digital Innovation Officer of the City of Barcelona; Anibal Gaviria, Mayor of Medellín from 2012 to 2015, a city controlled by narcotic trafficking and drug cartels that was transformed into one of the most culturally vibrant cities in Central and South America; and Amy Edmondson, Professor at Harvard Business School, an expert on complex team collaborations that lead to innovation.

Our panel began by considering the new, experimental forms of management explored in Smart City contexts. Traditionally, city administrations focus on ensuring order and public safety, democratic governance, and the maintenance of public infrastructures and the provision of services such as basic utilities (water, sanitation), public health, and education. Within services, some cities have emulated technology platforms that successfully develop services with third-party organizations, in a similar way to how Apple and Google enlist app developers for their platforms. This platform-based governance led to conceptualizing the city as the orchestration of ecosystems, where local governments can have a direct role in service provision or, in other instances, act as enablers supporting independent actors. The significance of this new operational modality of cities cannot be underestimated, not only because it is central to their mission but also because of the tensions that arise with its introduction.

Discussing this widespread change in roles, Carlo Ratti highlights the importance of citizens:

I think municipalities are starting to understand the importance of this approach. Most urban transformations are the result of a joint effort between different actors (government, industry, etc.). We think that citizens in particular

should have a key role through “bottom-up” dynamics. So, rather than focusing too much on the installation and control of hardware—fixed, static “sensing systems”—it is important for governments to get people excited about creating apps and using data themselves. If we can develop the right platforms, people can be the ones to address urban issues.

Pilar Conesa on the contrary focuses more on governance and the need for a legal framework that could support it:

In the last decade, and to adapt to the current times, governments have had to rethink themselves in many ways. One of the most relevant changes has been the conceptual shift that is taking us from understanding Governments as providers of services, to thinking of them as data facilitators. Today, with the ICT (information and communication technology) and Big Data, instead of offering services to citizens directly, governments are rather expected to facilitate the information they collect from citizens to entrepreneurs and start-ups, so they can provide public services in a more efficient and sustainable way. This is, in my understanding, a better and more efficient model of governance.

The more data accessibility governments offer, the better public services will be delivered. That is why another of the important steps for city governments is to require big enterprises to share the data they collect from their users. For that, of course, there is the need to work on new business models and a legal frame so these companies can get an economic return for the information provided in the case that the final services will get revenues.

This said, governments should also develop new laws regarding personal data protection, because big companies such as the telcos, banks, and Internet operators have incredible amounts of information about every one of us. We need to think about solutions that allow these companies to continue providing their services, with a better data protection for individuals.

One of the best examples of this vision of cities as ecosystems extending beyond the competences of local governments is the extraordinary transformation of Medellín. A city once dominated by crime and drug cartels that now is an example of economic and social progress. Anibal Gaviria, former Mayor of Medellín, expresses the vision behind this transformation as this:

Medellín is a Colombian city that suffered the effects of violence more than any other city in our country. In the late 1980s and early 1990s, Medellín was unfortunately renowned as the world’s most violent city. However, in just a few decades, the city transformed, and in 2012, it was recognized and granted an award by the Wall Street Journal, City Group, and the Urban Land Institute as the world’s most innovative city among 150 cities in five continents.

How did the City of Medellín accomplish the miracle of going from hell to heaven in 20 years? What was the key to Medellín being reinvented in so little time? As the former mayor of Medellín (2012-2015), I must emphasize the ability

and vision of the city that, at the height of the violence, firmly decided to structure a public-private institutional fabric that would give rise to stable, long-term policies. Our city created and strengthened more than 20 institutions, companies, and universities, whose initial formation, in some cases, occurred in a public-private joint venture, and in other cases, with public capital only. However, in either scenario, the boards of these institutions contained a significant percentage of members from the private sector. Today, many of these institutions run successful programs guided by the municipality through various public policies.

An outstanding case of this model of development and transformation of the city is Ruta N. Created in 2009, this institution is in charge of leading the innovation and business model of the city. It has been promoting the development of a system of innovation and entrepreneurship by design, through various local programs, where different actors in the ecosystem—citizens, entrepreneurs, startups, universities, research groups, and others—permanently interact to generate synergies and collaborative work. Proof of this is the University-Industry-State Committee, which for the past 14 years has held monthly meetings for researchers to present their work, for companies to raise their needs for research and technological development, and for the state to generate support programs for the parties. Under the Ruta N framework, we have created programs like Mi Medellín, an open innovation process based in co-creation and citizen participation, where citizens help solve city challenges. Projects of this kind stimulate co-creation and help unleash the collective intelligence in our city. The magnitude of this type of proposal is worth mentioning as the Mi Medellín platform has received more than 14,000 ideas from thousands of Medellínenses.

