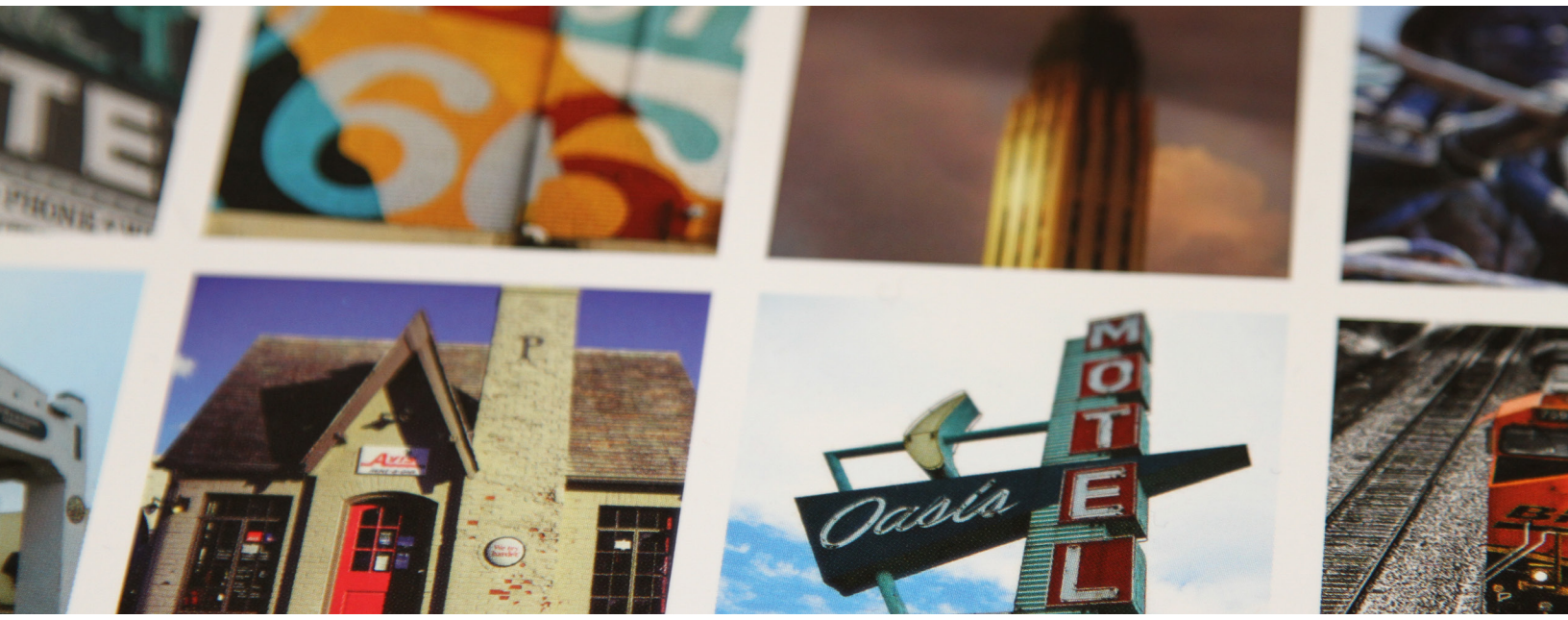
Urban Data Pioneers

An **Engaged Cities Award** case study. Created by Cities of Service in partnership with 2018 award winner Tulsa, Oklahoma.

Executive Summary

Tulsa Mayor G.T. Bynum campaigned on a data-driven policymaking platform, but upon taking office found few resources in the budget that would allow city government to utilize existing data. He launched Urban Data Pioneers as a volunteer program encouraging city staff and community members to deploy their technical skills in data visualization, coding, and geographic information systems to study discrete issues facing Tulsa and inform policymaking.



