Smart Cities Strategic Roadmap Update

Council Work Session, November 7, 2017
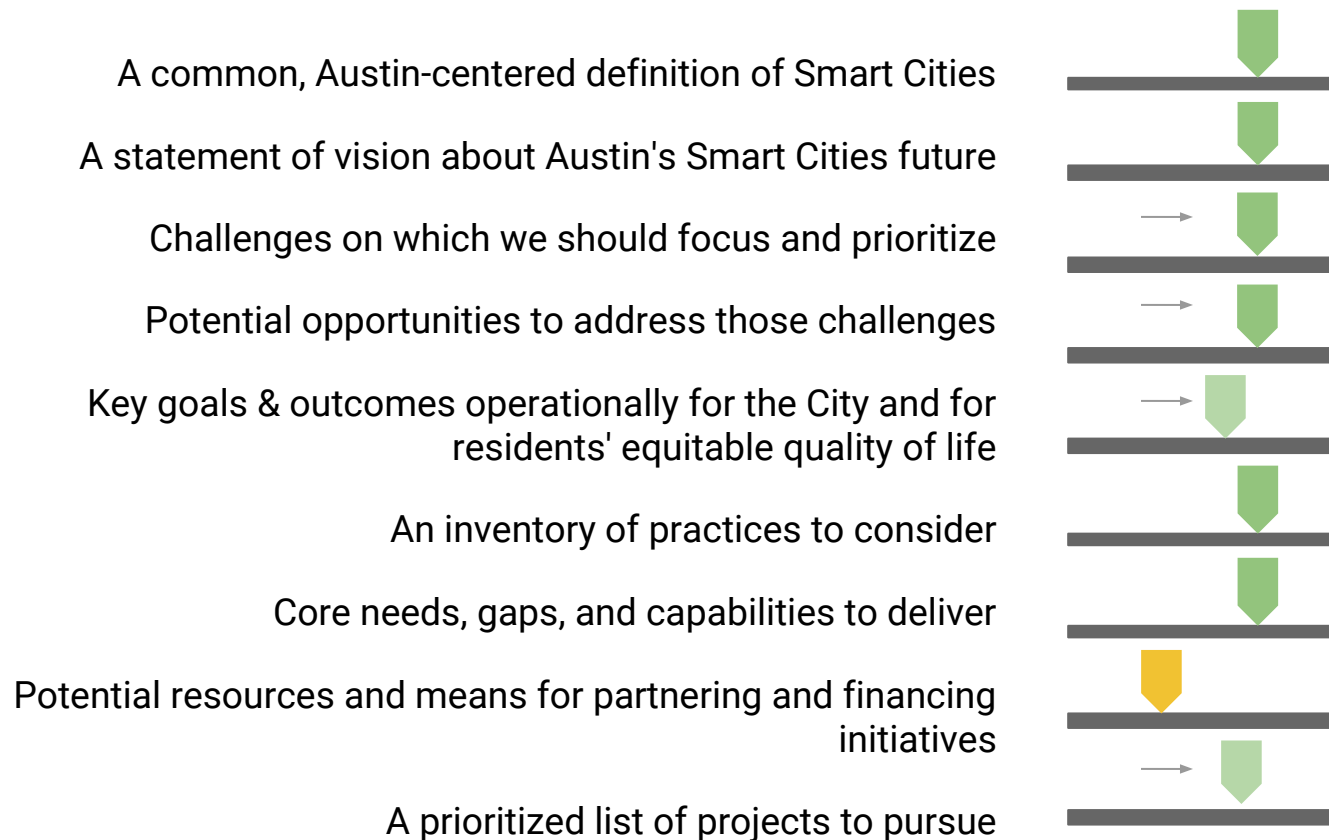
Contents

1. Quick recap

2. Current list of projects

3. Unpack how we got here; how we'll get there

4. Recommended projects

5. Discussion

Goals   Progress

A common, Austin-centered definition of Smart Cities

A statement of vision about Austin's Smart Cities future

Challenges on which we should focus and prioritize

Potential opportunities to address those challenges

Key goals & outcomes operationally for the City and for residents' equitable quality of life