Even so, in this open innovation model, we were always conscientious that connecting the government with citizens to have a purposeful dialogue rather than a critical one was not enough. We understood that it is important for us to connect with the world, to share and bring ideas to collaboratively solve common challenges and also receive feedback from the global scene about our experiences. For us to achieve this, we created Cities for Life (CFL), a global network of cities and citizens that come together virtually via the CFL platform and physically at the annual CFL Global Meeting. In 2015, we held the first CFL Global Meeting, in which more than 100 cities from 50 countries actively participated in high-level dialogues and co-creation sessions. This year the CFL Global Meeting will be held in Paris.

Finally, I must mention the Great Medellíninnovation Pact, where 2,800 entrepreneurs came together to commit to invest 2% of their gross domestic product into science, technology, and innovation.

All these coordinated actions from our government between 2012 and 2015 enabled us to strengthen a system of public-private joint innovation-oriented model which is now the model in Colombia and Latin America.

Amy Edmondson provides some clues on how to activate these ecosystems¹:

The policy of local governments must start with enabling collaboration. At the very least, local governments today must collaborate across sector boundaries. Doing this well starts with intensive listening and, through listening, identifying potential partners with whom to pursue innovation work. Diverse partners—from industry, academia, planning, design, and more—bring capabilities that local governments lack (and vice versa). In short, it is not easy to articulate the best policy today, given the current state of the art. The only best policy at this point is to learn, and learn as fast as possible, about how to team up across boundaries.

In these ecosystems, both commons and digital infrastructures are basic elements.² Francesca Bria, CTO (Chief Technology Officer) of Barcelona, discusses which new commons and digital infrastructures cities should focus on in order to better develop civic ecosystems:

Access to and control over data has become a strategic asset for cities. A study by London School of Economics for the European Parliament argues that centralizing computing, data storage, and data-driven service provision closes down the innovation ecosystem, favoring incumbents and dominant players. In time, it constrains user-driven innovations, particularly those oriented toward social impact and those that do not involve monetary transactions and commercial uses within an established market.

Although the platform economy has a clear potential to generate huge economic impact, there are several important issues that need to be resolved (first and foremost around ownership, control, and management of personal data). The current digital ecosystem and IoT landscape is highly fragmented, with a multitude of non-interoperable vertical solutions, all offering their own set of devices, gateways and platforms, and means of data handling in data “silos.” This fragmentation makes data unmanageable and end users ultimately lose control over it. This status quo arises because small SMEs, start-ups, and other innovators cannot see a clear value proposition in offering open, horizontal, interoperable components and data-driven solutions. The cost of engineering such solutions from scratch makes them unaffordable.

Cities should aim to disrupt this data accumulation, making data available across vertical silos experimenting with decentralized data infrastructures and distributed ledgers such as blockchains and proposing new frameworks and business models that rewards and incentivize openness, enabling data discovery, transaction, and secure data sharing.

Cities should also design new legal, economic, and governance schemes to foster collaborative behaviors by individuals to contribute to digital commons, including those involving personal data. The goal is to foster open and socially beneficial behaviors like those that fuel free software, Wikipedia, Open Street Map, and other digital commons. Today almost every great advance is a platform advance, and when we have common standards, so much more happens.

One of the main pillars used to advance the idea of Smart Cities as an open ecosystem is open data. However, after years of numerous coding hackathons and other open data extravaganzas pushed by municipalities, naming a successful open data based app remains elusive, much to the dismay of the policy makers that sponsored them. The reasons for this lackluster reception have been well explored³: unrealistic expectations, limited standards, small local markets, failure to raise backing capital, and so on. After the first wave of meager open data app adoption, a number of modifications to the governance of open data platforms were made. Jonathan Wareham explores several of the lessons learned by the sponsors of the first generation open data app tournaments:

The value of open data is still potentially very large. One assumption was that the data would generate a great deal of economic stimulus through new businesses and services. However, what was often seen was a similar socio-demographic (younger people) attracted to this space, developing apps related to consumption and transportation (restaurants, entertainment, busses, etc.). Although this is not bad, it ignores the vast majority of the activities that municipalities actually deal with. Cities have huge budgets and collect large amounts of data on critical but less glamorous elements of civic society such as public safety (law enforcement, judiciary, emergency services), public health (medical, sanitation, disease control), and public infrastructure (roads, environmental control, public parks). This is perhaps not the kind of data that directly appeal to young hipsters frequenting restaurants and nightclubs, but represents huge financial budgets for the cities. Here there are tremendous opportunities for more transparency, accountability, and efficiency, and the development of apps that integrate and augment the service provision provided by municipalities. These areas are not necessarily directed toward the consumption patterns of the younger demographic, but have massive potential impact in transparency, efficiency, and efficacy.

