SIX WAYS TO BUILD AN INFORMATION TECHNOLOGY STRATEGY

Where Location Is Never an Afterthought

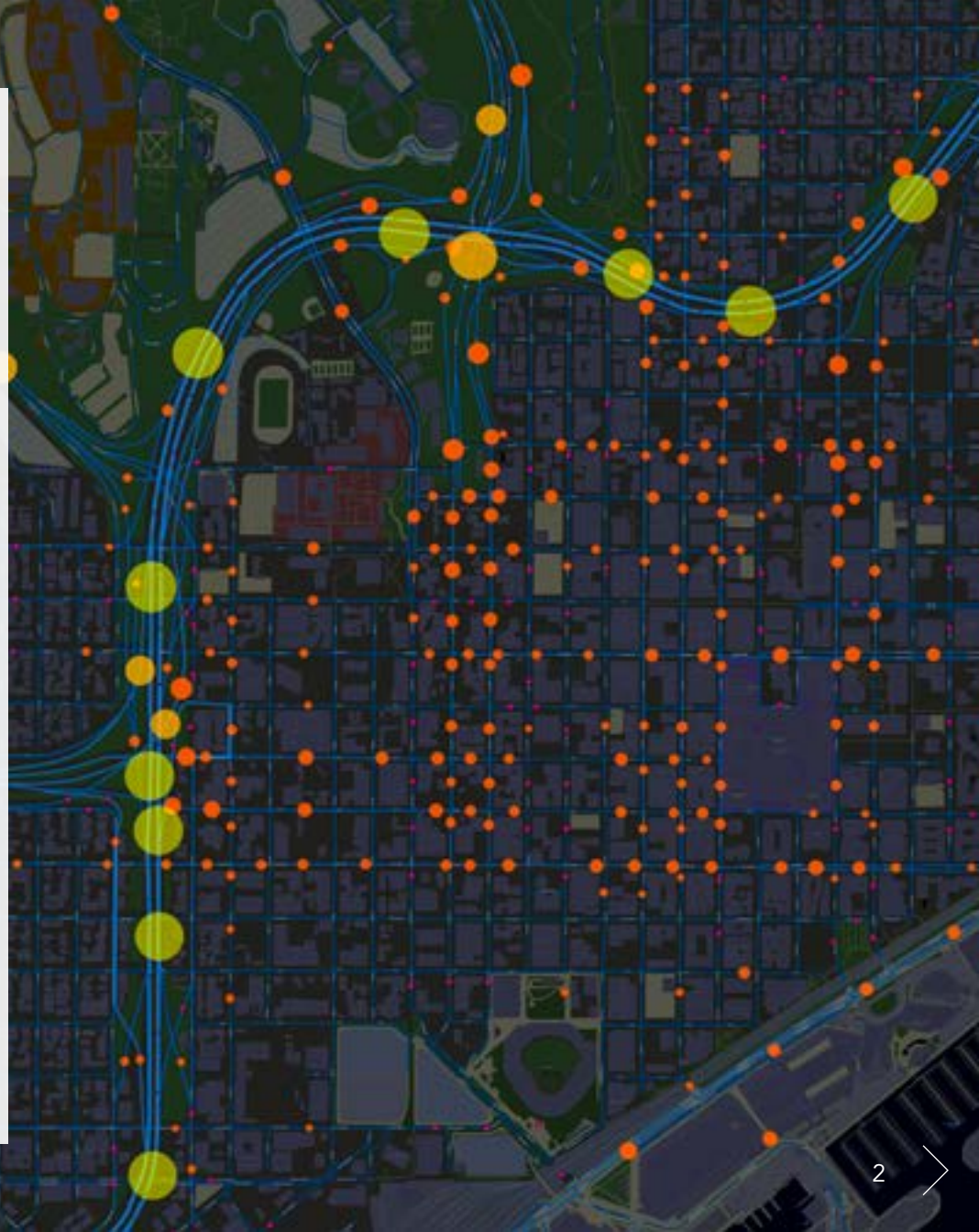
esri® THE SCIENCE OF WHERE®

The Evolution of the IT-Savvy Executive

The role of the information technology (IT) professional is changing and becoming more elevated. As a technology executive, you have a tough job of balancing your IT portfolio, and it can be difficult to keep pace with all the advancements in the industry. No longer are you responsible for simply purchasing IT or enhancing operational efficiency. Your position now has a public-facing element, and you have an even greater responsibility to support discipline-specific goals. You are seen as the lead of a modern, data-driven organization.