An inventory of practices to consider

Core needs, gaps, and capabilities to deliver

Potential resources and means for partnering and financing initiatives

A prioritized list of projects to pursue

Project Highlights

Economic Opportunity and Affordability

Austin Energy Smart Grid and Digital Meters

Connectivity from power plants through transmission and distribution systems to achieve quicker outage restoration, easier billing, personal control over energy usage, and improved efficiency

Economic Opportunity and Affordability

Digital Inclusion PC Loan Pilot

Program ensures that all residents have access to the skills and devices necessary to engage in our digital society -- including our PC loan pilot

Mobility

Smart Mobility Roadmap

Analyzes impact of shared, electric and autonomous mobility vehicles on equity, affordability, safety, land use, infrastructure, and resources

Economic Opportunity and Affordability

Tech Hire

Identify data related to employer needs, innovative hiring practices, opportunities to connect students to internships, jobs; identify strategies for scaling up

Cultural and Learning Opportunities

Central Library & Video Conferencing

150 self-check portable devices and a technology petting zoo with virtual reality, 3D printing; video conferencing in progress for all branches to help residents communicate with Council

Cultural and Learning Opportunities

WiFi in Austin Parks

Provide free, consistent, and reliable public WiFi within parks at no cost to the City

5

Health

Food Environment Maps

Map Travis County food retail store survey data into a food environment map understand food access in Austin to help prioritize initiatives

Safety

Improvements to ATX Floods

Improve how we provide information about the status of roadway closures to the public and emergency services, with real timestamped data, imagery and context region-wide

Safety

Security Operations Center

A virtual security operations center to organize and centralize information security staff for enhanced security monitoring

Health

Resource Recovery Smart Fleet

Get to more sustainable outcomes with Integrated data, GPS, radio-frequency identification in vehicles to reduce risk, improve customer service, and increase operational efficiencies

Safety

Pedestrian Lighting Pilot

Reduce nighttime crashes by increasing visibility with interactive contrast lighting in a West Campus safety study with Vision Zero that integrates sensor-activated pedestrian lighting.

Safety

City of Austin Continuity of Operations Program

Digitizing the City's Continuity of Operations Plan management system, including pilot focused on the Combined Technology, Emergency, Communications Center facility

Government that Works for All of Us

Leak Detection of Austin Water's existing infrastructure

Detecting water leaks by analyzing spectral images from satellites

Government that Works for All of Us

Human Capital Management

Provide an automated self-service system for time, attendance and scheduling capabilities to replace the current paper time-keeping and scheduling processes

Government that Works for All of Us

Austin.gov Goes Paperless

Identify and prioritize services that need transformation from paper to digital on new austin.gov platform to reduce transaction cost, save time, increase accessibility, open data

Government that Works for All of Us

Open & Smart Project Tracking

Provide a smart and open project tracking tool to help following along on open government and smart city projects across City departments

Let's unpack how we got here.

Discovery Phase

We are here

Roadmap definition, maturity model

Standardize, refine inventory

Align Key Goals, Measures from Strategic Plan

Prioritize Resources & Means

Project Tracking Site

9

Think of our roadmap as a strategic conversation

Our first draft unifies our vision.

Next steps - we refine the vision and course of action.

Austin's Smart City Definition

We are a city that becomes **increasingly efficient** in **solving real problems for real people** by:

(i) engaging stakeholders and users,

(ii) leading collaboratively,

(iii) working across disciplines, departments, and city systems; and

(iv) using data and integrated technologies

to transform services and improve quality of life with and for *all* **Austinites,** businesses, and visitors.

In this definition, Open Government + Smart Overlap

We are a city that becomes **increasingly efficient** in **solving real problems for real people** by:

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With this definition, we know how to grow…

