Conversational Artificial Intelligence Will Drive 'Citizen-Centric' Services for Smart Cities

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Artificial intelligence is leading to a more "citizen-centric" services model by enabling smart conversational interfaces and chatbots that personalize and contextualize city services. CIOs should exploit conversational AI for smart services delivery and improved operations efficiency.

Impacts

- Artificial intelligence (AI) powered chatbots and learning technologies will let CIOs tailor predictive services based on city conditions and citizen needs, and accelerate public service delivery.
- Advanced analytics with chatbots improve decision making, problem solving, anomaly detection and citizen-facing communications.
- Scaling conversational AI will require changes in city operations, IT platforms and data privacy/security policies.

Recommendations

CIOs responsible for the transition to digital government should:

- Create citizen engagement interfaces and access tools by leveraging AI in a holistic chatbot strategy that maintains the complete interactive conversation flow.
- Leverage back-end advanced analytics with conversational agents to improve citizen-facing service quality.
- Create and sustain an AI-capable infrastructure by establishing AI application platform requirements for conversational services and an ecosystem of third-party developers, providers and solutions to deliver to those platforms.

Strategic Planning Assumption

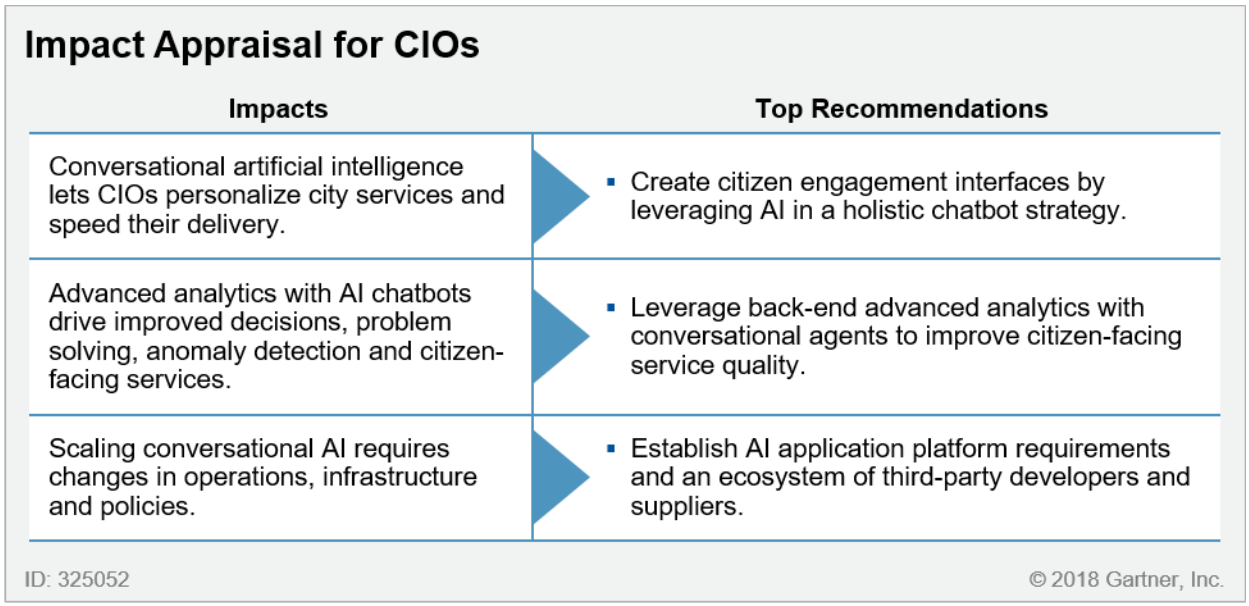
Twenty percent of all citizens in developed nations will use AI assistants to help them with an array of everyday operational tasks.