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The Challenge

"In God we trust. Everyone else bring data," is a favorite dictum of New York City Mayor Michael R. Bloomberg. In the 21st century, data-driven decision-making is a mantra among city leaders, who increasingly wish to harness the capacity of data science to measure every aspect of a city — from well-established police evaluation tools like CompStat to more recent concepts like tracking greenhouse gas emissions by benchmarking buildings' energy usage. But how can a mid-sized city with limited resources tap into the data-driven revolution to drive municipal policy?

Tulsa (population 401,800) is the second-largest city in Oklahoma. A historic hub for the petroleum industry, it was known as the "Oil Capital of the World" after discoveries in the early 1900s that were among the largest ever at the time. Over the following two decades, Tulsa boomed on the back of oil and developed into a medium-sized financial center with an art deco commercial district. The national Chicago-Los Angeles highway known as Route 66 passed through the city thanks to the efforts of civic boosters.

African-Americans also thrived in a segregated neighborhood with a commercial district known as "Black Wall Street," which was the site of one of the worst race riots in U.S. history, in 1921. Today the city is about 64 percent white, 15 percent black, 15 percent Latino, 4 percent Native American, and 3 percent Asian.

A 1982 slump in oil prices hit the local economy hard as did a national recession in 2001. In 2003, metro-area voters approved a ballot initiative package known as Vision 2025, a 13-year, 1 cent increase in the local sales tax to be spent on regional economic development and capital improvements. The fund raised $611.5 million, which leaders spent on projects like a 19,000-seat arena and an aviation maintenance facility. Some big-ticket items, like incentives to lure a Boeing manufacturing facility, did not pan out, but the city netted a number of new and improved cultural and civic facilities.

In that same period, Tulsa succeeded in diversifying its economy — to an extent. Oil and gas jobs now account for between 1.5 and 2 percent of private sector, non-agriculture jobs, down from 3 percent in 1990. There is a growing tech sector with about 7,500 jobs in app development and IT. In Tulsa County, which includes the city and surrounding suburbs, the average per capita income in 2016 was $28,970 with 15.7 percent living below the poverty line, about 3 percentage points above the national average.

"I ran for mayor on a platform of utilizing data not just to improve city services, but as a way of pulling together people who might normally not agree with one another."

TULSA MAYOR G.T. BYNUM

G.T. Bynum was elected mayor in June 2016 and assumed office in December of that year. "I ran for mayor very much on a platform of utilizing data evidence and evaluations not just to improve city services, but as a way of pulling together people who, from a strictly partisan standpoint, might normally not agree with one another," he said.

Tulsa, like most cities, had a large amount of data on hand, including crime statistics, utility information, and traffic statistics. Mayor Bynum wanted to use this data to achieve his campaign goals, which included reducing crime and growing the city.

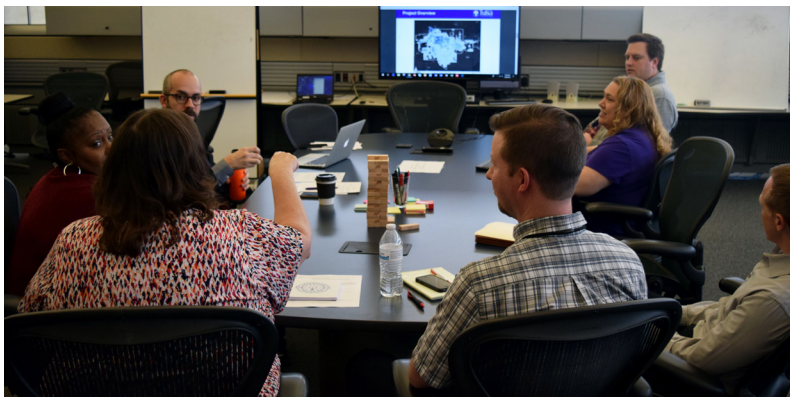
But resources to accomplish that goal were not necessarily forthcoming. For fiscal year 2019, the city budget is $867 million. This figure is on the lower side for cities with similar populations, although the City of Tulsa is not responsible for every sector. For example, the health department is operated by a joint city-county authority, not by the municipal government itself.