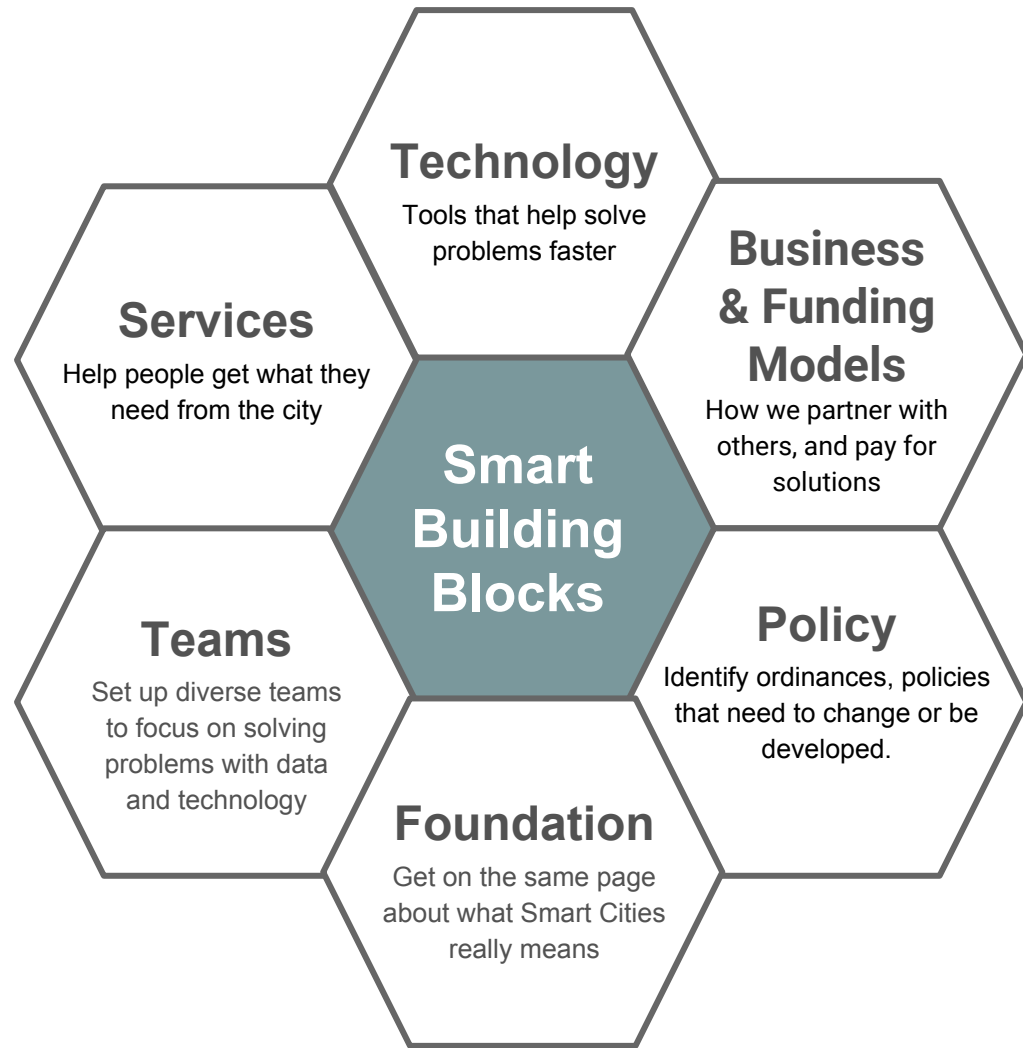|	**1**	**2**	**3**	**4**
ENGAGE PEOPLE How openly do you allow others to participate?	1-way/Broadcast Engagement	Receive input/ 2-way engagement	Close the Feedback Loop	Inclusive Partnerships/ Relationships
LEAD COLLABORATIVELY What does leadership look like on your teams?	Hierarchical	Encourage Team problem-solving	Shared Accountability for Outcomes	Transparent multi-partner governance
WORK ACROSS DISCIPLINES, SYSTEMS How do teams work together?	Silos	Across Disciplines or Units	Across Teams or Departments	Across systems
TECH & DATA How is content managed? How are services delivered?	Paper/ No Data	Some Automation/ Some Data	Transactional Services/ Analytics	Integrated Systems Data models
CAPABILITY How evolved is your ability to solve problems?	In-person, one episode at a time	Some analysis - high level trends	Deeper analysis, identify hidden problems, respond	Real-time data, predictive, proactive, transform

From roadblocks to building blocks

Technology — Tools that help solve problems faster

Services — Help people get what they need from the city

Business & Funding Models — How we partner with others, and pay for solutions

Smart Building Blocks

Teams — Set up diverse teams to focus on solving problems with data and technology

Policy — Identify ordinances, policies that need to change or be developed.

Foundation — Get on the same page about what Smart Cities really means

With the definition and building blocks, we can align and prioritize projects, which will then help define means for partnering and financing

Align with Strategic Outcomes, then Prioritize

Economic Opportunity and Affordability
Having economic opportunities and resources that enable us to thrive in our community.