You are now the facilitator of cross-departmental collaboration and the provider of insight through performance dashboards. As such, you open the gateway to a two-way dialog between citizens and your organization.

How do the leading IT executives drive innovation and improvements to the bottom line? In our experience, geographic information system (GIS) capabilities allow IT leaders to accelerate the modernization of an organization. The following six patterns are repeatable paths to success.



> “Maps and place-based information resonate with everyone, from citizens to managers to elected officials, regardless of the communication channel, enabling all of us to work on and solve community problems together.”

Lori Sassoon,
Deputy City Manager/Administrative Services,
City of Rancho Cucamonga, California

The 6 Pillars of Building an IT Strategy with Location at the Forefront

1. **Take action through insight**—Leverage advanced analytics for actionable intelligence.

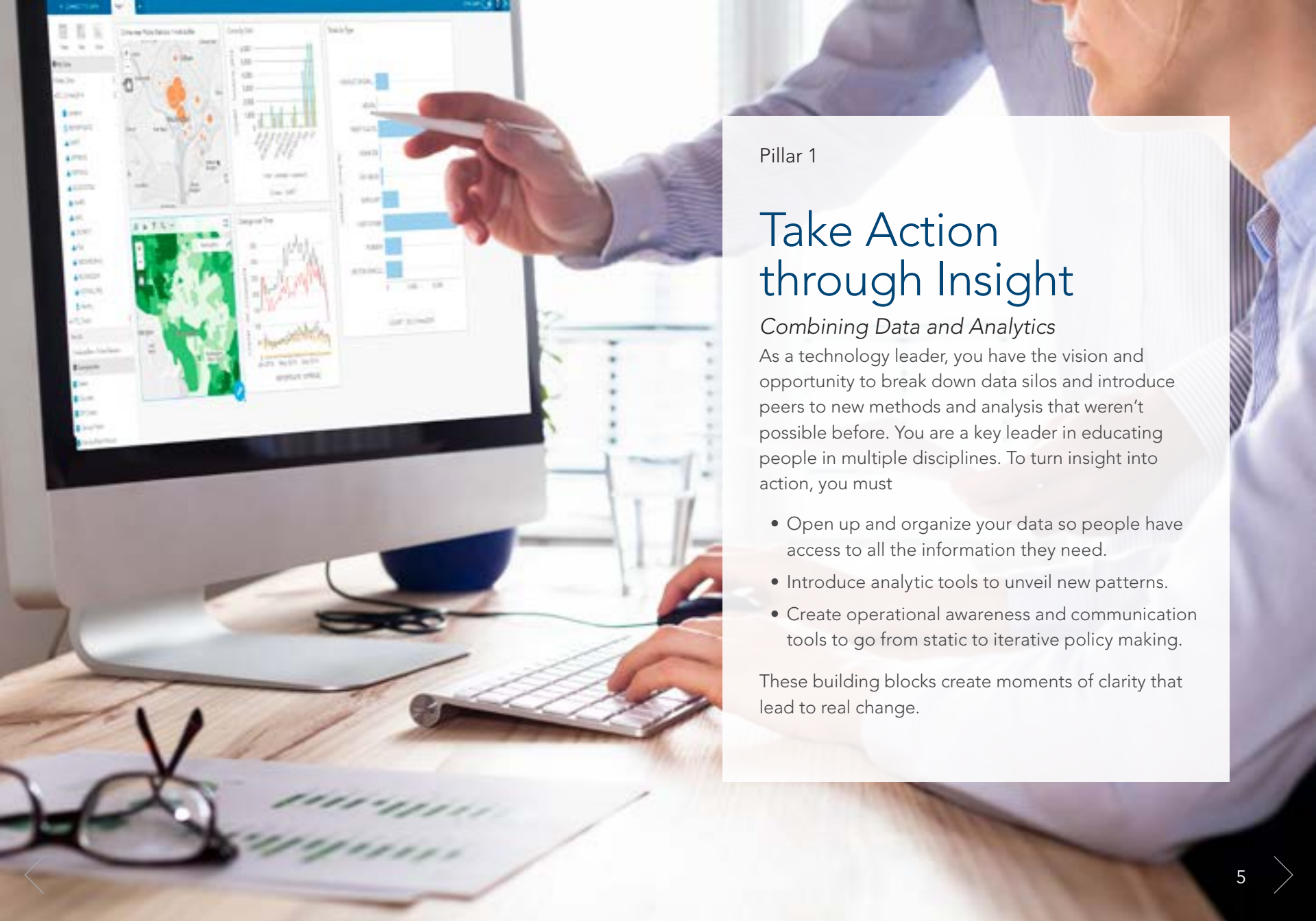
2. **Establish a connected community**—Set the foundation for real-time operations through Internet of Things (IoT) sensors and smart infrastructure.

