DATA-SMART
CITY SOLUTIONS

Next Level Responsiveness

How AI is Supercharging the Responsive City Cycle

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About Data-Smart City Solutions

Data-Smart City Solutions at the Bloomberg Center for Cities at Harvard University is working to catalyze the adoption of data projects on the local government level by serving as a central resource for city leaders. We highlight best practices, top innovators, and promising case studies while also connecting leading industry, academic, and government officials. Our research focuses on the intersection of government and data and explores innovations in open data, predictive analytics, and civic engagement technology. We seek to discover and preemptively address civic problems by integrating cross-agency data with community data.

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As trust in the federal government has cratered in recent years, U.S. mayors have taken some comfort in the knowledge that the public generally gives local governments much higher marks. However, new evidence suggests that the inability to respond effectively to local problems fuels polarization and erodes trust.

These trends present local leaders with genuine opportunities for positive change. As the level of government closest to the people, cities are well-positioned to regain trust by more effectively understanding, anticipating, and responding to residents' needs.

In our 2022 Data-Smart City Solutions paper, I laid out a vision of the "Responsive City Cycle"—a framework for how local leaders can respond to residents' needs by using digital tools to create feedback loops with residents that improve public services and build trust.

Since then, in just a few years, the staggering pace of technological change and innovation in this space has supercharged what's possible at every step of this cycle. In particular, artificial intelligence has given local leaders new and expanded tools to identify and act on the issues of greatest concern to residents, enrich public feedback, and tackle problems preemptively.

Today, three drivers of responsiveness are changing rapidly:

- **New sources and uses of data:** A rapid proliferation of data from sensors, cameras, smartphones, social media, polls, and surveys is vastly increasing the quantity and quality of data local leaders have at their fingertips. AI makes these data usable by reducing the time it takes to process and act on the information. Local leaders can now obtain real-time intelligence on which streets need snow plowing, which libraries have the greatest usage, or which park playgrounds require maintenance — reports that once took hours, days, or weeks to compile. With AI, city leaders do not need to wait for complaints about physical conditions or service levels; they can capture public feedback on everything from general satisfaction with their local government to niche ideas and opinions.
- **New uses of data by more people:** The rise of generative and agentic AI enables new ways to interpret and use all this data through natural-language queries. That means city workers can anticipate and respond to problems and opportunities more quickly, automate workflows, and address issues that span multiple agencies. An expanded, easy-to-use set of AI tools also empowers managers and frontline staff to surface insights that once required skilled data analysts. Democratizing analytical capabilities throughout the organization in this way enables local governments to be more proactive about addressing issues *before* they turn into calls to 311 or 911.
- **New ways to create and close feedback loops:** The interactive nature of these tools unlocks new ways for local leaders and residents to communicate and co-create. Community groups empowered with AI tools, open datasets, and visualization tools can offer more productive feedback and shift from a posture of complaining to one oriented toward problem-solving.

This paper explores these new frontiers of responsiveness. We will start with a review of the Responsive City Cycle — the fundamentals have not changed, but AI is supercharging nearly every step. Then we will explore different ways that advances in AI and other tools enable local leaders to take responsiveness to the next level.

Many local leaders today are of two minds about AI — recognizing its potential to transform how government works, but wary of ceding control to bots and algorithms. Their constituents are similarly skeptical. According to the Pew Research Center, half of U.S. adults are more concerned than excited about the increased use of AI in daily life.

Using responsiveness as a lens to examine AI decisions can help local leaders reconcile opposing views. Mayors should adopt those technologies that make government more responsive to residents' concerns and needs. As Boston Consulting Group noted in a recent report, generative AI can be a "trust multiplier," making government services simpler, more accessible, personalized, and seamless. It is incumbent on local leaders to make good on that promise.

The Responsive City Cycle Meets AI

Residents look to city hall to solve everything from acute emergencies such as gunshots, fires, and car crashes to daily nuisances such as litter, broken streetlights, and abandoned vehicles. While local leaders monitor how quickly their organizations respond to these complaints, they do not focus enough on *responsiveness*.