Safety
Being safe in our home, at work, and in our community.

Cultural and Learning Opportunities
Being enriched by Austin's unique civic, cultural, ethnic, and learning opportunities.

Mobility
Getting us where we want to go, when we want to get there, safely and cost-effectively.

Health
Enjoying a sustainable environment and a healthy life, physically and mentally.

Government that Works for All of Us
Believing that city government works effectively and collaboratively for all of us—that it is equitable, ethical and innovative.

Draft prioritization formula

✓ Real People:
Resident population served

✓ Real Problems:
Resident value

✓ Equity

✓ Sustainability

✓ Total Cost of Ownership
Shared tools lowers costs

17

Resources and means for partnering and financing

Progress

18

Platform for Advanced Wireless Research (5G) Feedback on $25 million grant application

Strengths:

Effort brings together diverse skillsets and organizations across the state, including communities that already work well together

Strong connections to academic wireless research (local and foreign)

Effort includes the development of verticals such as public safety, health, energy and transport

Weaknesses:

Lack of a coherent coordination plan among the various local and vertical communities
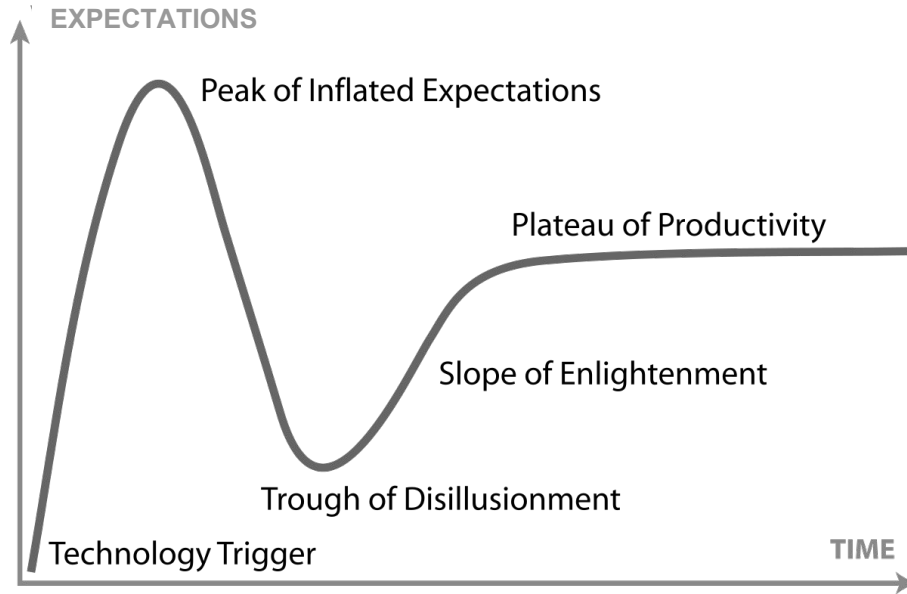
Lack of details on engagement plans and governance

