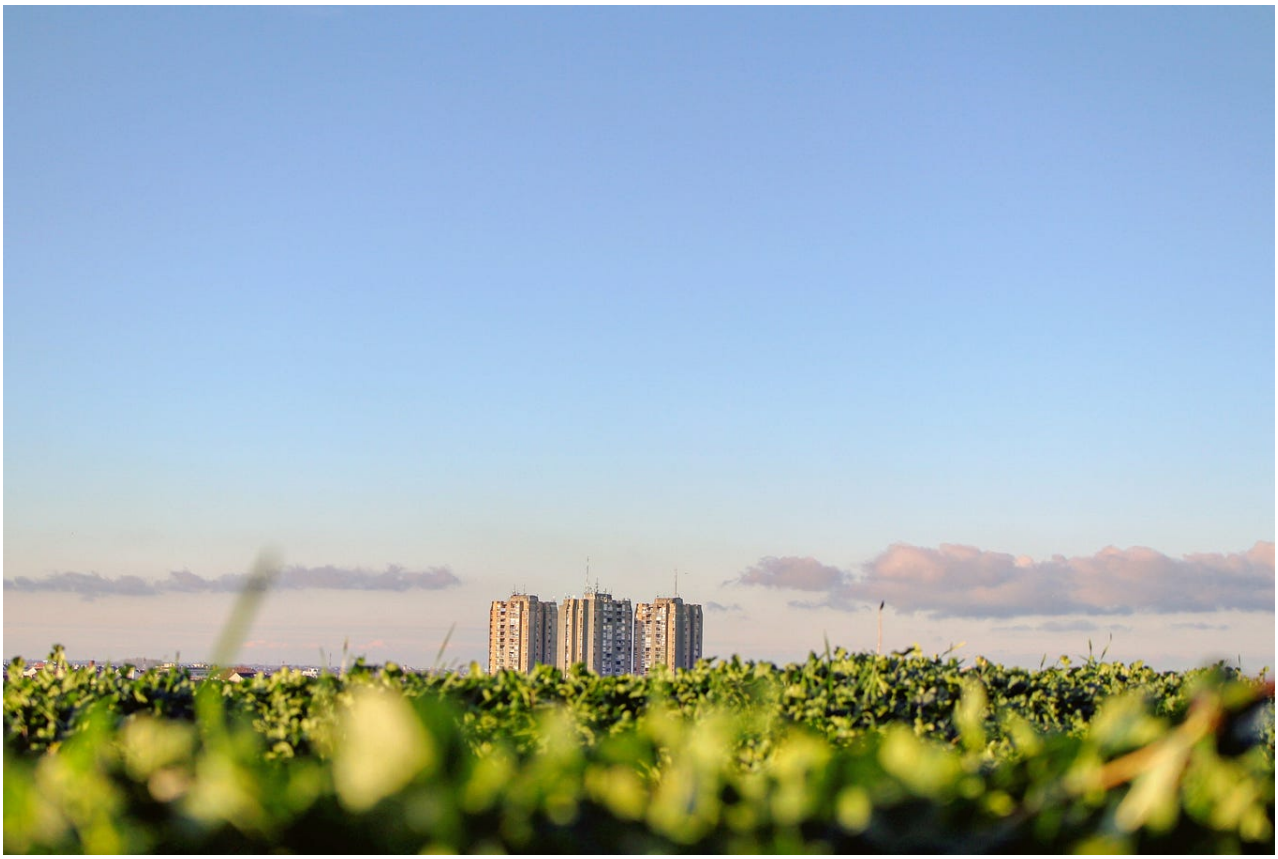
Why do we need smart(er) cities and how to build one

medium.com/user-experience-design-1/the-smart-city-primer-e4c4b7715819

Non A April 16, 2022



The Smart City Primer.

Ward's Island, Toronto, Canada. Photo by on

This article is a 'primer,' or a defining introduction to smart cities.

The need for a primer arises from the fact that there isn't a universally accepted definition of the term 'smart cities.' Given the term's novelty, this is to be expected; however, what concerns this primer is how the term's mixed reception leads to confusion.

While some believe the term is apt because it conjures up images of how technology and urban life are linked, others believe it is only applicable to technologists and professionals.

We are living in a very special time where half of the world's population is currently living in the urban environment, resulting in opportunities for both innovative success and unforeseen failure. It is, therefore, necessary for us to understand why and how cities can be smarter when catering to their citizens' quality of life.