Analysis

One of artificial intelligence's most evident success stories is natural-language processing — understanding and creating spoken language — and merging it with virtual assistants. Most citizens already are familiar with such conversational platforms as Apple's Siri, Google's Google Assistant and Amazon's Alexa. For the second year in a row, it is a Gartner Top 10 technology trend (see "Top 10 Strategic Technology Trends for 2018: Conversational Platforms"). This same technology trend is driving a more citizen-centric services model for smart cities.

Chatbots, as the name implies, engage with citizens or customers via a text or spoken conversation. A growing number of web-based support services rely on AI-based chatbots for initial customer contact, response and support as virtual assistants (see "Market Guide for Virtual Customer Assistants").They turn to human-based support staff only when the query complexity is beyond the chatbot capabilities. AI-powered chatbots can contextualize and personalize government services, improve service delivery and augment municipal employees' effectiveness. But you won't be able to buy one from Amazon.

Figure 1. Impacts and Top Recommendations for CIOs



Source: Gartner (May 2018)

Impacts and Recommendations

AI-Powered Chatbots Personalize and Simplify Citizen Services

A key benefit of smart-city strategies is the government's ability to create more citizen-centric service options. AI, introduced in conversational interfaces and chatbots, will allow agencies to improve the citizen service experience, which involves both citizen-facing interactions and internal operational interactions.

Conversational platforms shift complexity and workload from being a user problem to a technology capability. Instead of people needing to become computer-literate, computers are becoming "people literate" — with a deepening, contextualized understanding of the person with whom they interact. The technology is still in the early stages of development. But CIOs can expect continued advancements to deepen and expand context, maintain a dialogue and handle ever-more-complex interactions. Eventually, some of these systems will become intelligent agents that proactively engage with citizens (see "Top 10 Strategic Technology Trends for 2018: Conversational Platforms").

But the conversational interaction is only one-half of the citizen engagement. The fulfillment side of conversational agents is critical to their success. Often, CIOs and their teams focus primarily on the interaction interface to capture as accurately as possible the citizen's "intent." But addressing — fulfilling — that intent accurately and as completely as possible determines the success of that agent application. CIOs should be ready to spend an equal amount of time on the back-end fulfillment of their agents.

Citizen-Facing Services

Increasingly, smart public-service delivery is starting to use chatbots, like WienBot for the city of Vienna in Austria.[1] This bot answers questions from citizens and tourists — about parking locations or government services for example — and learns from these interactions and the most frequently used terms in the request lines. In July 2017, the city announced the bot would be available as an app instead of via Facebook and would include the ability to process citizens' complaints. Such virtual personal assistants (VPAs or variants such as virtual customer assistants or VCAs) rise to a new level of capability when AI powers natural-language processing in a conversational platform. They do so by creating a new intelligent intermediary layer between people and systems.

> By 2022, 30% of customer service experiences will be handled by conversational agents, up from just 3% in 2017, according to Gartner's "Top 10 Strategic Technology Trends for 2018: Conversational Platforms."

Conversational AI entails capturing, parsing and responding to humans asking questions and expecting appropriate answers. As AI capabilities mature, conversational AI platforms (CAPs) and

applications enable organizations to create contextualized user experiences — intelligent, responsive and engaging — in relatively short amounts of time.

Chatbots let citizens navigate government entitlements and create easy access for citizens to understand and engage with local services. They offer city CIOs the opportunity to explore and cross-reference applications, mapping them with sentiment from social media and chatrooms, to reach an audience prone to use the internet and smartphones. One example is combining all government touchpoints — permits, applications and operations management — together in one small and midsize business (SMB) portal to reduce time and effort in starting a business.

City Service Back-End Operations

Internal local government operations can leverage conversational AI for similar outcomes. In this context, the conversational platform can streamline employee support and mission processes, and augment their direct interactions with citizens. The result is interactions that are faster, more efficient, more accurate or all three.