Lack of risk mitigation and analysis plans

Not enough transformative and innovative research elements and sufficient details to be convincing. The value-added remains incremental and small.
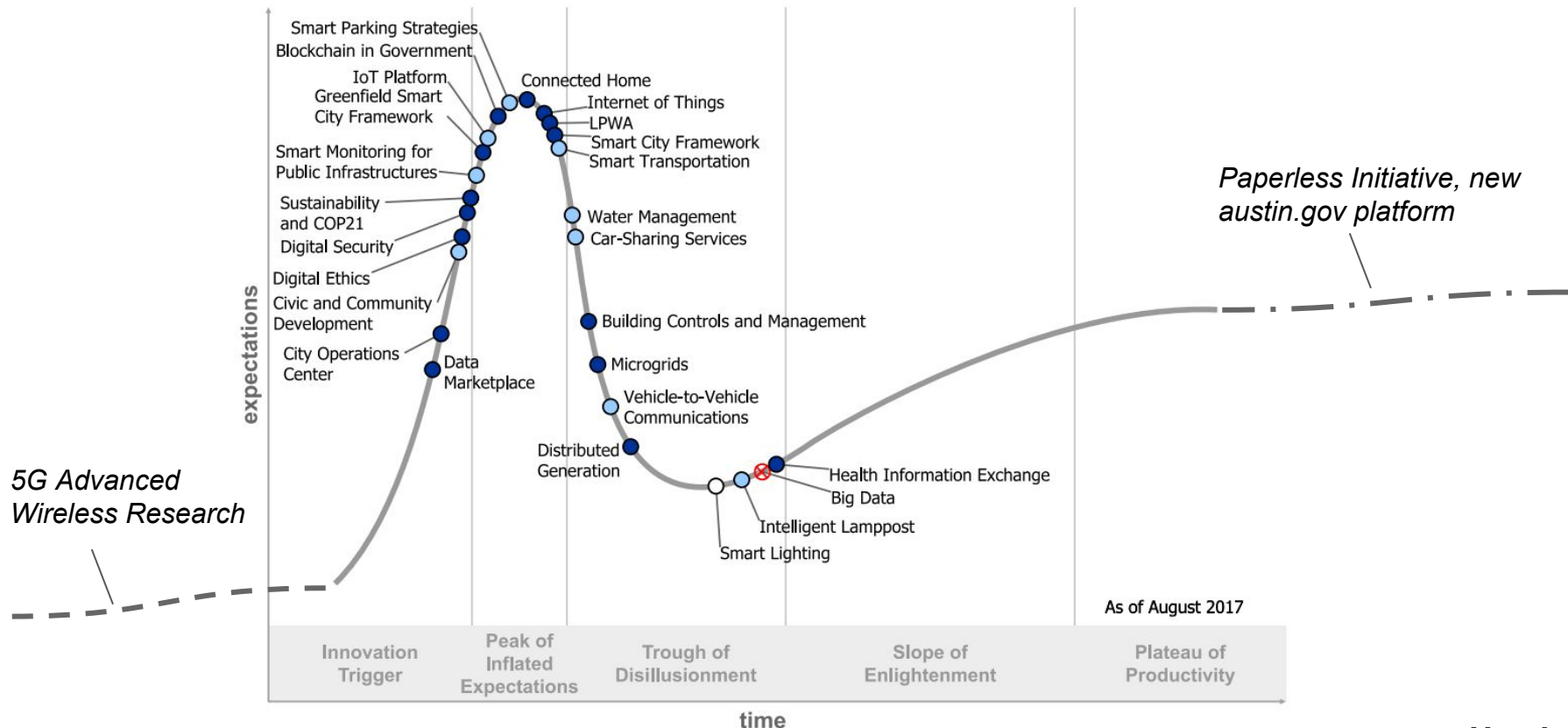
Why the Maturity Model is important

Introduction to the Hype Cycle

EXPECTATIONS

Peak of Inflated Expectations

Plateau of Productivity

Slope of Enlightenment

Trough of Disillusionment

Technology Trigger

TIME

We tend to overestimate the effect of a technology in the short run and underestimate the effect in the long run.

Smart Cities Hype Cycle (plus future and past)

Smart Parking Strategies
Blockchain in Government
IoT Platform
Greenfield Smart City Framework
Connected Home
Internet of Things
LPWA
Smart City Framework
Smart Transportation
Smart Monitoring for Public Infrastructures
Sustainability and COP21
Digital Security
Digital Ethics
Civic and Community Development
City Operations Center
Data Marketplace
Water Management
Car-Sharing Services
Building Controls and Management
Microgrids
Vehicle-to-Vehicle Communications
Distributed Generation
Health Information Exchange
Big Data
Intelligent Lamppost
Smart Lighting

Paperless Initiative, new austin.gov platform

5G Advanced Wireless Research

expectations

As of August 2017

| Innovation Trigger | Peak of Inflated Expectations | Trough of Disillusionment | Slope of Enlightenment | Plateau of Productivity |

time

Plateau will be reached:
○ less than 2 years ○ 2 to 5 years ● 5 to 10 years △ more than 10 years ⊗ obsolete before plateau

22

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Between the peak and the trough

Cautionary tales of investing during the hype cycle, and why prototyping and testing should be the norm before big roll-outs of smart city technologies

Smart Lighting

TechRepublic

SMART CITY

The 4 IoT products a smart city needs in 2017

Connected IoT devices are part of the key elements of a smart city. Here are some of the most interesting and useful products for smart cities in 2017.

