Case Study: An Intelligent Urban Ecosystem Approach to a Sustainable Smart City

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Initiatives: Government Digital Transformation and Innovation

Maximizing value from smart city efforts requires cities to move beyond siloed IoT and data solutions. Cities must adopt an integrated approach, leveraging a digital government technology platform. This case study provides government CIOs an example to use in setting a vision for their communities.

Coral Gables, Florida, U.S.

Organization name: City of Coral Gables

Industry: Local government

Main location: Coral Gables, Florida, U.S.

Budget: $396,458,420 (2021 to 2022)

Employees: 1,070 (2021)

Case Overview

Problem

- The City of Coral Gables information and technology capabilities could not support the public safety, sustainability and economic development priorities of community leaders and residents.
- Initially, residents and city leadership struggled to see how integrated smart city efforts could enable their established priorities.
- The city faced capacity and capability resource constraints in IT and other city departments to develop and execute innovative programs.

Action

- The city engaged the community to understand which smart city efforts to prioritize.
- The city implemented a smart city platform.
- The city established a broad coalition of government, business, academic, transportation and cultural partners, by clearly defining economic and social benefits for the smart city ecosystem participants.

Quantifiable Value

- The city measurably reduced crime and accident rates through improved surveillance and analytics capabilities.
- The city measurably improved economic development through the use of analytics, data sharing and development of digital skills for small businesses.
- The city increased the quality of life for city residents and visitors by establishing the digital infrastructure to support smart mobility and improve air quality.

More Detail

Figure 1 details an intelligent urban ecosystem approach to a sustainable smart city taken by the City of Coral Gables.

Figure 1. Intelligent Urban Ecosystem Approach to Sustainable Smart City

Coral Gables Sought to Move to a Comprehensive Urban Ecosystem Approach

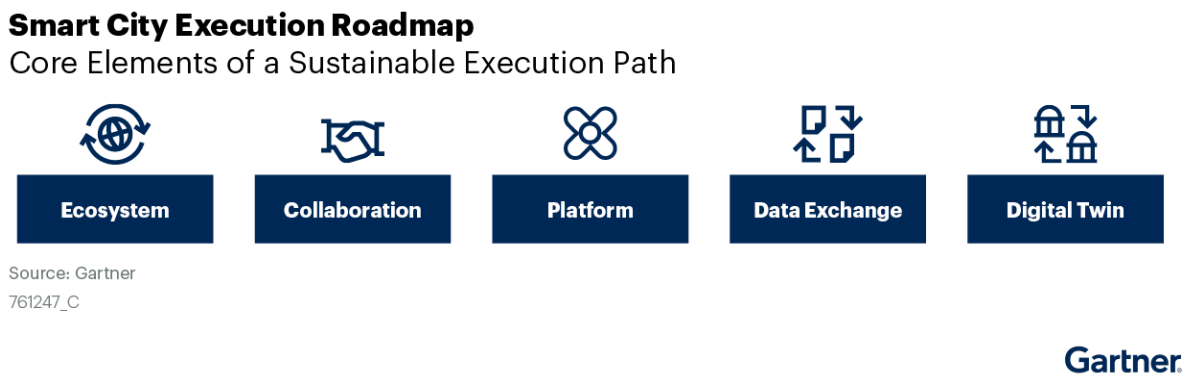
One of the most common challenges that cities have in developing a smart city is to move from siloed Internet of Things (IoT) and data projects to a comprehensive intelligent urban ecosystem approach to create scalable and integrated city services. Making this transition requires a modern IT and data architecture, strong executive and community leadership, and the skills and personnel to execute on the smart city plan. These were all parts of the challenge that the City of Coral Gables faced.

To address this challenge, the City of Coral Gables engaged the community in prioritizing smart city projects, [2] established an ecosystem to support its smart city efforts, implemented a smart city platform, [3] and upskilled its workforce and community. Coral Gables is a coastal city of just over 50,000 residents in the middle of Miami-Dade County, Florida, with a small, but effective IT department with 22 positions. The city has established multiple smart or innovation districts as part of its efforts to continuously improve the quality of life for residents and visitors, foster sustainability, and promote economic growth.

Coral Gables Leverages Smart City Execution Roadmap

Gartner's execution roadmap for smart cities focuses on three standard elements and two emerging elements. The three standard elements are establishing a smart city ecosystem, [4] collaboration with stakeholders and leveraging a platform approach to smart cities. The two emerging elements are implementing a data exchange and implementing a digital twin (see Figure 2). Coral Gables' integrated smart city project leverages the three foundational elements and prepares them for the implementation of the emerging elements.