This primer starts by asking ‘why’ we’re talking about cities and smart cities in the first place — why hasn’t there been a better time to discuss how to make cities more appropriate for how we live, learn, work, and play? Then, as we investigate this new concept of ‘smart cities’ together, this primer introduces ‘how’ the smart city trend is being utilized, as well as how it is shaped and reshaped by innovation.

This primer urges readers to consider problems both from the perspectives of the general public as well as those professionals who are in the midst of solving urban problems. The primer concludes with a discussion of ‘what’ we can do to help with this critical effort, which has far-reaching implications for our lives and livelihood.

The primer is intentionally brief in order to convey the most important information in the shortest amount of time. Its goal is to provide a clear introduction to smart cities, from which readers can branch out in the direction of their choice.

This introduction to smart cities may be your first, but it should not be your last! In fact, the success of this primer will depend on the manner in which it encourages and prepares you for your journey into the world of smart cities.

Let’s dive right in.

Setting the Stage

Before we start, let’s do a small exercise.

You are about to read a term. After which, imagine whatever that term evokes. Try to remember as much detail as possible from whatever picture that pops up in your mind. Do close your eyes if that helps.

Are you ready?

The term is ‘Smart Cities.’

Take your time.

.

.

.

.

.

If you are like two-thirds percent of people taking part in this exercise, the image that just popped up in your head is probably similar to this:

Some of you might picture something like Dubai or New York City, where high-rises dominate the skyline, and highways weave around buildings conveying vehicles at hyper speed.

Some of you might see a city where self-flying drones fly through the skies, robots walk the streets, and autonomous cars transport people and products wherever they choose to go: a metropolis where cutting-edge technology makes hyper-convenience possible. Some of you would see an image of a network of communication signals connecting all equipment in the city, allowing everything to be connected to a robust network that controls key infrastructure in the city, and thus sensitive to the demands of the people, much like in science fiction.

Some of you might see a high-tech intelligent operation room with numerous screens and dashboards displaying what is happening in key public locations in real-time. Perhaps it's an image similar to a scene in a film in which a superhero (say Batman or Iron Man) analyzes the complex visual information on the screen to help him figure out how to apprehend a bad guy. Some of you might have imagined a city that opts for an all-in-one smartphone app that handles everything from payment to ride hailing to restaurant reservations to public transport.

You are not alone if one of these images has suddenly come into your mind upon hearing the term 'smart cities'.

Indeed, these are images representing what is both in front of and behind some of the most awe-inspiring cities in the world, where urbanization is fueled by cutting-edge technology. However, this is only one aspect of smart cities.

We've done this exercise hundreds of times and most of the time the results are exactly what we have just described. On the one hand, it is undeniable that the term 'smart city' conjures up images of high-tech urban environments.

On the other hand, these depictions lead to the conclusion that "Maybe, smart cities are all high-tech and therefore unable to be understood by the average person."

Let's turn to another picture here:

Aspern Seestadt is consistently ranked among the best in the world in terms of how technology enhances livability. What you see here are not robots, drones, or a lot of high-tech equipment; instead, you see regular people having fun. Aspern intends for you to be unable to see those technologies.

In Aspern Seestadt, technology 'works in the background' to provide a sense of security, convenience, efficiency, and environmental friendliness to the citizens. The traffic lights use real-time traffic data to optimize vehicle movement, getting drivers and riders to their destinations faster and safer. Smart energy systems and intelligent buildings work together to reduce energy consumption while maximizing physical comfort. The robust

waste management system is connected end-to-end from the household to the waste-to-energy plant to ensure that the streets are clean and pollution is minimized. The consequence of these technologies is the residents' improved livelihood and well-being.

A true smart city will most likely be similar to Aspern Seestad, where the key performance indicators (KPIs) aren't the number of skyscrapers, sensors, robots, or drones. Instead, true smart city's KPIs are the lowering number of traffic accidents, shorter commute times, and easier access to goods and services, to name a few. These KPIs represent an improved quality of life and well-being as a result of the strategic application of 'behind the scenes' technology. Aspern Seestad is also a 'living laboratory' for smart-home research, a topic which we'll return to later in this primer.