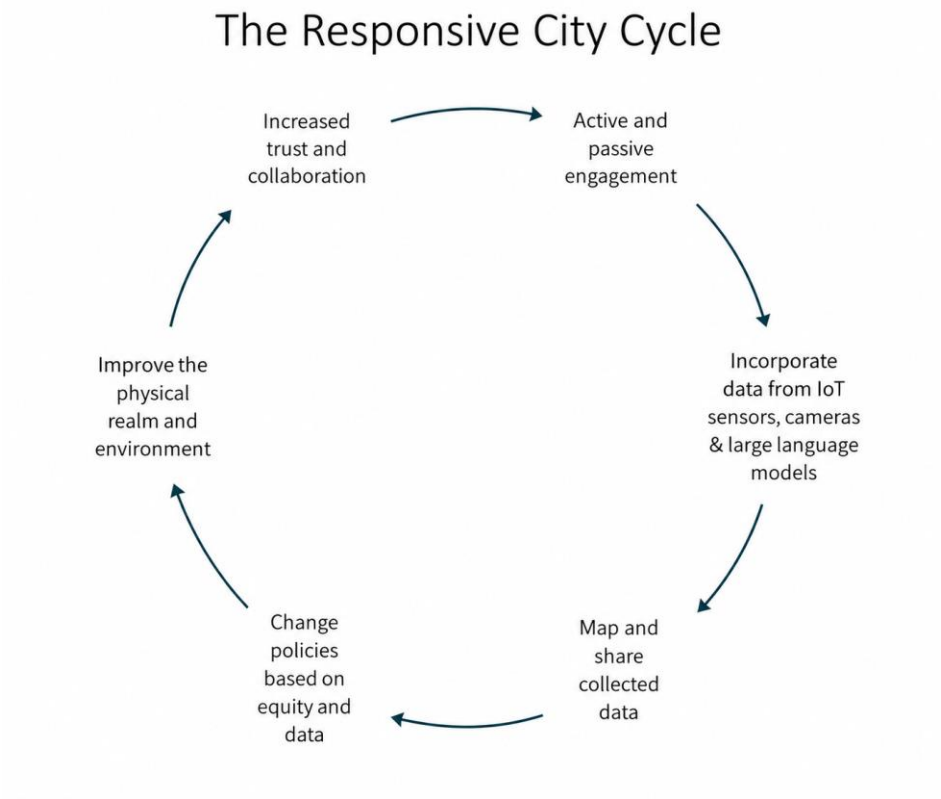
Reacting to a 311 complaint by patching a pothole is a transaction — closing out the ticket. Responsiveness means more — it describes an organizational posture. A responsive city hall maintains a deep and ongoing understanding of what public constituencies care about and uses that knowledge to plan, prioritize, anticipate, and deliver on those priorities.

Our 2022 paper laid out the key elements of responsiveness. These include how city officials engage with residents in decision-making, how effectively they deliver basic services, how widely they listen, and whether they act early in the life cycle of a concern. At the time, advances in digital and data tools had enabled innovations in online services and predictive capabilities. Meanwhile, the COVID-19 pandemic had spurred a wave of experimentation with virtual meetings and other new tools for public engagement.

The Responsive City Cycle was a framework for thinking about how these and other tools can be used strategically as a flywheel to build trust. It envisioned local governments leveraging the latest technology to do several things:

- Understand what residents want by engaging them through traditional forums such as community meetings, as well as new forms of "listening," such as crowdsourcing, 311 apps, and social media sentiment analysis.
- Make sense of this feedback using layered data maps and other visualization tools, sharing insights across agencies and with the public when appropriate.
- Take action based on this feedback by changing policies and operations, improving the physical realm, and delivering results on the issues residents care about most.

- Increase public trust in local government and strengthen a continuing cycle of engagement, action, and results.



One month after Data-Smart published "The Responsive City Cycle," the landscape shifted. OpenAI publicly released ChatGPT, and similar generative AI (GenAI) tools developed by other companies soon followed. As generative and agentic AI capabilities advanced at a staggering pace, city leaders began to identify use cases. It became easier for public employees to mine vast troves of city data for insights previously hidden in databases, spreadsheets, transcripts, digital photos, and video feeds. Powerful data analysis and visualization, once the province of technical experts, became accessible to anyone, from agency managers to frontline workers to community leaders. At the same time, the use of Internet of Things (IoT) sensors, sentiment analysis, and surveys increased dramatically.

These developments do not change the Responsive City Cycle. But they do add new entry points for residents to make their voices heard and for local leaders to listen. They also create new opportunities to close feedback loops and build trust by taking action on issues of concern, and connecting decisions and outcomes back to specific public input. There is greater capacity than ever for local leaders to gather feedback from communities at scale, make sense of it, contextualize it, and act on it quickly and precisely.