Carlo Ratti looks at its long-term potential:

Open data are very interesting. The issue is that most of what has been opened so far are data that were already available one way or another (think about urban GIS [geographic information system] information). So, opening it has facilitated access—and should be promoted at all costs—but has not been a great game changer. The real game changer would be the immense wealth data that we generate as individuals, but although that is accessible by some of the large IT companies, it cannot be “opened” because of privacy reasons.

However, to achieve this potential, open data initiatives need to first address some major concerns, as Jonathan Wareham points out:

In the area of open data apps, one still has the problem of each city re-inventing the wheel. Common municipal coding semantics, standards, and repositories should be developed (like OASIS), perhaps under the W3C (World Wide Web Consortium).

This quest for ecosystem management also requires the attraction of talent to revitalize the cultural and economic vitality of communities. Innovation districts have been the tool of choice for city transformation for quite some time. However, now innovation in cities is very different than years ago. Tech companies are flooding the center of major cities. Co-working spaces are becoming the new normal for small entrepreneurs and freelancers. In some cities, co-living is taking off. Pilar Conesa discusses the evolution of Innovation Districts:

Innovation Districts are a key element for fostering innovation and talent ecosystems in cities. These districts, as the word says, are usually placed in a specific place of the city, and this is not enough. Innovation is beneficial for cities and therefore, instead of being concentrated in a single area, it should be spread around town. Each spot can have a different focus and offer different services, but it is good to have it all around, so the whole city can benefit of it, and evolve.

Today, starting a business or a project is not as difficult as it used to be. We have a lot of services on the cloud, and the tools we need are much cheaper. Sometimes we do not even need to rent a space, many start-ups and other projects are being produced from our own homes, garages, co-work spaces, or just laptops that move around.

An example of how innovation can spread in cities is the big number of centers that are being open in many cities to host the Maker Movement, a contemporary subculture based on technology and the rise of openness in technology and innovation. In Barcelona, for example, we can see that with the FabLab, an initiative of the Institute for Advanced Architecture of Catalonia that gives support to different educational and research programs related to innovation and new technologies, or with Ateneus de Fabricació, a public service that offers different spaces of co-creation in different boroughs of the city, and that fosters bottom-up initiatives, participation, social innovation, and collaborative economy.

Carlo Ratti explores its current reality:

I think that we will see more and more innovation places in cities across the world. To a certain extent this is already happening. In Berlin, a new start-up is said to be founded every 20 minutes. Paris is busy building what will be Europe's largest incubator at Halle Freyssinet. In Tel Aviv, the phrase "Startup Nation" has gone from a political slogan to an economic reality. Even with its cycles of violent conflict, Israel has built a high-tech environment that some experts say is second only to Silicon Valley—one in which government, the military, academia, multinational corporations, venture capitalists, and angel investors work in tandem to foster the risky business of launching companies. Tel Aviv was said to have the highest density of tech start-ups in the world. In 2009, there were 63 Israeli companies listed on the NASDAQ, more than Europe, Japan, Korea, India, and China combined.

There are several factors behind these kinds of dynamics. In a globalized world, capital flows have accelerated and extended their reach. Innovators around

the world are able to muster support from traditional venture capitalists or from crowdfunding platforms such as Kickstarter. Ideas move even faster—propelled, sustained, and strengthened by the Internet. The ability to turn them into reality is keeping pace, as global supply chains and new technologies like three-dimensional (3D) printing reduce implementation times. I think these will be key factors in the development of innovation districts in our cities.

Jonathan Wareham cautions on their nature and their perils:

The main concern I hear about innovation districts is that they are not innovation districts, but gentrified “consumption districts” that are OK for upscale services, restaurants, bars, and real estate development, but never generate any real production economies. What is the difference? Production economies generate more employment via ripple (second order) effects (services needed to support the production economies). In other words, having trendy lofts and nightclubs does not do as much for the economy as a factory or research institution, even if employment numbers are similar. One fact that can influence this is if the real estate values are so overpriced such that no normal manufacturing organization would ever consider locating in a trendy “innovation district.” So municipalities should consider tax subsidies to address this.