If you recall the images of awe-inspiring skylines or a city where people are served by robots in the previous page, you'll realize that while those were impressive, they aren't necessarily 'smart cities' — especially if citizens don't benefit from their presence. Many cities claim to be 'smart,' but they breed structural inequality among their citizens. Many cities also use advanced technology to monitor residents and instead make them feel uneasy rather than safe. A true smart city prioritizes the citizens' livelihood and well-being. Smart cities are urban environments that encourage us to stay healthy, succeed in our chosen professions, learn new things, and engage in constructive leisure activities.

With many examples and ideas similar to Aspern Seestadt, we will take you on a ride to better understand how to achieve smart cities in this primer.

Let's start from the very top.

Why Cities?

Why are cities important?

You're probably already living in a city if you're reading this primer.

Why? The short answer is that cities are fertile ground and incubators for new ideas. Generally speaking, cities often provide a more 'tolerant' atmosphere, freely expressed thoughts, innovative solutions, and access to publications containing new ideas. 'Talents' are often drawn to cities because of the sense of freedom they offer, as opposed to non-urban areas where close-knit communities may prefer existing values and norms. We can almost certainly expect changes in the way we live when these 'talents' come together to exchange ideas in a 'tolerant' space with the right 'technology.'

Although the three Ts — and , as economist Richard Florida calls them — appear to be in a linear progression at first, they are in fact working in symbiosis. There can't be just one or two of the three Ts in a successful city.

Cities have been the world's economic engine for the past few decades, accounting for nearly 80% of global gross domestic product (GDP) despite their small footprint of just 2% of the earth's surface. People are naturally drawn to places where there are plenty of

employment opportunities and economic activities.

Just as those who are born in the late 1990s might not be able to comprehend a world without the internet, many might presume that cities have always been the norm for how we live today. But what if we told you that cities weren't always so important?

In fact, human beings only made cities the dominant living environment about a decade ago. For more than 2 million years prior to that, most humans had been living in non-urban areas. Only around 12,000 years ago did we begin to meet and live in groups, establishing communities primarily for agriculture. The earliest towns were constructed circa 7500 B.C. in a historical region known as Mesopotamia. Since then, group living has been the primary driver of global economic and population expansion. Not only did collaboration breed more productivity, but it also provided the in-group with the sense of physical and social activities.

While the magnificent city of Rome had a peak population of one million people during its heyday around the beginning of the common era, major cities today easily can contain tens of millions (we call them 'mega cities.') There are around 8 billion people on the planet now, which has more than doubled in just a decade.

Cities are the norm of modern inhabitation, as they house more than half of the population. Cities not only define how people interact with one another, but they also create our relationship with the environment and shape our future as a species. But is that a good thing?

Cities are, in general, more energy efficient than villages and vast towns, but energy is also consumed and lost more carelessly. While the compact form of cities aids in the preservation of natural ecology, they are also — by some estimates — using 60 to 70% of our global energy resources, much of which is not always clean or renewable.

Often going hand in hand with this massive energy consumption are environmental problems such as air and water pollution, as well as household waste. In an urban environment without a clean water supply or robust recycling program, for example, the average citizen may need to purchase bottled water whose plastic container will ultimately wind up in a landfill. Similarly, a lack of access to farmer's markets in lower-income areas of a city may lead to the purchase of processed food in disposable containers, which affects both the bodily health of the citizen as well as the civic infrastructure.

And in addition to a citizen's physical health, cities can pose challenges to their mental and emotional state as well. Proximity to people and ideas incubate invention, yet fast-paced and high-pressure environments can often take a psychological toll. The diversity of a city's population can foster wonderful interactions, but can also require a delicate navigation of social and cultural norms. Inequality, too, can be a stressor, with economic, racial, or other social disparities existing side-by-side.

According to the United Nations Human Settlements Programme (UN-Habitat), cities pose many paradoxes for our time. As cities are now the norm, addressing development challenges with effective interventions can have wide-ranging cumulative impacts.

So, in all, are cities good or bad for people? Unfortunately, this primer isn't going to concern itself with answering this question. The reality is that as populations continue to grow, the urban environment will only continue to grow with them. With cities expected to house more than two-thirds of the world's population by 2050, our goal here is to better understand how this increasingly common living environment can best accommodate those who will inevitably make it their home.

Enter Smart(er) Cities

We began the previous segment asking why cities — with all their pros and cons — will continue to be an important part of the human condition.