Sugar Land, Texas, offers a constructive example. The Houston suburb of 120,000 periodically conducts a representative survey of residents to understand their satisfaction with various city

services and how that satisfaction changes over time. Surveys are nothing new, of course. But in the past few years, several vendors have integrated surveys and polls (along with AI capabilities) into software that city leaders use for public engagement and performance management. In Sugar Land, which uses an engagement platform from the technology company Zencity, surveys generally showed high satisfaction among residents across all services except one: public transportation.

Based on resident feedback, city leaders subsequently partnered with a microtransit company to provide subsidized on-demand van service. It was the first time Sugar Land had offered a service resembling public transit. Subsequent surveys showed a 50% increase in resident satisfaction with public transportation. In addition, AI-powered text analysis on Zencity's platform showed generally positive feedback on the new service, both in open-ended survey responses and in residents' social media posts. When a newly sworn-in city council grilled the city manager about whether the new $10 million investment in transportation was necessary, he quickly produced a sentiment analysis showing continued public support for the service.

Should a 50% increase in satisfaction warrant a $10 million public investment? There is no correct answer, of course — only what local leaders choose based on the values and priorities of the communities they represent. Whatever officials decide, the ability to do that analysis (essentially measuring public satisfaction per dollar) is a powerful new tool they can use to shape budgets, communicate trade-offs, and even put a price on how responsive people want their government to be.

An Explosion in Data Sources

A dramatic rise in the quantity and timeliness of data powers these capabilities. Internet-connected sensors, cameras, license-plate readers, and other tools are ubiquitous and placed on streetlights, sidewalks, sewer pipes, trash bins, buses, and the chests of police officers. Today, nearly everyone is a sensor thanks to anonymized mobile phone data that local governments increasingly use to understand who is using parks, riding transit, shopping at local businesses, or visiting from out of town.

These tools mean city leaders have more data than ever to make decisions, adjust service levels, and anticipate future needs. Cameras attached to city buses or fleet vehicles can spot potholes, broken sidewalks, flooding, unplowed streets, code violations, and other problems, triggering responses before residents call 311. Vibration sensors on bridges, HVAC systems, and pipes can predict failures before they happen, enabling timely inspections and maintenance.

Public debate and discussion also produce a growing volume of usable data. The meetings of city council committees and community boards — once out of reach for the vast majority of people who do not have the time or inclination to attend — can now be quickly transcribed, translated, categorized, and even turned into podcasts. In an era of declining local news media, this gives residents and community groups new tools for tracking their local government's activities.

The information flow works in the other direction, too. GenAI makes it easier for city leaders and elected officials to extract useful information from the high volume of public meeting

transcripts, comments, social media posts, and constituent emails, converting them into practical insights. In Los Angeles alone, Zencity's social listening capabilities capture about 10 million posts, comments, and engagements per month that relate, in various ways, to city operations. This broad source of information provides city leaders with real-time insight into residents' concerns and an opportunity to address them before they fester.

For example, in a recent visioning exercise in Bowling Green, Kentucky, 8,000 of the city's 75,000 residents answered an online, open-ended question about what they wanted to see in their community over the next 25 years. AI tools developed by Jigsaw, the technology incubator under Google, sorted through the feedback to identify common themes and ideas, giving city leaders a roadmap for their next strategic plan and residents a fine-grained look at what they had collectively suggested.

Some survey tools enable detailed sampling of community opinion at the local level. In Oshkosh, Wisconsin, which uses an engagement platform from Polco, a private vendor, about 10% of the city's 60,000 residents participate in a standing survey panel. That group is not perfectly representative of the city's population, but survey results can be weighted to closely mirror demographics by age, gender, race, ethnicity, neighborhood, and other attributes. A typical weeknight town hall, which tends to draw organized advocacy groups, residents with specific grievances, and disproportionately older and more affluent participants, will not provide the same breadth of voices.

Oshkosh leverages this capability to conduct a comprehensive annual survey to track resident satisfaction with services and quality of life. In addition, the city regularly conducts smaller, issue-specific polls on topics such as overnight parking restrictions or the regulation of all-terrain vehicles. City leaders use the feedback to track progress over time, inform budget priorities, and shape policy choices.