A limited municipal budget thus created an obstacle to a city-funded data initiative. The city was also in the middle of a budget year when Mayor Bynum stepped into office. “We had no budget, and so we started looking at who is out there who wants to help solve these things and are motivated by wanting to help their community,” he said.

The Solution: Urban Data Pioneers

Although Tulsa felt constrained by a limited budget, Mayor Bynum believed that his election had galvanized local interest in civic participation. “There was tremendous interest communicated to me from throughout the community. People wanted to know how they could help and didn’t have a clear way to work with us,” Mayor Bynum said.

The mayor proposed a working group called Urban Data Pioneers. The program engages teams of city employees and community members who volunteer their time to explore questions through data analysis. The teams meet to identify a problem, ask questions, analyze data, and produce a visual analytic report within a specific time frame. Urban Data Pioneers’ goal is for teams to learn data analysis techniques together and provide actionable information that can enable the mayor and city leaders to make policy decisions.



Urban Data Pioneers engages teams of city employees and community members who volunteer their time to analyze data and inform policy.

Mayor Bynum campaigned on improving education, reducing crime, increasing per-capita income, and growing the population. Drilling down to measurable data points to address these priorities, specific topics for consideration included utility billing, per-capita income, the pavement condition index, land-use productivity, population growth, traffic crashes, and the relationship between blight and violent crime. With a slate of issues deserving rigorous scrutiny,

Mayor Bynum sent an email invitation to everyone in city hall to join with an expectation that a dozen or so employees would show up to the first meeting. But that initial gathering elicited 60 attendees, with 120 ultimately engaged in the effort that kicked off in February 2017.

The first cohort ran from February to April 2017 and looked at street prioritization, traffic crashes, land-use efficiency, and blight. The second cohort ran from June to August 2017 and covered vacant land, blight inventory, population growth, and drivers of per capita income. The third cohort ran from October 2017 to January 2018. It expanded upon some earlier topics like blight and violent crime, and also embarked on more sophisticated projects like benchmarking land value, building a predictive model for neighborhood stability, mapping spending on schools, and measuring neighborhood walkability.

A fourth cohort began in September 2018. There are about 50 active members at any given time, roughly split between two-thirds city employees and one-third private citizens or nonprofit representatives.

Nuts and Bolts: How it Works

The premise behind Urban Data Pioneers is that small teams of volunteers (10 or fewer, including community members and city staff), some with data collection and analysis experience, each tackle a different municipal topic. At least one team member must have essential technical skills like the ability to create graphic visualizations of data points and use geographic information systems (GIS) to visually illustrate data on city maps.

James Wagner, chief of Performance Strategy and Innovation, manages the Urban Data Pioneers program from within a unique city hall department with a mission of harnessing data for civic innovation. Wagner's department, newly created by Mayor Bynum, has a strategically cross-departmental purview. With such a mandate, rather than a day-to-day responsibility for city operations like transportation or garbage collection, Wagner is positioned to focus his office's time and energy on Urban Data Pioneers.

Each cohort kicks off with a planning meeting where Wagner's office brings a series of predetermined topics, based largely on the mayor's agenda, that deserve more data-driven scrutiny, such as examining the greatest predictors of per-capita income or the connection between blight and crime. Some topics are suggested to Wagner by city employees and community members.

Volunteers gravitate to the project that most interests them — Wagner typically posts them on large pieces of paper around the room at the meeting so that participants can gather around the topic they would most like to explore. During the meeting, the teams fill out charters, which are simple forms that include the question or hypothesis they are examining, the data sets they would like to use, and information about the team members. Team members then select a team leader.

Wagner's office ensures that each team has a data analyst, subject matter expert, and someone skilled in data visualization. Data experts may be recruited from the city's crime and utility analysts or the auditor's office, for example, or from partner organizations like Code for Tulsa, a nonprofit group of civic-minded data analysts. The teams largely use free or easily available

software to analyze the data, such as Microsoft Excel, Tableau, and coding languages like Python and R.