The term 'Smart City' has been met with skepticism because it often evokes a laundry list of equally sophisticated-sounding technological sub-terms such as 'artificial intelligence' (A.I.), 'Internet-of-Things' (IoT), 'cloud computing', and 'blockchain', just to name a few) that will no doubt leave the average listener confused and possibly uneasy.

In fact, many smart cities fail because they focus on technology rather than the needs of the citizens, a key point which we will address at length in this primer. Thus, this primer will encourage you to approach technology from the standpoint of the citizen. Smart Cities use technology as a means to an end — the end being to solve the 'pain points' of those living in cities.

In the previous segment, we touched on how and why innovation and consumption are defining characteristics of cities. While innovation and consumption have always been a primary characteristic of urbanism, the explosion of cities today can be traced historically back to another characteristic: Industrialization.

Historically, there have been four stages to industrialization. The 'First Industrial Revolution' kicked off in Britain with the mechanization of the textile industry in the mid to late 1700s. The use of new energy sources such as electricity, gas, and oil, as well as mass-production assembly lines, characterized the 'Second Industrial Revolution.' This revolution was centered on a new industrial and economic model based on large factories. The 'Third Industrial Revolution,' also known as the 'Digital Revolution,' began in the late 1900s and is marked by the widespread use of electronics and computers, as well as the invention of the Internet and the discovery of nuclear energy.

We are now in the era of the 'Fourth Industrial Revolution' (also known as 'Industry 4.0'), which takes advantage of new technology's limitless potential, including high-speed mobile and internet communications, digitalization, big data analytics, automation, and machine learning. This 'Fourth Industrial Revolution' is an era whereby the boundaries between the physical, digital, and biological worlds are blurring, while industries all over the world are being uprooted by new technologies and the opportunities they present.

Products and services have become more efficient as a result of the wide and fast spread of Industry 4.0 technologies. For example, it is difficult to envision urban living without the at-the-fingertip ease of ride-hailing and e-commerce, which in turn would not be conceivable without high-speed mobile technology, a secure digital platform, robust electronic payment, automated on-demand delivery, and so on.

The concept of a smart(er) city emerged in the 2000s when information technology (IT) companies were actively hunting for a new market for their wares. IBM announced a $50 million 'Smarter Cities Campaign' in 2009 to investigate how the corporation could employ sophisticated computer technologies to assist cities in optimizing their operations. Along with IBM, many other companies aimed not at a definitively 'smart' city, but a 'work in progress' city that would test which technology could best increase the quality of life and efficiency of the urban environment (and with it, create marketing opportunities for themselves!)

(In fact, many argue that we should have stuck with the term 'smarter city' rather than just 'smart city' since 'smarter' implies an ongoing process of improvement, rather than 'smart' which sounds like an end result. In any case, it's the term 'smart city' that stuck, so we'll roll with it.)

And as IT companies increasingly contributed their prowess to the urban landscape, educational institutions, too, got into the mix. Home to the world's most prestigious engineering and urban planning schools, The Massachusetts Institute of Technology

(MIT) was in fact an early proponent of research and development in smart cities. For instance, MIT's 'Senseable City Lab' was one of the first proponents of the use of data-collection sensors to 'feel' a city's nervous system in a manner akin to that of human beings. Roads, buildings, public spaces could embrace the use of sensors in order to pinpoint areas of the city that required attention.

In addition, as early as the mid-2000s, MIT students were developing smart economy and e-governance systems that used traditional mobile phone short messages (SMS) to transfer and receive money and to share crowdsourced data with authorities. Anyone with a basic mobile phone (for example, a flip phone) could send a text message to make a financial transaction, locate employment, or communicate with local government authorities ranging from accessing public services to disaster warnings, accidents, and emergency situations.

Today, many educational institutions are collaborating with businesses to accelerate innovation. Graduates from these institutions go on to work for other companies, while others launch their own businesses. As a result, the collaboration between cutting-edge industry and higher education produces a workforce and new ideas that help to improve the urban environment.

What Is a Smart City?

Can you show me a smart city?

This is one of the most often asked questions among smart city practitioners. When asked, the smart city historian Anthony M. Townsend puts it:

> My answer is always the same. “The one you live in.” It sounds glib, but I’m serious. The idea of a single, utopian design for the smart city has kept us from the hard work of building a rich and varied collection of ones that we can actually live with.