Innovation Districts can also become key for city regeneration, transforming problematic areas, and becoming a regeneration hub for the city. This was the case of Medellín, as former Mayor Anibal Gaviria describes it:

As part of our innovation strategy, we are transforming the Medellín innovation District into a place for urban, economic, and social transformation. This project is located on a site that was formerly the city dump. In the 1990s, it was one of the most violent places in the city. Today, thanks to this initiative, garbage and violence were replaced by a huge flower garden and a natural park that brings about coexistence and citizen interaction.

This 172-hectare project has been proposed to create a process of urban renewal under the concept of a “place to live, work, and develop technologies.” The district will strongly and increasingly promote the emergence of life and equity through innovation and new technologies.

Today, in the Medellín innovation District, there is the natural science museum Parque Explora, the University of Antioquia (which has more than 35,000 students), the recreational complex Parque Norte, the Botanical Gardens (which focus on biodiversity research development), and two very strong hospitals that specialize in surgical procedures and organ transplants. In addition, the Ruta N complex has 34,000 square meters of space for innovation and business, and a home for technology companies. It now houses 134 companies and start-ups from 22 countries, currently generating 2,017 skilled jobs.

Our district has an interesting typology as it seeks to be a living lab that will test technologies and pilot solutions in the area. It also strives to stimulate the

permanence of most of its original inhabitants, generating new employment opportunities and providing new benefits by using advanced technologies. To date, there have been more than 30 community workshops on issues such as urban planning and economic and social inclusion.

This is therefore an area where we have been migrating rapidly, going from hopelessness and insecurity to opportunities and technologies. In it, strategically we are redesigning and stimulating new urban furnishings, smart buildings, spacious sidewalks, bike routes, and, of course, high-speed networks that mobilize data and videos in an easy way. All this in the middle of a robust green area of endemic tree species that act as an important lung for the city. Finally, we have strengthened the institutional fabric in the area so that more than 48 organizations work with citizens and the business sector in strengthening their networks of cooperation and confidence building.

The sharing economy has emerged as a powerful disruptive force in many industries, and it is having a widespread impact on cities and the quality of life within them. Yet, there is an ongoing tension between the platform capitalism models of Uber and Airbnb and a more social-based view of the sharing economy. A key question involves regulation: what can or should cities do to encourage desirable sharing while restricting or regulating undesirable outcomes in ways that result in more equitable access to resources and services? Jonathan Wareham shares his vision for Barcelona and its new policies that aim at limiting one of its main industries—tourism:

Cities simply must have a consistent view of what their long-term public policy and economic objectives are. Barcelona is a case of a city that is rather schizophrenic about this. On one side, they know they are totally reliant on tourism incomes, yet they occasionally implement “anti-tourism” policies. There is nothing wrong with limiting sharing economies in the instance that it undermines a well-functioning, regulated industry that services the greater public interest efficiently and reliably. The general tenant of let the free market work—and regulate only when necessary—is valid. But one needs to examine the consequences of that regulation if it has secondary effects that negatively influence the economy/society. There are the general goals of public safety, public health, and universal access that, in some cases, can only be serviced by a well-regulated state-mandated monopoly while other cases don’t necessarily require it. It should be examined on a case-by-case basis. It is also important to remember that there is a strong temporal dimension to regulation. Regulators are appointed by politicians, and politicians represent incumbent industries/interests. When new business forms emerge that challenge the orthodoxy, regulators will naturally defer to the interests of the incumbents and other installed political interests. It may take one or more political cycles before regulation becomes current with the latest business modalities.

Carlo Ratti also complains about the missed opportunities due to the lack of regulation:

Every new disruption requires new regulations. I think that cities should adopt a “try and see” attitude, instead of the “block and see” attitude that we often see in Europe.

Gains could be immense. What is happening with mobility is a good example. Cars are idle 95% of the time—so they are ideal candidates for the sharing economy. Autonomous vehicles, for instance, promise to have a dramatic impact on urban life, because they could blur the distinction between private and public modes of transportation. “Your” car could give you a lift to work in the morning and then, rather than sitting idle in a parking lot, give a lift to someone else in your family—or, for that matter, to anyone else in your neighborhood, social-media community, or city.