3. **Accelerate an inclusive citizen experience**—Provide a two-way exchange of education, feedback, and information about potential impacts, for better living.

4. **Become a higher-performing organization**—Increase productivity and efficiency through performance management and mobile technology.

5. **Invest in technology for the public good**—Deploy integrated solutions that support your organization's initiatives.

6. **Embrace future-ready trends**—Pilot next generation technology and intelligent things so you stay ahead of the curve.



Pillar 1

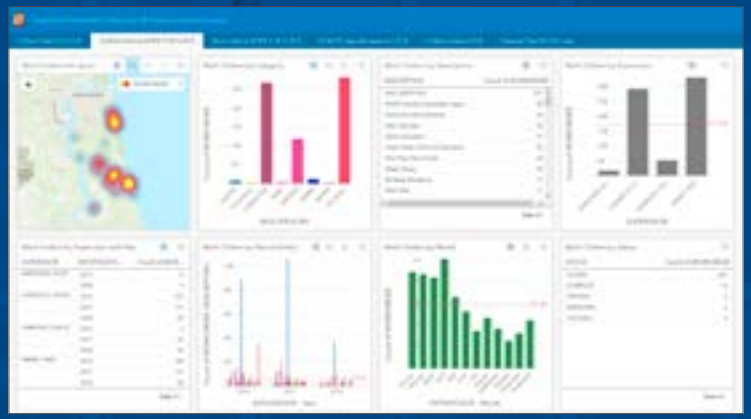
Take Action through Insight

Combining Data and Analytics

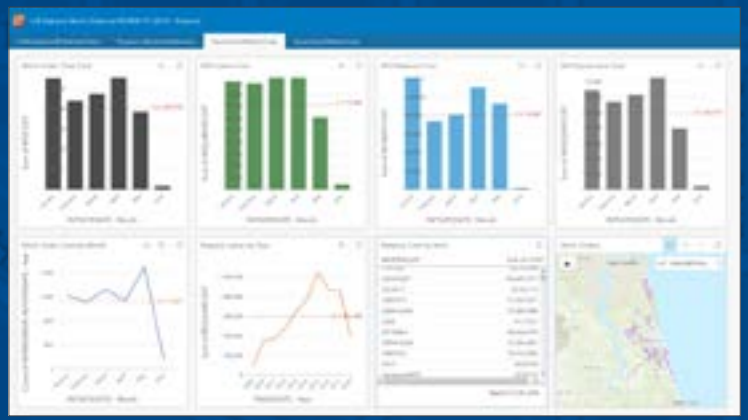
As a technology leader, you have the vision and opportunity to break down data silos and introduce peers to new methods and analysis that weren't possible before. You are a key leader in educating people in multiple disciplines. To turn insight into action, you must

- Open up and organize your data so people have access to all the information they need.
- Introduce analytic tools to unveil new patterns.
- Create operational awareness and communication tools to go from static to iterative policy making.