What he’s implying is quite brilliant. People, as we’ve seen previously, are the most important component of smart cities. If you already live in one, the city you live in is smart in some way as well. The other components, such as technology or operations management, are secondary.

Although the term ‘smart city’ is quite popular, there has yet to be a universally accepted definition. Many people assume that ‘smart’ implies ‘technology’ or ‘optimization.’ However, we’ve learned quite a bit from the failures of many ‘smart city hopefuls’ that technology isn’t the place to start.

To have a common understanding, let’s say that we need a definition. We think that it would be useful to start from the top — that ‘smart city’ is a process rather than an end result (remember that we discussed earlier how ‘smarter’ is probably a better adjective than ‘smart’). A working definition of a smart city that incorporates essential ideas from popular definitions would look like this:

1. A smart city is a process (not an outcome) for how a city makes use of appropriate technology to enhance the wellbeing of its citizens.
2. A smart city focuses on the effective integrations of physical and digital systems to increase its capacity, managerial efficiency and resource utilization.
3. HSmart cities, after all, make the most optimal use of available interconnected information that enables the scalability of the products and services to solve common urban problems.

Smart cities, therefore, are urban areas that are developing and evolving to become smarter through the use of purposeful and appropriate technology. Vienna (i.e., Aspern Seestadt), Singapore, and Amsterdam, for example, have all been scored relatively high in numerous smart city rankings as a result of their ongoing efforts to come up with innovative solutions to existing problems.

Although the smart city trend is quite new, many cities around the world have experimented with creating them. Based on how some succeeded and failed, there are principles that have proven to be effective.

These are the absolute basics: Citizen-Centricity, Technology in the Background, People-Public-Private-Partnership (4P), and Data-Driven decision making.

Smart City is Citizen-Centric

The principle number one is ‘a Citizen-Centric Approach to Smart Cities.’ What this means is that the key performance indicators (KPI) of a city should always be its people’s well-being, not the features and benefit sets that technology vendors tend to market.

Calvin Chu, a smart city expert from the global consulting firm Eden Strategy Institute, summarizes several reasons many smart city initiatives fail.

The most common reason is that people are prioritized over technology. It may be tempting to use the most up-to-date technology available, but this may not be effective if there is no real need for it. Furthermore, assuming that people will accept new technology and adapt their lifestyles and behaviors to align with the technology can erode trust in the role and intentions of the implementer — in most cases, the local government — and incur opportunity costs.

A typical example of this could be when a city relies too heavily on a mobile app to access various services. While mobile apps can be extremely helpful, they can also be susceptible to rushed launches, confusing interfaces, glitches, management issues, high traffic, and a host of other problems that will ultimately leave citizens feeling frustrated and underserved. In such aggregator apps, a single point of failure will disrupt a wide range of city services.

Smart city projects also fail when city planners pay insufficient attention to operating and business models. It’s usually the business and operating model, not the product or service, that makes a new product or service revolutionary. The magic lies in the business model, as seen in how Apple revolutionized how we enjoy music. Listeners no longer purchase a CD to ‘own’ a collection of songs so they can enjoy the music. Instead, they ‘subscribe’ to a service that allows them to listen to any song they want, whenever they want, without having to own it.

This shift from owning to subscribing is clever because appreciating intangible forms of entertainment like music and movies has never been about ‘owning’ in the first place. Some cities have attempted to implement similar Mobility-as-a-Service (MaaS) models for services such as bicycles and electric scooters. We don’t need to own them as long as we can use them when we need them, just like we don’t need to own music. In fact, not owning a single bike allows users flexibility should they choose different modalities on a single commute, or different commutes to and from a destination.

Several companies saw an opportunity in this market and brought in a bicycle-sharing program that promised to simultaneously solve urban mobility and health issues. However, fueled carelessly by venture funds, they did not invest in attractive marketing or loyalty programs but focused instead on dominating ‘distribution channels’ by outspending each other to place more bicycle units on the streets. Rather than developing sustainable business models, they lowered the price per use to untenable levels, in hopes of winning market share.

These companies ended up being perceived as 'dumping' large numbers of bicycles on the streets, resulting in oversupply, causing eyesores, and creating obstacles to pedestrians when the bikes were strewn about messily. Their operating models did not include adequate monitoring and penalties for improperly parked or damaged bicycles, and the disarray devalued their utility and ultimately also saw the abuse. The entire program was discontinued within months, creating tremendous shareholder, environmental, and reputational damage that could have easily been avoided with more forethought.