Subject matter experts vary according to the topic. The team studying blight and violent crime, for example, includes an employee of a nonprofit that works in the neighborhoods the team was examining and a code enforcement officer. Others include university professors and healthcare providers, as well as members of Indian Nations Council of Governments, a nonprofit organization that works with local governments to coordinate projects addressing issues such as economic development, land use, and transportation.

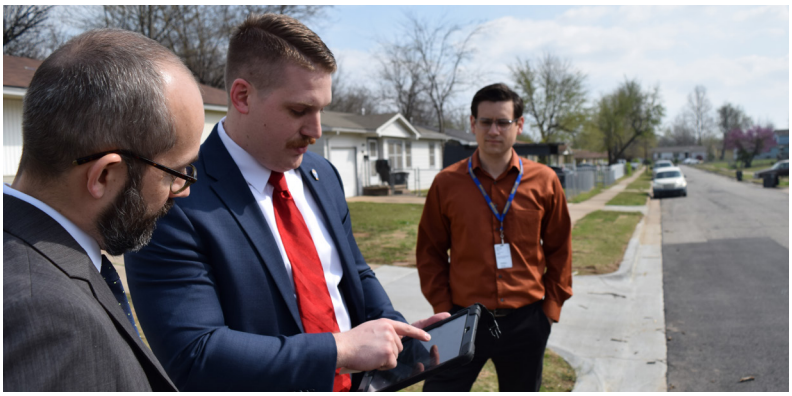
Visit **citiesofservice.org** to download the Urban Data Pioneers blueprint, a step-by-step guide to replicate the program in your own city.

Each team then spends 10 weeks gathering and mapping data. Volunteers generally spend three to four hours per week — likely more if they are city employees — often meeting early in the morning or during lunch. City staff coordinate their participation with their direct supervisors, which is facilitated by the mayor's support for the program. They may meet in person, but just as often the work happens remotely via collaborative digital platforms like Slack. Most city employees cannot take their work computers out of the office, making virtual communication and remote meetings the easiest options for many teams.

The final product is a slide deck with an emphasis on visual analytics like GIS maps that can illustrate the data analysis. These are presented at a showcase attended by about 50 city employees, including most department directors, at the end of the 10 weeks. Wagner's department routes presentations on priority topics to the city council and the mayor; all presentations are also available on the program's website.

The banner of Urban Data Pioneers helps teams get access to raw data, which the city is already predisposed to make available under the 2013 Tulsa Open and Accessible Data Resolution. As a result, most data sources are subject to public records requests and thus easy to obtain with the help of city employees able to navigate the process. A local nonprofit called Tulsa Data Science, which engages data analytics professionals in pro-bono public interest projects, contributes significantly to Urban Data Pioneers, as the city imprimatur helps them secure access to data they had previously struggled to obtain, like utility billing data for the purpose of tracking vacant homes as an indicator of blight.

On the advice of an informal steering committee guiding the project, Wagner's office uses a hands-off approach. He allows the teams to self-govern and does not enforce check-ins during the 10-week period, only using the final presentation at the end of the cycle as the ultimate deadline to motivate teams. The result is substantial analysis for each and every project, although as to be expected of any hypothesis testing, some efforts yield more conclusive results than others depending on the complexity of the issue.



The city worked with Urban Data Pioneers members to answer the following overarching question: "What do we need to know as policymakers to make better decisions?"

One straightforward city responsibility, maintaining streets, has already seen a change in policy direction due to the Urban Data Pioneers' efforts. Previously, Tulsa selected which street projects to execute based on a computer model calculating road conditions against available funds. A team on the first cohort comprised of Department of Engineering Services staffers and a GIS specialist added a more detailed analysis. They looked at data about water main breaks from the water and sewer work order database, collision data, potential bike lanes from the Tulsa Regional Bicycle and Pedestrian Master Plan, and other information, mapping the data to look for areas where overlapping issues indicated streets in highest need of improvement. Wagner's office sharpened the results into actionable items for the upcoming capital budget.