These building blocks create moments of clarity that lead to real change.



Using analytics to better allocate resources



Evaluating months with high volumes of work orders for better time management

St. Johns County, Florida, Prioritizes Asset Operations through Insights

The United States has reached a critical point where the condition of infrastructure is in crisis: aging utilities, roads, and bridges are in desperate need of repair or replacement; maintenance has evolved into a process of constant prioritization with no end in sight; and new infrastructure needs to be planned and included in the existing asset management life cycles. In Florida, the St. Johns County Utility Department recognized the need to meet this crisis head on and knew that it could not continue with a business-as-usual approach. What it needed was a transformative data-driven method to prioritize its most critical assets for inspections, rehabilitation, repair, and replacement.

The county's strategy was to leverage the latest GIS-based asset management systems to stretch its budget and establish a tool for ongoing assessment that more proactively met the needs of citizens and businesses alike. The Utility Department integrated GIS tools and combined big data analytics and operations dashboards. The resultant solution provides continuous updates of assets at risk of failure, and the consequences of failure scores, so that new maintenance strategies can be immediately implemented on high-risk assets. This data-driven approach provided stronger analysis and allowed the integration of datasets from a wider set of stakeholders including finance, hydraulic modeling, customer information systems, and supervisory control and data acquisition (SCADA).

Pillar 2

Establish a Connected Community

Working in Real Time

Much like people's homes, cars, and devices, communities and governments are becoming more connected. Governments are drawing intelligence from citizens, vehicles, assets, GPS-enabled cameras, and IoT-enabled infrastructure. This raises a vital question: With so much data readily available, how do you make sense of it all?

GIS allows you to consume, filter, monitor, and analyze data so it can be applied to problems to improve outcomes. State and local governments are combining GIS, systems of record, and IoT to improve traffic flow, monitor stream gauges for flood management, aggregate social media feeds for citizen safety and public opinion, and so much more.

Monitoring material and labor costs for better service and transparency

State of Iowa Paves the Way to a Connected Community

State and local governments are finding that a modern GIS, fed by real-time data, can be an effective tool for daily operations, empowering decision-makers and stakeholders with the latest information they need to drive current and future ideas and strategies.

Iowa Department of Transportation (Iowa DOT) is changing the rules on how it is engaging with citizens and improving operations. The department incorporates an open approach and focuses on providing citizens with up-to-date information during severe weather conditions to keep the state moving. The DOT's data sharing extends beyond Iowa's borders, keeping motorists informed of road and weather conditions to ensure safe travel. The department ingests data feeds from other states and includes its own to publicly share the location of DOT snowplows, dashboard camera shots from snowplows, fixed-camera location feeds, road conditions, traffic and weather reports, and other data.