By Teena Maddox | December 26, 2016, 4:00 AM PST

4. Smart streetlights

Connected LED streetlights are the easiest way for a city to add smart tech. One benefit is reduced crime, because the lights automatically brighten when there are multiple people in the area, and dim when no one is around.

The ROI is a no-brainer, with the LED lights saving more on energy costs within a few years than it costs to purchase and install them. In Los Angeles, the city saves nearly $9 million annually on utility costs as a result of its decision to spend $57 million to convert nearly 80% of its 215,000 old sodium-vapor streetlights to LED versions.

IEEE SPECTRUM

LED Streetlights Are Giving Neighborhoods the Blues

Early adopters of LED street lighting are struggling with glare and light pollution

SMART CITY

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3. Digital kiosks

A digital kiosk gives information about restaurants, retail stores, and events in the immediate area. It also provides mapping for visitors, and can sync with a mobile phone to give additional data as needed.
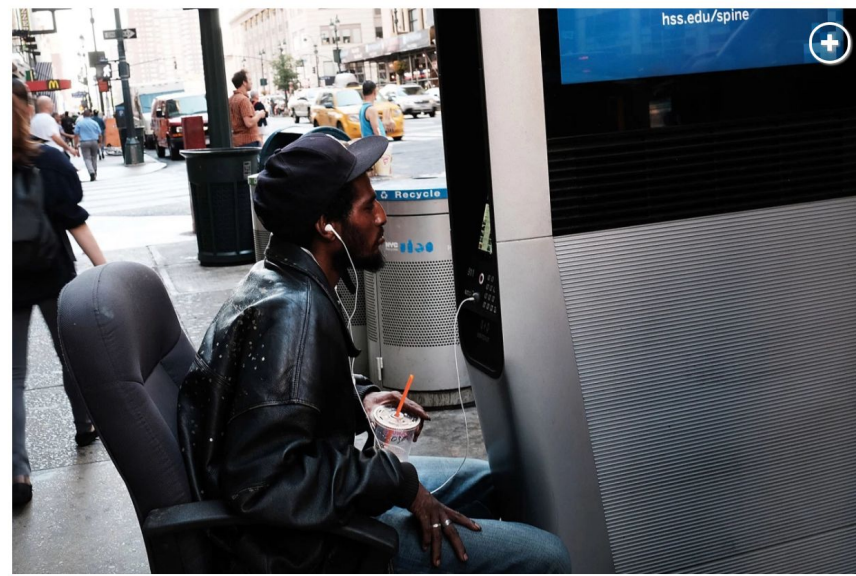
OPINION

The shuttering of those internet kiosks is another tale of two cities

By Nicole Gelinas

September 18, 2016 | 7:45pm

http://www.techrepublic.com/article/the-5-iot-products-a-smart-city-needs-in-2017/

http://nypost.com/2016/09/18/the-shuttering-of-those-internet-kiosks-is-another-tale-of-two-cities/

Big data has biases too

When the municipal authority in charge of Boston, Massachusetts, was looking for a smarter way to find which roads it needed to repair, it hit on the idea of crowdsourcing the data. The authority released a mobile app called Street Bump in 2011 that employed an elegantly simple idea: use a smartphone's accelerometer to detect jolts as cars go over potholes and look up the location using the Global Positioning System. Here's a news item from that time celebrating the innovation. But the approach ran into a pothole of its own.

The system reported a disproportionate number of potholes in wealthier neighbourhoods. It turned out it was oversampling the younger, more affluent

Security, Privacy, Governance Concerns About Smart City Technologies Grow

As urban centers expand their reliance on automated sensors and algorithms, they increase risks of data security breaches, vulnerabilities to invasions of privacy and concerns about software reliability.

But as urban centers expand their reliance on automated sensors and algorithms that improve productivity, sustainability and engagement, they increase risks of data security breaches, vulnerabilities to invasions of privacy and concerns about software reliability.

http://www.govtech.com/Security-Privacy-Governance-Concerns-About-Smart-City-Technologies-Grow.html

The too-smart city

We're already building the metropolis of the future—green, wired, even helpful. Now critics are starting to ask whether we'll really want to live there.

But as political leaders, engineers, and environmentalists join the smart-city bandwagon, a growing chorus of thinkers from social sciences, architecture, urban planning, and design are starting to sound a note of caution.