"The Urban Data Pioneers developed a model whereby we could weight different factors more heavily in deciding which overall street projects to pick," Mayor Bynum said. "Ninety-plus percent of the capital program we do next year will be street work, and that is going to be done utilizing the tool that the Urban Data Pioneers developed." The model is now employed by the city's engineering graphics team that factors in pavement condition — the traditional benchmark for street projects — along with issues like traffic crashes, sidewalk gaps, ADA accessibility, bicycle infrastructure, and storm sewer overflow. Mayor Bynum anticipates a capital package — estimated at around $500 million — will be put to voters in 2019; the package is comprised largely of street repairs determined by the Urban Data Pioneers model.

Keys to Success

The most important role that the city's management team played was to help teams scope their projects. "A lot of time, teams will be really excited to analyze data generically but don't really know how to do it in a way that is helpful for policymaking," Wagner said. His team worked

with Urban Data Pioneers members to answer the following overarching question: "What do we need to know as policymakers to make better decisions?"

A prime example came from the team analyzing income with the objective of increasing per capita income, one of Mayor Bynum's campaign goals. Without direction, the team would have struggled to provide a useful take on a complex issue like individual earning capacity. Wagner's office consulted with a Census data expert at a local nonprofit who helped the team home in on 120 census-available variables that could influence income. After crunching the data on questions like race, ethnicity, age, and access to a vehicle, the team determined that education was the principal indicator over any other census-tracked variable that correlated with a person's income. Thus, if Mayor Bynum hoped to increase per-capita income during his administration, he would do well to focus on education. With this new evidence, he singled out education as a mayoral priority in his November 2017 State of the City address, three months after the Urban Data Pioneers cohort working on per-capita income delivered its results. The city also ramped up efforts to encourage high school students to complete the Free Application for Federal Student Aid, providing resources for school administrators, toolkits for students, and special events to encourage completion of the form.

Going forward with the support and recognition from Cities of Service, Wagner hopes that future teams can better reflect the city's demographics. A group called Oklahoma Women in Tech has also joined up with the Urban Data Pioneers after having heard that the initiative won the Engaged Cities Award. Members are part of the fourth cohort, which started in September 2018. To increase participation from diverse groups, Wagner also hopes to use some of the award funds to promote the program and provide additional training in data analysis.

"Since Urban Data Pioneers, the walls have come down [in city hall] and there's been a huge increase in working together."

DIANA PHILLIPS, TULSA CALL CENTER MANAGER

The program has offered workshops, and participants reported that they learned by doing and enhanced their skill set. "Urban Data Pioneers has enriched my day to day — I'm better at using data," said city utilities analyst Mike Dougherty. "It's professional development." Tulsa Data Science also provided people with advanced skills who could lead individual teams. "Urban Data Pioneers was a great way to pull these people together with completely different levels of expertise," said Penny Macias, a project manager in the Office of Performance Strategy and Innovation.

Bringing together teams from across city departments also allowed people to engage with fellow employees within city bureaucracy on the neutral territory of Urban Data Pioneers without any particular department holding sway. "Since Urban Data Pioneers, the walls have come down and there's been a huge increase in working together," said city call center manager Dianna Phillips, who led a project trying to predict neighborhood stability based on utility data that involved cross-department collaboration from city staff working in GIS, utilities, planning, finance, engineering, and the city call center.

Urban Data Pioneers also found success by combining back-end data analysis with front-line data collection. The project embarked with and ultimately returned to the relationship between blight and violent crime — a topic for both the first and third cohorts. While the first cohort sought to set the scene about how to measure blight and track that against violent crime, the third cohort worked specifically with blight data reported by police officers and concerned citizens. The development of a blight reporting tool was a major boon to collecting eyewitness data. They created a simple online form with questions such as, "Are the windows boarded up?" and "Is there fire damage to the structure?" The form has been used by police officers and volunteers from the Cities of Service Love Your Block neighborhood revitalization program to report blight.