Some governments already use chatbots and AI to identify and reduce workload redundancy, cut the response time for public services coordination and better align with back-end processes. This means AI chatbots can handle routine tasks while the IT department and citizen engagement specialists focus on critical, more complex issues that require human assistance. Take for example the North Carolina Department of Information Technology's Innovation Center (iCenter), which discovered that 80% to 90% of IT help desk tickets were about resetting user passwords. iCenter has been piloting chatbots to handle these routine queries and interactions, freeing up IT staff to deal with more complex, urgent or challenging issues.[2]

As with citizen interactions, local governments can begin to leverage AI conversational platforms for government employee interactions.

Recommendations:

- Create citizen engagement interfaces and access tools by applying a holistic chatbot strategy that will maintain conversation flows, and document the complete "search to question to answer" interactive sequence.
- Create an ecosystem of developers to use AI chatbots for a citizen experience platform that enables conversational as well as virtual assistant services.
- Apply a "center of excellence" approach to employee training, positioning conversational AI platforms as an augmentation to citizen-facing work and as a workforce knowledge hub with regard to internal systems training.

Advanced Analytics in Chatbot Deployments Will Improve Decisions and Citizen-Facing Services

Conversational AI has a key role in making municipal digital platforms more efficient and contextualized. Urban infrastructure and government operations are currently organized based on

siloed processes and management systems. But these should be linked through collaborative processes to allow for seamless interaction and decision-making handoff with AI-powered chatbots.

One of the mechanisms to create meaningful conversational insights is machine learning (ML), one of the advanced technologies covered by the "artificial intelligence" label. Gartner currently defines machine learning as:

> Advanced machine learning algorithms are composed of many technologies (such as deep learning, neural networks and natural-language processing) used in unsupervised and supervised learning scenarios, which operate guided by lessons from existing information.

Machine learning is about creating and training models. To do so, ML uses large amounts of government and citizen data. That includes sensor data collected from the urban environment, to train predictive models that can solve an array of problems — such as classifying inputs or detecting similarities — without explicit programming.

One role for chatbots is to act as the front-end delivery for ML-driven insights or decisions to the respective agent or citizen, thus "democratizing" complex insights into the conversational capabilities of the user. This link, between front-end chatbots and back-end ML capabilities, also will enable these systems to support either faster or more comprehensive failure recognition, improving the overall citizen experience.

Embrace Artificial Intelligence and Chatbots

CIOs should begin to embrace AI and conversational chatbots as one way to communicate and disseminate information on anomalies or abnormalities while processing citizen or user requests. This combination can also detect patterns in claims that could signal fraud, as well as simple user errors. Advanced analytics and data science, including machine learning algorithms, make it possible to cross-reference data and validate complex business or service processes. These outcomes, accessed by citizens via AI chatbots, are a key benefit in administering smart city services.

One example is a so-called "lawyerbot" called DoNotPay.com, which started as an AI-powered chatbot to help drivers appeal parking tickets. The founder, Joshua Browder, has been experimenting with other legal services. One experiment was helping newly evicted citizens apply for housing assistance without hiring a lawyer or having to struggle with complex forms and information.[3]

This type of legal assistance is especially important in migrant communities where differences in customs, culture and language are obstacles in obtaining the right service levels. On the other hand, government can uses the same approaches to help minimize fraud and process claims faster.

Recommendations:

- Leverage back-end advanced analytics to improve citizen-facing service quality by means of better decisions, anomaly detection, problem solving and communications.
- Drive citizen and local government employee AI adoption by positioning these conversational interfaces for automating routine tasks, augmenting employee interactions and improving overall service quality.
- Create a program around digital ethics and digital equity to establish societal trust for the deployment of chatbots and AI.
- Prioritize fraud protection and security as a key AI application area to minimize fraud and protect citizen and government data.

Scaling Conversational AI Leads to Operational Changes

Technology providers of smart city platforms are embedding AI-driven chatbot technology stacks to support the contextualization requirements of user-facing applications and services. The goal is to enhance the platforms' operational capabilities and scaling. This "embedded and interoperable AI" improves the range of applications for city operations. But it also opens the door for new complexity in procurement, information governance and security.