Building a new, intelligent urban infrastructure could be every bit as momentous as building a water supply, or roads, or a subway system—setting development patterns for decades.

Though they share enthusiasm for what a smart city could do, they also point out that smart-city programs could—with little public oversight—put us on track to a kind of urban future that not everyone thinks is ideal.

It's not about stopping progress. Methodically researching and testing in a human-centered way can mitigate these risks.

Six Inconvenient Truths about Smart Cities

The Urban Technologist, former IBM UK Executive Architect for Smarter Cities

1. The "Smart City" isn't a technology concept; it's the political challenge of adapting one of the most powerful economic and social forces of our time to the needs of the places where most of us live and work

2. Cities won't get smart if their leaders aren't involved

3. We can't leave Smart Cities to the market, we need the courage to shape the market

4. Smart cities aren't top down or bottom up. They're both.

5. We need to tell honest stories

6. No-one will do this for us – we have to act for ourselves

https://theurbantechnologist.com/2015/02/15/6-inconvenient-truths-about-smart-cities/

How Austin brought the human touch to smart city planning

By Jenny McGrath — Posted on July 31, 2017 3:00 am

https://www.digitaltrends.com/home/austin-texas-smart-city-technology/

Orient to the future, play catch-up, flatten the curve

EXPECTATIONS

Inflated Expectations

Plateau of Productivity

Prototype and test

Get rid of technical debt, keep building a strong foundation

Participate in R&D

Let it go if it doesn't work

TIME

Didn't really work

4

New Recommended Projects

Next steps - strategic initiatives, projects

Research & Testing Lab for Smart City Initiatives

A collaborative space where city staff, residents, and technology community can
test new technologies

Smart & Open Advisory Network

Networking the technology community with Commissions and the City Manager's Open & Smart Advisory Committee in permanent open dialogue on smart cities

Smart Kiosks

Testing and experimenting with kiosks for wayfinding and other uses in a controlled environment

4

Discussion

For discussion

A. **Smart & Open Advisory Network**

B. **Prioritization Methodology**
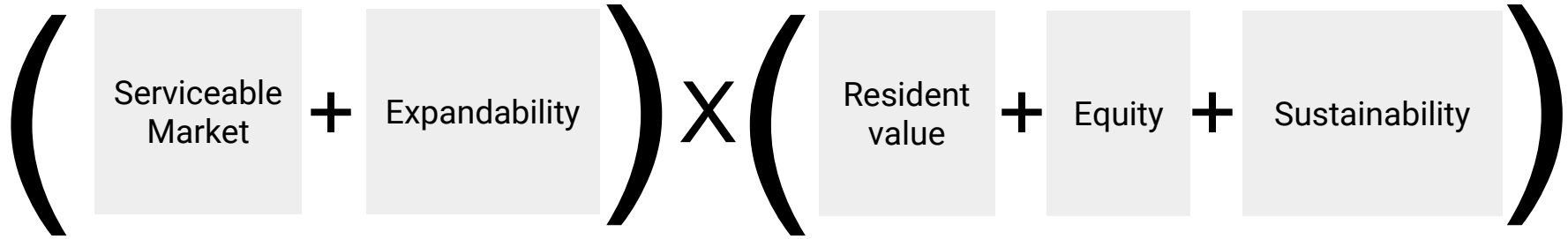
A

How might we network more effectively?

B

Prototyping a Prioritization Framework

Prioritize with a smart benefit-cost analysis

Real People

Real Problems

$$\frac{\left(\text{Serviceable Market} + \text{Expandability}\right) \times \left(\text{Resident value} + \text{Equity} + \text{Sustainability}\right)}{\text{Total Cost of Ownership}}$$

Shared Tools

Longer term objective - modernize the core

City website: tech stack

Asset Management

Case Management / Process Management

CRM / Service tools / community outreach

Document Management

Data Storage, and accessibility

HCM tools

Task Management

Municipal Services List ⟷ Tech stack building blocks

3-1-1 Request

Visit 311's website to submit a service request.

Accident Report Form

If you are a ground transportation company and need to file an accident report, please click here to print out the form and return to the parking division by fax at (512)974-1560 or by mail to 1111 Rio Grande Street...

