Tainan, Taiwan

Smarter Cities Challenge executive summary

Introduction

The City of Tainan, Taiwan, was one of 16 cities selected to receive a Smarter Cities Challenge® grant from IBM in 2014 as part of the company's citizenship efforts to build a Smarter Planet®. During three weeks in July 2014, a team of five IBM experts worked to deliver recommendations on a key challenge identified by Mayor Lai Ching-Te and his senior leadership team:

Increase the use of public transportation to facilitate economic growth and tourism, reduce carbon emissions and improve quality of life for the citizens of Tainan.

The challenge

The City of Tainan has four priorities for its future:

- Preserve the Tainan culture — the unique feeling of happiness that residents and visitors have about life in Tainan
- Become a leading low-carbon city
- Become more tourist friendly
- Support economic development by attracting high-tech industries

The City leadership sees smarter transportation management as the key to achieving these objectives and has already developed a vision for a Smart Traffic Management Center (STMC). The Tainan City executives asked the IBM Smarter Cities Challenge team to recommend strategies and tactics to improve transportation in ways that support the four priorities.

To make the STMC successful, the IBM team participated in 12 site visits and met with 40 officials from the City of Tainan to assess the current state of transportation in Tainan and offer insightful recommendations. To do this, the IBM team conducted interviews, examined data, reviewed websites and observed City operations firsthand. The team reviewed bus operations, parking management, tourism information, traffic monitoring and management, electric vehicle operation, bicycle programs and regional rail to develop a complete picture of transportation throughout the municipality.

Findings and recommendations

The IBM team identified several recommendations for smarter transportation in Tainan. These recommendations align with the overall goal of realizing the City's vision for the STMC. The team's seven recommendations fall into three categories: communication, governance and technology.

Communication

This recommendation encompasses several tactics designed to improve citizen, tourist and inter-agency access to consistent information. Greater awareness of transportation options will help increase usage of public and low-emission transportation, generate better feedback about service quality and contribute to reducing CO_2.

Highlights:

- Communication: Consistent and effective outreach strategy
- Governance: CTO role and increased enforcement
- Technology: Software architecture, transportation data, analytics

C1. Establish a communications office

Tainan should establish a communications office that focuses on two objectives: 1) consolidation and standardization of information sources, and 2) improved access to information for citizens, visitors and City agencies. The first objective ensures information is consistent across various modes of delivery. For example, websites and mobile apps would deliver the same information and create a more integrated user experience. The second objective helps information to reach more recipients. The overall strategy should include measurable ways to ensure that communications are reaching intended audiences. As part of its outbound communications efforts, the City also could appeal to citizens to contribute to the "greater good" of making Tainan a leading low-carbon city.

Governance

These recommendations address the opportunity for administrative changes that will improve transportation operations throughout Tainan.

G1: Enforce parking regulations

Tainan should increase enforcement of existing parking regulations:

- Use digital and print media to build awareness of the benefits of proper parking
- Impose parking fines or tow illegally parked vehicles
- Offer incentives to parking attendants for enforcing regulations in their respective zones

G2: Create Chief Technology Officer role

Tainan should establish a Chief Technology Officer (CTO) role that is responsible for the following activities across all City bureaus:

1. Developing data and application integration standards and interoperability policies
2. Educating bureaus about best practices for technology projects
3. Providing training on new technologies
4. Providing guidance on procurement policies for technology and services
5. Monitoring vendor/contractor compliance with technical specifications in contracts

The CTO should be a technology expert with broad knowledge and experience — a leader who can guide teams of solution architects, developers, vendor contract negotiators, solution-deployment staff and operations staff.

Technology

These recommendations will help Tainan establish an architectural vision, integration standards, prioritization and an implementation roadmap for new technology that will enable the City to leverage big data and analytics to build predictive models, recognize transportation patterns and prioritize investments and incentives.

T1: Create a software architecture for the STMC

The City should define a software architecture to integrate disparate systems for traffic, transportation and parking to provide useful and timely information to citizens as a service. The architecture should enable the development of value-added applications by universities, citizens and other interested third-party providers. It should define the data and application integration interfaces and standards required by internal and external stakeholders. To enable analytics, the architecture should ensure standards are developed and maintained for historical data collection, linking and retention. The architecture should also ensure appropriate availability, scalability, security and privacy standards while hosting and/or supporting internal and third-party public service applications.

T2: Gather transportation data

To better understand transportation dynamics, the City should gather data about how citizens and tourists move through the city. Collecting origin and destination information provides valuable raw material for analytics. Once the City understands where most people live, where they work and what transportation modes and routes they use to get back and forth, the data can be analyzed to help optimize transportation. This data also can be used to create simple map-based visualizations that provide valuable insights about enhancing transportation management.

T3: Apply analytics to operations

As the City gains experience gathering data and applying analytics to gain insights, it could use analytics to improve day-to-day operations. After gathering historical data, the City should build predictive models that enable more accurate estimates of bus arrival times, areas and times of traffic congestion and the effects of incidents on traffic congestion.

T4: Utilize analytics for strategic and tactical planning

After the City gains experience with analytics, it should leverage historical data from the STMC along with data about current transportation dynamics to produce advanced analytics. The results can help the City make better strategic and tactical transportation decisions. Applications include generating more reliable bus schedules, optimizing the locations of T-Bike rental stations and charging stations for electric scooters, optimizing routes for parking toll collectors as well as determining optimal incentives to increase bus ridership.

For more information

To learn more, send an email to ccca@us.ibm.com or visit smartercitieschallenge.org

Conclusion

A smarter transportation management system is critical to addressing Tainan's priorities of preserving its unique culture, becoming a leader in low emissions, becoming more tourist friendly and attracting high-tech economic development. A smarter transportation system involves integrating existing subsystems of transportation, traffic management, parking and tourist information into an open, extensible, secure and user-friendly system. It requires continuous improvements driven by gathering data and applying advanced analytics. To ensure success, these recommendations suggest a technology path, a companion communications strategy and a governance structure.