In addition to broadening the scope and improving the quality of input, technological advances reduce the effort required of residents to communicate their wants and needs. Local leaders can now think of community feedback strategies as a range, from high-burden to low-burden to no-burden activities:

- **High-burden feedback** requires residents to invest time in attending meetings, workshops, or focus groups — or in writing letters or emails, or in making phone calls. Technology will not eliminate the need for high-burden feedback. But it does offer ways to enhance it. For example, technology can enable more voices to be heard within a room or add texture and context to responses to make them more actionable for decision-makers.
- **Low-burden feedback** requires minimal time or effort for residents to make their views known or report an issue. For example, rather than having to attend a weeknight council meeting, residents can attend virtually. Instead of delivering public testimony, residents can respond to a poll, prompt, or chatbot on their phones. And rather than taking five minutes to call 311 about a pothole, they can snap a photo and text it to the city, letting AI identify the problem and its location and initiate a service request.

- **No-burden feedback** uses technology to identify what residents want and anticipate what they are likely to need, without requiring any additional effort on their part. In some cases, this means tapping into existing signals residents are already sending, such as social media posts. In others, it means using a combination of sensors, cameras, and AI to monitor urban conditions and address emerging issues before they become problems that residents need to report.

As city leaders take responsiveness to the next level, they will better understand what residents want while bothering them less for feedback. "Historically, it's taken a lot of effort to get input from the public," said Eyal Feder-Levy, CEO of Zencity. "You need to organize a meeting; you need to hire a survey firm. There's a lot of work to do, and there are lags before you get quality data. In the world we are heading to — and you can see this in Sugar Land — we will be able to hear the voice of the community on a much more regular basis because it's a lot easier to do."

Acting on Insights

In addition to more data to draw upon, city leaders now have new capabilities to analyze it. This combination of more data and better analytical tools will lead to smarter decisions, yielding results that respond to residents' needs more quickly and with greater precision.

Three advances in particular stand out. First, the new ability to analyze unstructured data — including text documents, emails, social media posts, images, and video feeds — opens procurement records and other previously inaccessible data repositories to systematic analysis. In urban contexts, new capabilities for analyzing visual data can be particularly powerful because they eliminate the burden of having humans watch thousands of hours of video. A traffic engineer, for example, can simply query an AI system to determine how many drivers ran a red light at 10th and Main — and adjust signal timing immediately — instead of waiting for monthly or quarterly reports.

Second, sophisticated analysis can now be done simply by chatting with an AI assistant in natural language. That means you do not need to be a data scientist to spot and interpret trends in large datasets or to produce data dashboards, visualizations, and maps. In city governments that rarely have sufficient data analysts, this substantially expands analytic capacity.

Third, emerging tools enable data analysis across siloed systems. Advances in "Model Context Protocol" (MCP) servers mean that AI agents will increasingly be able to query multiple city databases simultaneously. This enhanced access will make it faster and easier to extract information from fragmented data systems across agencies and jurisdictions. Want to identify the causes of rodent infestation complaints on a particular street? AI can trawl city data on restaurant inspections, trash collection, and street lighting and identify likely contributing factors. Again, it will be possible for non-specialist staff, not data analysts with advanced degrees, to do this work using natural-language queries.

These changes carry significant implications for local government operations. It will become easier to identify and address the root causes of problems, from street crime to double parking to flooding. Local leaders can shift from responding to problems to predicting where they will

occur and preventing the conditions that generate 311 and 911 calls. Frustrating processes, such as applying for a building permit, can be radically streamlined as AI takes over basic functions, such as ensuring applicants include the required documentation.

The democratization of data analytics tools could radically change how local governments measure and manage performance. As I discussed in "Transforming City Operations with StatGPT," AI enables cities to move away from the prevailing top-down model in which the mayor, city manager, and other top lieutenants hold the keys to operational data and use it to hold managers accountable at monthly or quarterly "stat" meetings. Instead, managers and even frontline workers — possessing more analytic capability than was imaginable only a few years ago — will be able to more readily identify problems independently and respond more quickly.

Enriching Resident Engagement and Closing Feedback Loops

Local leaders are not the only ones enjoying new access to AI and other digital tools. City residents can use them, too, in ways that can transform democratic participation and collaborative problem-solving.

In response to traditional town halls often dominated by the loudest voices, local leaders are experimenting with citizens' assemblies, online deliberation platforms, real-time translation, public-feedback chatbots, and other new ways of interacting. GenAI has a role here, too, enabling local leaders to mine enormous volumes of written or spoken comments in any language; identify common themes and unique ideas put forward by residents, local businesses, and other stakeholders; and close feedback loops by citing specific input or broader public sentiments behind specific policy decisions.

One example comes from Europe, where several cities are using a stakeholder engagement tool called dembrane to enhance in-person meetings and workshops. AI rapidly synthesizes recordings of resident small-group conversations into key insights, ideas, and areas of agreement and disagreement. The technology ensures that every voice in the room, not just the loudest, is heard. It also enables voices outside the room to contribute, asynchronously.