ADA Training to Staff on Disability

Disability awareness training called ADAtude is provided in regular orientations for employees and other classes; i.e. employment, evacuation, and effective communication as requested.

AFD Patch

If you meet the security criteria, please send a copy of your Fire Department ID addressed to our Headquarters location. Only 1 patch per request please.

Affordable Homes

The Austin Housing Finance Corporation is a leading force in the creation of reasonably priced housing in Austin.

Alarm Permits

The City of Austin has adopted laws regulating the operation of alarm systems. The City of Austin requires an alarm permit for each residence or business that operates an alarm system in the City Limits of the City of Austin. The Austin Police Department enforces and administers the Alarm Permit...

Alcoholic Beverage Permits

Businesses which want to apply for a liquor license/beer permit from the Texas Alcoholic Beverage Commission are...

Login Identity Provider
CMS
Forms
Interactive Map
Calendar
Search (Site)
Search (Records/DB)
Data Portal
Payment
Data Visualization, basic
Notifications (email+sms)
Discussion Tool
Media Gallery
Project Tracking
D3.js
CDN
Audio Transcription
Translation
Chat-bot (web+sms)
OCR
Document Management

41

Align with Sustainability

	Name	Description	Website Services
1	Carbon Footprint	CO2 emitions from city opperations	Walk Texas! Active Austin 10-Week Challenge	Sign Up to Recei
2	Green Building	% New CIP Meeting Minimum LEED...	Construction Design and Technical Resources
3	Water Use	Gallons of Potable Water Per Squar...	Reclaimed Water Service Application
4	Energy Use	Annual Building Energy Use / Cost ...	
5	Zero Waste	Percent Recycled at City Office ...	Set Up New Trash/Recycling Service	Environmental Site Asses:
6	Vehicles and Equipment	% Alternative Fuel or Hybrid Fleet ...	Capital Metro
7	Procurement of recycled ...	Recycled Content % of all Paper ...	
8	City Right of Way	Miles of New Bike Facilities, New ...	Pedestrian Hybrid Beacons	GIS Information and Mapping	Bike
9	Green Infrastructure and ...	Number of Trees Planted ...	Permitted Use Chart	Floodplain Models	Drainage Concerns ar
10	Workforce	Number of Employees Completing ...	Walk Texas! Active Austin 10-Week Challenge	Capital Metro

Equity Lens

Equity Budget Worksheet

Box 1: History	Box 2: Data	Box 3: Community Engagement
+1) Project will address, mitigate, and/or eliminate historic racial inequities	**+1)** Project addresses inequities validated by racial disparity data	**+1)** Communities of color have been actively and efficiently engaged
0) No historical racial impact; not a racial issue (e.g. administrative issue)	**0)** Data reflect no impact on equity; not a racial issue (e.g. administrative issue)	**0)** Community is not affected by the issue (e.g. administrative issue)
-1) Perpetuates, reinforces, or ignores systemic racial inequities	**-1)** Project is not supported by disaggregated data on racial inequities	**-1)** Communities of color have not been engaged, or have not been engaged appropriately or effectively
Box 4: Advancing Racial Equity	**Box 5: Unintended Outcomes**	**Box 6: Score**
+1) Economic Opportunity	**-1)** Economic Opportunity	**History:** _____
+1) Mobility	**-1)** Mobility	**Data:** _____
+1) Safety	**-1)** Safety	**Community Engagement:** _____
+1) Health	**-1)** Health	**Advancing Racial Equity:** _____
+1) Cultural and Learning Opportunities	**-1)** Cultural and Learning Opportunities	**Unintended Outcomes:** _____
+1) Government that Works	**-1)** Government that Works	**Total:** _____

City Comparison with and without equity lens

Austin

Automation of forms on city website
Expand Public PCs - Austin Library
Electric Carshare in Low-Income Areas
AV Shuttle
Electric Scooter Sharing
Electric Bike Share
Dockless bike share
Paperless Parking Permit Registration
Fleet as sensors
Meter Data Analytics

Denver

Advanced Transportation Management
Electrifying the City Fleet
Enterprise Data management system
Air quality measurement devices
Vehicle Charger Deployment
Interactive Wayfinding Kiosks
Electrify high mileage fleets
Enterprise Dashboards
Smart City Lab
GoDenver smartphone app for travel planning