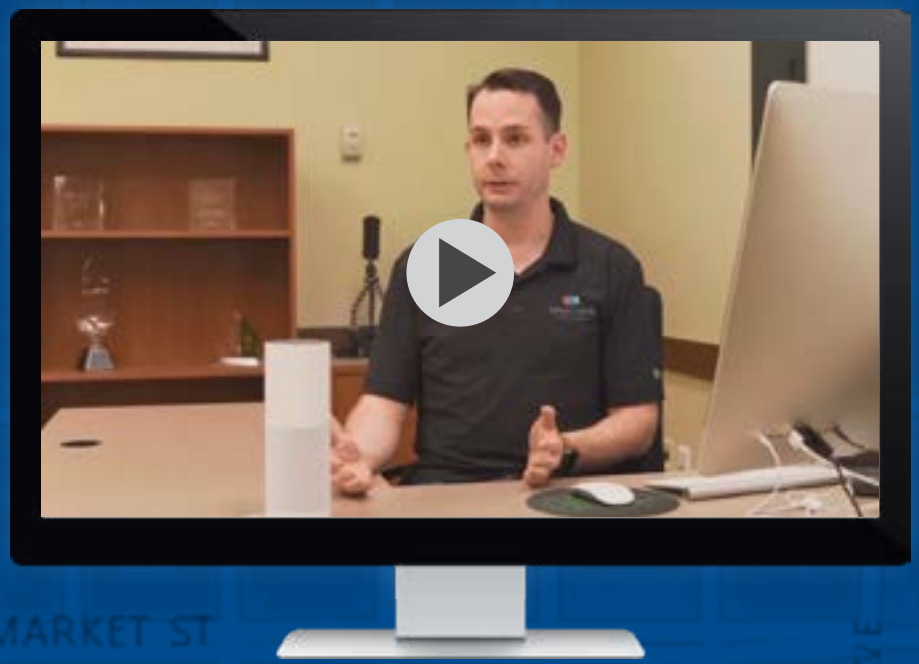
Pillar 3

Accelerate an Inclusive Citizen Experience

Improving Confidence in Government

Governments have struggled for decades to improve citizen participation and input, trying everything from town hall meetings to public notifications and steering committees in order to build a consensus. However, engaging citizens in the modern era requires the use of technology to gain increased data points and comprehensive feedback.

Citizens who are better informed through GIS feel more inclined to participate. Data-driven interfaces provide greater context for people to understand what governments are asking of them, and through the art of storytelling, they can explore the contents of interactive maps and media. The Science of Where helps both citizens and governments understand the points of view of both the individual and the community at large. Never far from a smart device, citizens can easily share their viewpoints with the organization in real time so that adjustments can be made, increasing government transparency. Crowdsourced information can be communicated in interactive applications anytime, anywhere, and on any device.



Johns Creek, Georgia, Reimagines the Citizen Experience

The City of Johns Creek, Georgia, is a standout example of how a government can connect seemingly unrelated trends. The city combined its GIS open data portal, DataHub, with public engagement through a virtual assistant to unleash a unique citizen experience.

Imagine, rather than typing out questions about the specific zoning on a property or the crime rate around your neighborhood, that you were to ask your virtual assistant. That is exactly what Johns Creek did to connect with citizens—in a way they weren't expecting.

> "We had been trying to improve engagement with our DataHub and were thinking about ways to take it to the next level. We took the concept of using consumer technology in the home and extended it to city hall. The result was the first-ever use of a virtual assistant connected to a city's open data."
>
> Nick O'Day, Chief Data Officer, City of Johns Creek, Georgia