A recent paper by MIT shows that the mobility demand of a city like Singapore—potentially host to the world’s first publicly accessible fleet of self-driving cars—could be met with 30% of its existing vehicles. Furthermore, this number could be cut by another 40% if passengers traveling similar routes at the same time were willing to share a vehicle—an estimate supported by an analysis of New York City taxis share-ability networks. This implies a city in which everyone can travel on demand with just one-fifth of the number of cars in use today. Such reductions in car numbers are just a lower bound and will depend on human adoption. However, they give us a sense of the possible impact on our cities. The cost of our mobility infrastructure could be lowered, as well as the embodied energy associated with building and maintaining it. Fewer cars may also mean shorter travel times, less congestion, and a smaller environmental impact.

Francesca Bria addresses the central problem of the lack of feasible business models for the commons-based shared economy:

Public policy efforts and billions of Euros have been spent promoting digital innovation for commercial and military purposes, but a lot less on reaping the public benefit of these technologies.

Digital technologies are particularly well suited to helping civic action: mobilizing large communities, sharing resources, and spreading power. A growing movement of tech entrepreneurs and innovators in civil society are now developing inspiring digital solutions to social challenges harnessing the collective intelligence of people. These range from social networks for those living with chronic health conditions to online platforms for citizen participation in policy making to using open data to create more transparency about public spending. This is the kind of commons-based sharing economy that society needs to foster and that in my opinion will scale in the near future.

One key reason cities and municipalities have so far failed to foster local alternatives to Uber or Airbnb is missing access to raw data. One of the aims is to demonstrate local open and decentralized data platforms, where people can use contextual data to guide meaningful decisions and actions.

Cities should explore how to build a commons-based sharing economy that is data centric but where the data that is generated and gathered by citizens, IoT, sensor networks, and open city level data, is available for broader communal use with appropriate privacy protections. As a result, a mass of innovators, start-ups, SMEs, NGOs, cooperatives, and local communities can take advantage of that data to build apps and services that are most relevant to them and the wider community. In Barcelona, we are working in this direction.

Pilar Conesa reminds us of the importance of cultural change in city councils to address this nascent sharing economy:

When we talk about the sharing economy, we usually refer to companies such as Airbnb or Uber. However, there are many other projects and companies that would better represent the spirit of a collaborative or sharing economy.

Airbnb and Uber are managed like big companies, but with a different base in their business model. Uber does not allow the service provider to decide about his or her own prices, whereas Airbnb does. This might seem an insignificant detail, but it is actually important in the way we conceive these types of platforms regarding the sharing economy, since naturally, the sharing economy comes from the collaborative movements, which is not very corporate and is much more open. On the contrary, these platforms set, more or less, the rules of the game.

Nevertheless, it has been made clear that these kinds of services are here to stay. So, rather than banning them, governments should accept them and develop new policies that help regulate the economic practices and competences they bring along.

About encouraging a sharing economy, governments should also implement two important things. First of all, they should set more sharing platforms for people in cities. An example of that would be “Pla de Buits,” a project by the Barcelona city council where they let some civil collectives to use plots in the city that remained empty for a long time, as a result of the 2008 recession and the collapse of the state bubble in Spain. Now we have several community gardens and community-managed open spaces around the city, and it feels much better for many neighbors. Another example is the platforms that let neighbors share books or tools.

Second, governments should, very importantly, foster cultural change, and not only externally but also internally, in public administrations. An example of this would be what the Offenbach city council did: since publicly owned cars were not being used in the weekends, the city government offered them to citizens. This is a clear example of how governments can start open initiatives and make cultural changes in their cities both internally and externally.

Amy Edmondson points out on the perils of a very skewed distribution of value:

I hope cities will keep the true aspiration of “sharing” social value in mind as they assess, facilitate, or promote new innovations in the so-called “sharing”

economy. Consider two kinds of value: simple economic value, accrued by one or multiple people; and societal value shared relatively equally among members of a community. Too much of the sharing economy is at risk for adding temporary and private economic value to a few, while slowly eroding societal value, such as worker rights and protection from exploitation.

Postscript

Through this conversation, we highlighted some of the most relevant tensions in smart cities. The first involving the form of governance, a tension between centering the efforts in the provision of services and understanding their role as an orchestrator of ecosystems of organizations that actively and independently collaborate in this provision. The second concerns the tension associated with the need for growth, affecting the way organizations and societies compete with regard to innovation. The necessity of maintaining and fostering existing structures clashes with the need to build new ones supportive of innovation. Finally, the sharing economy brings the tension resulting from the conflict between two different modes of production. How cities solve these tensions will certainly shape their future as smart city initiatives enter more advanced stages of maturity.

Author Biographies

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Notes

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