Problems arise in the blurry lines between the right to ride and public safety. In this case, an operation like this could have started with a 'sandbox' or confined testing environment, which would have allowed service providers to gauge in stages if the service is in fact operable, scalable, or if it could present any problems. Challenges can then be identified and dealt with early on before they become too widespread.

Finally, a lack of transparency in the public-participation plan can be a problem. The most well-known example of this is Sidewalk Labs' decision to halt the construction of a smart city on a 12-acre plot of land in Quayside, Toronto. Mass housing, heated and illuminated sidewalks, public Wi-Fi, and a slew of cameras and other sensors to monitor traffic and street life were planned for this ambitious US$1.3billion project.

The company envisioned this network of sensors collecting data on energy use and citizen behavior, which could then be used to automate public infrastructure and improve citizens' well-being. Residents, however, criticized the company's approach to privacy and intellectual property, questioning how much of their private information was compromised. While this vision initially seems revolutionary and transformative, the lack of trust between the residents and the company ultimately led to the program's failure.

All of these examples lead to one important point: Smart cities deploy appropriate technology, such as automation and Internet-of-Things (IoT) sensors, so that citizens may benefit from increased wellbeing, such as having more time to spend with their families as automation takes care of more tedious tasks. Citizens in a mobility-focused smart city, for example, may be able to arrive home sooner and in a healthier state, because traffic lights operate seamlessly to reduce congestion, prevent accidents, and reduce air pollution. Citizen-Centric 'technology in the background' could therefore look at the increased number of hours these citizens get to spend with their families as a potential performance metric.

Smart City Incorporates the 4Ps

To speed up the process, it is critical to combine the 'superpowers' of the people, public, and private sectors under the People-Public-Private-Partnership model (or the 4P model).

The commonly used term is 'Public-Private-Partnership' (or PPP), but we have decided to include the 'P for the People' in the equation because many recent examples of success, as well as failure, of smart city projects around the world have demonstrated the critical

need to communicate with the people, thus galvanizing their support in the process. Because most smart city solutions are novel solutions to open-ended challenges, their economic models must be redesigned as well. We have recently witnessed the emergence of the so-called 'sharing economy' for vehicles, office spaces, equipment, services, and even homes.

Smart city investments take many forms, depending on the type of project. Municipalities, for example, frequently invest entirely in projects that are primarily concerned with the public's interests and are less concerned with profit-making. On the other hand, the private sector would prioritize investing in profit-driven projects.

Ultimately, the '4P Model' is the third most well-known type of investment. The 4P Model is a collaboration between the private and public sectors in order to serve the needs of the people, reinforcing each sector's comparative advantage.

The public sector, in particular, would have greater clout on policy issues and legal proceedings. Despite its status as a central authority, the public sector frequently faces budget constraints, a lack of expertise in various fields, and a lack of incentives to develop a sustainable business. At the same time, despite having greater capabilities in terms of technology, digital literacy, innovation, and marketing, the private sector frequently encounters administrative bottlenecks from the government. As a result, the 4P Model is a perfect marriage of each sector's comparative advantage.

The 4P Model has been proven to deliver tremendous success around the world, A well-known example is a free high-speed wifi service. The private sector's expertise in delivering this service could help the public sector to provide broadband wifi to the citizens to increase their engagement with the digital economy as well as provide safety. Often the case is the local government's lack of funding to implement such a project at an effective scale; hence, the 4P Model comes into play in a form of the local government's allowing the private company to provide such service at no cost to the citizens.

The private implementing system integrator, instead, makes up for their investment in the service via advertisements. In this case, everyone wins. Often, this service can be extended to the domain of a 'smart pole' whereby not only the high-speed wireless internet connectivity is provided, but also other utilities such as air quality monitoring sensors, closed-circuit cameras, electricity chargers, and so on.

As the local government allows the private system integrator to install these smart pools on the sidewalks and public spaces, services can be provided whose cost is off-set by the revenue collected from advertisement, limited use to citizens' consensual data, and the real estate on the smart polls for various services. The local government can also help the project by enacting a taxation policy enabling experimentation while also lowering production costs.