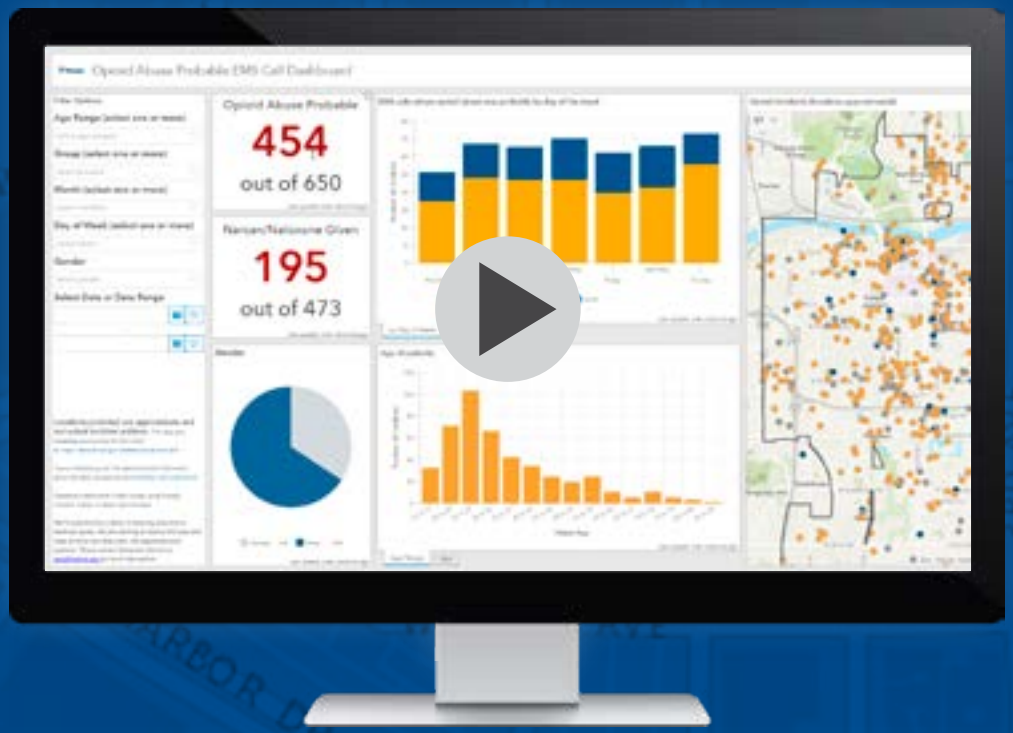
Pillar 4

Become a Higher-Performing Organization

Setting Benchmarks and Meeting Goals

Today there is a higher level of expectation to improve effectiveness at a faster rate. Technology increases the agility of a government organization to be able to reach performance goals. The use of dashboards and data allows governments to move from disconnected problem solving approaches to a more collaborative environment, enabling them to definitively ask, how am I doing?

Dashboards and performance management tools consume data streams from a wide variety of systems of record, like finance, work order, or customer relationship management (CRM), and GIS brings these systems together to provide a holistic view. Organizations are now able to create geographically targeted tactics that help them reach their goals.



Tempe, Arizona, Tackles Crisis Response

Performance dashboards are providing greater insight to executives who truly want to solve issues at a faster pace. Whether it's evaluating the cost of snow management materials, monitoring daily public safety calls for service, or consuming crowdsourced information to provide real-time traffic reports, these tools are paving the way for stronger cross-departmental collaboration, resource management, and data-driven decision-making.

The City of Tempe, Arizona, uses a dashboard that explores opioid-related emergency medical services (EMS) call data to provide deeper insight into the region's opioid abuse problem. With interactive charts and maps, users can gauge the days of the week that have more activity; ages and groups that are most affected; and most importantly, where concentrations of EMS calls are within the city limits. This helps departments and city leaders know where to allocate the right resources, at the right time.

Pillar 5

Invest in Technology for the Public Good

Supporting Infrastructure and Humans in Crisis

The world is facing a new series of crises in the form of aging infrastructure and social inequity. Bridges are collapsing, water systems are failing, homelessness and drug addiction are increasing, and infrastructure is not meeting community needs. These issues are becoming more cross departmental, requiring tools for collaboration.

Fighting a crisis is the same, no matter the type. The same patterns used in combating a hurricane, a fire, or an earthquake can be applied to humans and infrastructure in crisis. Technology can be used to organize the data quickly, provide situational awareness, and deploy the best tactics to turn the problem around. In each scenario, GIS plays a fundamental part in responding to and mitigating these issues, allowing organizations to

- Organize all relevant data.
- Consume real-time data as it comes in.
- Communicate the results.
- Deploy tactics and allocate resources.
- Inform all stakeholders and decision-makers.
- Educate the community.

The Trust for Public Land Tackles Sustainability for the Public Good in Los Angeles

Concerns on how climate change will impact livability is top of mind. Improving livability revolves around connecting citizens to parks and open space, mitigating the effects of urban heat waves, capturing and absorbing storm water, protecting coastal residents and industry from sea level rise, and prioritizing the protection of socially vulnerable communities from the impacts of climate change.