"Our officers aren't trained (to recognize blight), so the fact that it's straightforward is a huge benefit," said Tulsa Police Sgt. Malcolm Wightman of the blight tool, in which 86 percent of responses by city employees and volunteers were confirmed by an expert's evaluation.

Ultimately, mayoral leadership proved critical. Urban Data Pioneers started with Mayor Bynum, which inspired city employees and members of the general public who volunteered with a clear indication that their efforts would be considered by the highest level of city government to inform policy and create results.

That sense of worthiness and participants' innate beliefs in civic responsibility came together to create a successful effort. "We have this passionate feeling of duty for our fellow citizens of Tulsa," Phillips said.

Citizen Story: Stephen Lassiter

Stephen Lassiter is a GIS specialist at an oil company. His office happens to be in the same building as Tulsa City Hall. In early 2017, he bumped into James Wagner in the lobby. Lassiter was predisposed to civic engagement — the two were already acquainted from Lassiter's volunteer efforts to advocate for better pedestrian and cycling infrastructure in Tulsa. Wagner invited Lassiter to join the Urban Data Pioneers, where he led a team looking at land-use efficiency by studying tax generation on a per acre basis (in Oklahoma, municipalities cannot use property tax to fund operations). This data point examines the city's ability to cover its long-term maintenance obligations by comparing different land development patterns — from dense, multistory downtown blocks to sprawling, auto-dependent big box stores with lots of surface parking. By calculating the sales tax generated per acre, the analysis shows which types of development are generating sufficient revenue to cover the city's public maintenance obligations for those sites.

The project piqued his interest because of 3D property value maps popularized by analytics firm urban3. "I've seen all these other cities, I want to see what it's like in Tulsa," Lassiter said. His geographic information systems skills equipped him for the job and Urban Data Pioneers gave him the motivation to tackle such a project in his spare time. With a city contractor on the team, they had access to sales tax data and anonymized individual parcels. The results mostly confirmed the hypothesis that dense, multistory development is more productive per acre than low-rise, sprawling

development, although a cluster of big box retail on the city's outskirts outperformed downtown locations.

"I'm not looking at it from a bureaucrat's point of view but rather from a citizen's point of view."

STEPHEN LASSITER, TULSA CITIZEN AND URBAN DATA PIONEER VOLUNTEER

Like all Urban Data Pioneer projects, the resulting maps were presented at a showcase to department directors. They are a useful reference for city staff like Michelle Barnett, deputy chief of Economic Development, when planning economic and business development in the city.

Lassiter hopes to participate in future teams and has already generated some new questions, like "Can we point to certain characteristics that lead to more productive land use?" He found his private sector skills a useful complement to the majority city-employee team. "I'm not looking at it from a bureaucrat's point of view but rather from a citizen's point of view," he said. "I probably have different questions than someone working on the inside."

Cities of Service is an independent nonprofit organization that helps mayors and city leaders tap the knowledge, creativity, and service of citizens to solve public problems and create vibrant cities. We work with cities to build city-led, citizen-powered initiatives that target specific needs, achieve long-term and measurable outcomes, improve the quality of life for residents, and build stronger cities. Founded in 2009 by New York City Mayor Michael R. Bloomberg, Cities of Service supports a coalition of more than 250 cities, representing more than 73 million people across the Americas and Europe.

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THE ENGAGED CITIES AWARD

The Cities of Service Engaged Cities Award shines a light on cities that are collaborating with citizens to meet pressing local challenges in diverse and creative ways. Tulsa, Oklahoma was one of three winners of the inaugural Engaged Cities Award in 2018 for its Urban Data Pioneers Program.

Each year, Cities of Service recognizes cities that are effectively involving their citizens to do things like reduce community violence, produce better budgets, create safer streets, and build stronger communities. The strategies of the Engaged Cities Award winners and finalists are models for other cities around the world to learn from, adapt, and improve upon. Cities of Service works with winners and finalists to develop resources to share with other cities so they can implement similar programs in their own communities.

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