The tool does not merely capture a higher volume of public feedback. It also enriches the incoming comments. An interactive AI assistant flags vague comments and reflects them back to participants — a facilitation technique that encourages people to refine their comments into clearer, more useful feedback. According to Jorim Theuns, dembrane founder, these interactive capabilities can help local leaders identify quiet majorities on contentious issues. "It's going to get a lot easier to place emphasis on common ground," Theuns said. "You can more easily read the signals on what 90% of people are agreeing with and see polarizing issues for what they are."

Community engagement around planning, zoning, and development issues is amenable to AI-driven transformation. Too often, local planning meetings bog down in abstract arguments about what future change will look like: how tall a new building will be, how far it will be set back from the street, or whether there will be a comfortable place to sit outside in the shade.

New tools such as AI image generators enable people on all sides of these discussions to easily use pictures instead of words, changing the nature of the dialogue. Debates can move from the realm of abstract ideas into specifics that can be easily visualized, understood, and changed. Digital twins — 3D models of a city's built environment — also offer new ways to visualize, understand, and react to development proposals. For example, in St. Louis, civic leaders found that using a digital twin to show how a proposed manufacturing center would fit into one historically underinvested neighborhood shifted the conversation from "not in my back yard" to "what will the façade look like?"

Laypeople can now turn all kinds of data into visuals, graphics, and maps. Neighborhood groups can now do the same kinds of analyses that local leaders can, using the growing volumes of publicly available data that cities publish on their open data portals. This clarity and availability of data can powerfully change the often-contentious dynamic between residents and local government. Armed with insights drawn from publicly available government data and their own hyperlocal knowledge, residents can move from a posture of complaining about problems to one of actively collaborating with local leaders to solve them. For example, parents could assemble data on school attendance and traffic to advocate for safer walking routes for students.

AI also enables local governments to personalize services in ways that are common in online commerce, but that they have been slow to adopt. A consumer who purchases a toothbrush on Amazon, for instance, is immediately offered toothpaste. With AI, local governments can increasingly use their own data to make similar suggestions. A resident who has recently obtained a dog license, for example, might be directed to a nearby dog park.

Expanding the Listening Function: Channels, Sources, and Methods

A responsive city listens broadly, continuously, and across modalities. The following actions operationalize that posture:

1. **Expand the sources of civic signals.** Grow the number of information channels on which decisions are made, including social media, virtual meetings, sensor data, and images from fixed cameras and residents.
2. **Deploy AI to expand the uses of multimodal data.** Use machine learning tools to rapidly process signals from sensors, social media, imagery, and unstructured documentation, surfacing patterns that would be hard to discern through manual review.
3. **Use AI for anomaly and salience detection.** Apply analytic tools to identify outliers, recurring service complaints, and issues registering disproportionate resident frustration — distinguishing signal from noise across high-volume input streams.
4. **Ground data in place through spatial visualization.** Use geospatial and visual analytics to expose the linkages among neighborhood-scale issues, making cross-domain interdependencies (infrastructure, public safety, environmental health, service delivery) easier to see for staff and residents alike.
5. **Build staff capacity to design AI-informed interventions.** Train personnel to use AI tools not merely for data analysis but also to help design, test, and iterate new approaches to listening to residents.

Conclusion

Turning these technological advances into public trust will not happen automatically. City leaders will need to ensure their employees have the training and the freedom to use AI and other tools to improve responsiveness. They will need to shift away from tracking transactional performance metrics, such as the number of potholes filled, toward trust-based indicators, such as residents' satisfaction with their roads. And they will need to adjust their posture from one of "selling" ideas to the public and defending decisions to one that embraces residents as problem-solvers.

In just a few years, AI has gone from something few people outside the technology sector thought much about to a tool that half of all U.S. workers use daily, according to Gallup. The pace of change is dizzying and likely to accelerate. The Responsive City Cycle endures as a framework for local leaders to make sense of new tools, decide which ones are worth using, and deploy them to ingest, contextualize, and act on data strategically, thereby reinforcing democratic ideals and building the public's trust in government. The same principle applies to AI as to every other technological advance local governments have seen, from e-government to customer relationship management software to cloud computing to the enthusiasm for so-called "smart city" initiatives. It is not the technology that matters. It is whether technology improves residents' lives in concrete, tangible ways that they can feel.

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