Mayor Garcetti of the City of Los Angeles, California, set out on a novel approach to a public/not-for-profit partnership with The Trust for Public Land to keep the city on a path toward sustainability. The partnership includes the development of the Los Angeles Climate-Smart Cities Decision Support Tool, an interactive online GIS tool that integrates existing data and helps prioritize multi-benefit green infrastructure investments. The Trust for Public Land created the Climate-Smart Cities tool to identify regions and sites where green infrastructure projects can cool off the urban environment, capture storm water and recharge underground aquifers, facilitate walking and biking connections to transit and jobs, and protect at-risk populations. One notable outcome was the South Los Angeles Avalon Green Alleys project, which is seen as a leading example of The Trust for Public Land's nationwide green alleys efforts. This and several other projects have the potential to help Los Angeles enhance residents' quality of life.

Pillar 6

Embrace Future-Ready Trends

Preparing for Tomorrow

Advances in technology are driving government leaders to envision a world with drones in the air and driverless vehicles, creating new responsibilities in meeting the needs of citizens. If autonomous vehicles become the norm, will disabled-parking spots be necessary, or will the car simply drop you off at the front door? Will it be necessary to have traffic signals with the traditional red, yellow, and green lights if the intersection communicates directly to the vehicle? All these changes that are driven by IT require government executives to become trusted advisers on more and more topics.

There is a role for the IT leader to support the concept of a digital twin and embrace more immersive technologies like 3D and virtual or augmented reality. For example, augmented reality might be used in response to a water main break rather than relying on traditional paper maps. Virtual reality can empower firefighters to better respond to a building fire through an advanced understanding of the floor plan. 3D will provide a new and improved way to design cities through real-world context and accurate visualization.

What role will artificial intelligence (AI) or machine learning play in government operations? Predictive maintenance systems run by AI could help determine the optimal service schedule for fleets of garbage trucks, street sweepers, or snowplows. Machine learning could enhance decision-making by forecasting health outcomes or determining dangerous street intersections. Government leaders should be ready to proactively develop strategies that incorporate these new advances.

Cobb County, Georgia, Pioneers Future-Ready Mobility

Cobb County, Georgia, is leading the way in artificial intelligence and piloting a project to improve transportation management across the community. Where other organizations rely on historic traffic data to time their lights and build their infrastructure, the county is consuming vehicle and pedestrian data, along with real-time road closure and traffic accident information, to modify traffic patterns in real time.

By incorporating GIS into its Sydney Coordinated Adaptive Traffic System (SCATS), Cobb County can change traffic signals automatically to manage traffic and pedestrian flow. Cameras monitor the number of cars that are queued at the light, and an operations dashboard allows traffic managers to take control when necessary to make adjustments.

Cobb County is taking all the variables that cause congestion and pulling them into one system. This is a forward-leaning example of GIS and artificial intelligence paving the way to monitor and alter traffic flow in real time.

It Starts with You

You and your peers are clearly recognizing the profound need to transform your organizations through a mix of digital technologies and strategies designed to accelerate operations. GIS technology has been embraced by nearly every discipline to provide new insights and engagement to see the world from different perspectives.

Whether used to respond to disasters, rethink infrastructure needs, solve problems for humans in crisis, or enhance civic engagement, geographic data and analysis can help users see what might otherwise have been missed. They are important tools in every executive's arsenal.

Organizations large and small are benefiting from The Science of Where. When you shift your thinking to add the power of location to your business challenges, amazing patterns emerge. Connecting where people, resources, and assets are in relation to demand provides new insights. Combining systems of record, such as billing and customer relationship management, with new technologies like the Internet of Things allows you to gain an understanding of how a decision in one area can affect another. Better yet, you understand how to use resources more wisely; utilize people more efficiently; and work smarter, not harder.

The six pillars outlined in this piece set the foundation. Creating the strategy starts with you. To take your organization through a smart communities revolution,

visit go.esri.com/leading-IT.

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