Figure 2. Smart City Execution Roadmap



The Coral Gables IT team worked with the community, city leaders and all city departments to develop, plan, engineer and execute a smart city roadmap for Coral Gables. The IT team used this input to maximize its efforts and funding to deliver on key city priorities related to smart mobility, sustainability, traffic safety, and smart policing and emergency management.

Through this strong collaborative effort, the small team was able to guide and implement an impressive number of items from the city's roadmap, including:

- Launched the Smart City Hub Platform to provide residents and businesses access to related tools and data
- Supporting the implementation of smart building technology for city facilities
- Implementing a network for IoT and sensors for traffic, [4] environmental and safety
- Helping to coordinate the implementation of smart streetlights
- Establishing internet connectivity throughout the city through fiber, wireless and public Wi-Fi
- Developing a smart city lab and eight smart city districts or innovation corridors
- Deployed AI-driven smart poles

During the COVID-19 pandemic, local businesses used the Coral Gables Smart City Hub Platform to improve data-driven decision making. The city provided access to datasets and APIs through the platform and created a series of trainings to help businesses access the data. Businesses were able to use the up-to-date data to adjust operating hours, plan staffing and order inventory, all critical to staying open during this trying time.

Based on our research and client interactions, Gartner asserts that establishing an ecosystem is essential for cities to move beyond the items that they directly control and to influence the factors that improve quality-of-life issues (see Turning Smart Cities Into Intelligent Urban Ecosystems). Taking an ecosystem approach to implementing its smart city was key to Coral Gables' success. The city has actively engaged colleges and universities, technology providers, regional transportation, the business community, and nonprofits in driving its smart city ambitions forward. For instance, the city helped citizens engage with the tools and data made available through the Smart City Hub Platform, with an artificial intelligence digital assistant (AIDA). The city worked with the U.S. National Science Foundation-funded STiR Labs and researchers from West Virginia University, MIT, University of California, Berkeley, and Stanford University to develop AIDA. [6]

> **On Coral Gables' smart city ecosystem approach — "In Coral Gables, we have built an advanced smart city technology infrastructure that serves our residents, improves the quality of life, and fosters innovation and economic growth."**
>
> *— Peter J. Iglesias, P.E., Coral Gables city manager*

The extensive amount of work stretched the team and city staff. "From vision to planning and execution," Raimundo Rodulfo, Coral Gables' director of information technology, said, "city leaders, staff and IT had to rely on their core strength in leadership, public administration, urban planning and engineering." The IT team leveraged Lean Six Sigma practices to drive continuous improvement of both IT and city processes to ensure it was able to maximize effort and value from the various initiatives.

Coral Gables' Smart City Investments Yield Quantifiable Value

Coral Gables' smart city initiative brings together people, businesses, organizations, things and systems through technology and data, and has yielded quantifiable benefits for the city and residents.

Coral Gables' smart city investments have contributed to:

- A reduction in crime and accidents by 40% in two years, using AI- and machine learning (ML)-powered predictive crime analytics, closed-circuit television (CCTV) and automated license plate readers (ALPRs), and other advanced technologies and methodologies
- A reduction in carbon emissions and energy consumption by 12% with a goal of 20%
- Impacting economic development, as Coral Gables has been ranked as a top small city in which to start a business during each of the past three years
- Improving the city's livability due to safety and air quality as the city earned a 98 Walk Score for the core business district

About This Research

This case study was chosen as a result of the selection of the smart district expansion project at the City of Coral Gables as a finalist in the 2021 Gartner Eye on Innovation Awards for Government. The case study is based on the award submission and Gartner analyst interviews with representatives from the City of Coral Gables.

The awards recognize government initiatives around the world that demonstrate an innovative use of data or emerging technologies. Governments were eligible to submit admissions based on criteria, including innovative services or approaches using data and emerging technologies to advance their transition to digital government or to address the impacts of the pandemic. Submissions were assessed by an impartial team of Gartner analysts who selected regional finalists. Regional winners of the award were then chosen by government peers through an online polling process.

Recommended by the Authors

Emerging Trends in Smart City Development's Sustainable Initiatives

Hype Cycle for Smart City Technologies and Solutions, 2021

Evidence

[1] City of Coral Gables Annual Budget, City of Coral Gables.

[2] Coral Gables Smart City Journey. Coral Gables citizen engagement efforts, beginning with their concerted smart city efforts in 2016, includes digital surveys and citizen engagement portals, social networks, customer relationship apps, public kiosks, and most recently, artificial intelligence and machine learning applied to public sentiment analytics.

[3] Coral Gables Smart City Hub public platform, City of Coral Gables.

[4] Smart City Strategic Management Framework Architecture, City of Coral Gables.

[5] Innovation and Technology Strategic Plan, City of Coral Gables.

[6] Smart City Digital Library, City of Coral Gables.