> CIOs should oversee the necessary IT operational changes to manage this complexity and leverage AI conversational platforms in citizen-facing and employee-facing systems.

This oversight will include developing policies and standards for information governance, data privacy and information security regarding these platforms, their algorithms and the information accessed and used by the intelligent chatbot. It will also include assessing the integration of AI capabilities and requirements with the organization's infrastructure and data architectures.

CIOs should recognize that embedding intelligence in smart city solutions by technology providers requires a different playbook for integration and standards. This is especially true for value chains delivered through expanding public-private ecosystems. In such cases, CIOs should define the terms of service accuracy, event-based delivery and dedicated-service alignment. Internal infrastructures may need to be aligned or realigned to ensure that conversational AI can mesh with business or service processes.

Embedded AI will drive new operational requirements, skills and expertise, changing the municipal workforce profile. CIOs should utilize AI conversational platforms (both spoken and text) to create contextualized, relevant "just in time learning" for employees.

Scaling the use of AI chatbots will require changes in the way governments approach application development. Development teams that invest now in building the needed AI skills will be better positioned for innovation compared to teams that focus solely on packaged AI solutions (see "AI Will Alter Application Development — Things to Do Now").

AI application development among ecosystems partners raises a critical issue for CIOs. Who owns the intellection property that is generated by intelligent chatbots? Does it belong to platform vendors or the process owner? AI collaboration, development and deployment within business ecosystems will require new business rules to address these and other questions. Finally, conversational AI can facilitate improved business ecosystem operations and collaboration.

Recommendations:

- Create and sustain an AI-capable infrastructure by establishing AI application platform requirements for conversational services and an ecosystem of third-party developers, providers and solutions to deliver to those platforms.
- CIOs must align city operations and management platforms and optimize data and analytics governance, data orchestration and predictive analytics to realize the full value of conversational AI.
- Define the role and integration of machine learning and other techniques in IT strategy to address data equity and privacy concerns, as well as interoperability for RFPs and contracts.
- Drive scale of embedded conversational AI by aligning processes and procedures with context-rich customer and employee applications.

Acronym Key and Glossary Terms

Smart City	A life cycle approach of data and context exchange to improve environmental, social and economic quality of life for communities.

Gartner Recommended Reading

Some documents may not be available as part of your current Gartner subscription.

"Top 10 Strategic Technology Trends for 2018: Conversational Platforms"

"Hype Cycle for Smart City Technologies and Solutions, 2017"

"Transportation Network Intermediaries Will Disrupt Smart Mobility"

"New Business and Technology Priorities in Smart City Require CIOs to Change"

"Market Insight: Disruptive Macro Trends for 2025 — Smart Social Citizens Shape Digital Society"

"Three Rules When Using AI to Add Value to Your IoT Smart Cities Published"

"New Business and Technology Priorities in Smart City Require CIOs to Change"

"Market Guide for Online Fraud Detection"

Evidence

This research report draws on Gartner's extensive and growing AI research, specifically including virtual assistants, conversational AI platforms and AI in customer experience. It is also based on government-specific chatbot and virtual personal assistants research (see "Is Your Digital Government Platform Ready for Virtual Assistants and Chatbots?"), and on conversations with vendors serving the government market.

[1] "Wiens Chatbot Wird Immer Besser," OE24. (In German.) This system originated from a citizen's phone. Wienbot won the 2017 World Summit Award in the Government and Citizen Engagement category.

[2] "Chatbots Debut in North Carolina, Allow IT Personnel to Focus on Strategic Tasks," Government Technology.

[3] "This Robot Lawyer Helps the Newly Evicted File for Housing Aid," The Washington Post.

More on This Topic

This is part of an in-depth collection of research. See the collection:

- AI Use Cases, Tales From the Trenches: A Gartner Trend Insight Report

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