Smart City Is Powered by Data

When the Harvard Professor of Psychology Steven Pinker was asked what is one thing wrong with the world that he would change, he didn't think twice before pointing to the fact that 'we humans are not perfect' and are therefore prone to surrender to the cognitive bias of assessing the world through anecdotes and images rather than data and facts. In other words, we tend to take 'anecdotes as data,' and that can't be good.

Cities are fundamentally physical environments. We have discussed how technology must work in the background to enable a better urban environment for the citizens. To do so, this in-the-background technology needs data as a fuel. Whether that be an automated traffic light or energy efficient algorithms, data is key.

In the past when data was not easily collected, we leveraged our beliefs, biases, and familiarity to make decisions. That's the best we could do. Today we are living in an era where we have the technology to collect data in a fast, accurate and comprehensive way.

What we expect from technology is to use that data to make decisions better than we humans can do. The use of digital technology connects data in order to benefit those living in physical space. Many cities are developing their digital infrastructure to seamlessly work with the physical one.

This intermediary 'smart city platform' layer, which permits interactions between new technologies and the physical environment, plays a key role in the smart city. An apt metaphor of this smart city platform is a marketplace. A marketplace is created for the demand to find the supply and vice versa. In this analogy, the demand is the need for smart city services, while the supply is the services to be provided to the citizens.

The smart city platform is where the demand for and supply of data meets. In this sense, the job of this 'platform' or marketplace is to establish a data integration standard, allowing any services to be easily 'plugged and played' to serve the city. For instance, a delivery service that has access to the traffic data can better service their customers. Cities, too, that know exactly where the needs of the citizens are can provide those services quickly and effectively.

Making data open securely is an urban innovation in itself. Innovators profit from the open data made available by this platform, allowing them to create new goods and services. In contrast to the time it takes to develop a new building or city, we can establish a digital service from the ground up in a matter of days or weeks, allowing people to reap the biggest benefits from digital technology in the shortest amount of time.

In the UK, for instance, the government open data program publishes data to help better policy-making and continuous improvement of services. Since the launch in 2018, open data has reduced massive amounts of waste, created countless innovations and enhanced public services to the citizens.

It only makes sense to be protective of data, for it is gold in today's Industry 4.0 era. Even though users benefit from apps that collect their data, they are also increasingly aware of their rights, and of the value of their data. No one would like to see their personal data

being abused, and no measure of benefits would compensate for severe data breaches and cybersecurity attacks.

Successful smart cities projects not only openly communicate these concerns with the citizens, but pay close attention to addressing issues of personal data protection and cybersecurity. For instance, the European Union's General Data Protection Regulation (GDPR) restricts the use of facial recognition in smart cities. Data collection needs to be limited to essential services.

High standards of data collection need to be established, and citizens are asked to give meaningful consent to processing of personal data and analysis.

Putting it All Together

Realizing that the future will demand three things.

> First, creators of smart city technology must draw on specialized knowledge of the local context. Second, we need a framework for data governance: agreements on how data is collected, shared, and used. And finally, public participation is essential. Simply put, the way forward is to respond to the needs of the community, not the motives of industry. — *Professor of City and Regional Planning at Ohio State University*

First, it is the people, not the technology, that are at the heart of a smart city. This is an extremely important point that cannot be overstressed. Most, if not all, failures are caused by a mismatch between user demand and available technology vendors. Tech corporations may desire to impose on citizens, whether or not they are relevant or acceptable to the setting.

Second, we must focus on value rather than optimization. Many organizations can be understandably preoccupied with optimization, however over-optimizing can lead to cheap products and services with no value to the end user.

Third, there is a genuine need to facilitate the discourse among all important players in the smart city, including private entrepreneurs and potential investors with the technology and business model to drive smart cities; all of them should be present at the same time.

Fourth, we need more open data for all citizens, which has been proven to promote confidence and transparency among beneficiaries and the government, as well as to spark innovation that could lead to robust solutions in the future.

Fifth, because leadership drives the process, we want to collaborate with cities that have effective governance through visionary and practical leadership. This does not always mean strong leadership but rather 'empathetic leadership' capable of inspiring everyone at the table to fulfill their greatest potential.

It is hoped that this little article — a primer — has convinced you that all of us have a meaningful responsibility not only to the environment we all share, but also to the people for whom our designs are meant.

Because of economical and effective technologies, we can now accomplish far more with less time, resources, and effort. We can serve more people while minimizing the negative impact on what we all value.

Let’s do this together.