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AI: A game-changer for cities

June 24, 2024

In the ever-evolving landscape of urban development, artificial intelligence (AI) has emerged as a transformative force, promising unparalleled advancements in smart city planning and management. Cities are now setting up AI policies and exploring a myriad of AI use cases across urban domains, from optimizing traffic flows and minimizing carbon footprints to enhancing public safety and healthcare services. As part of ThoughtLab's new study on how cities are becoming future ready, called "From Future Vision to Urban Reality," we asked a series of questions related to AI usage to our research sponsors, advisors, and smart city experts. Below are their insights.

1. What role will AI play in the city of the future? What is your vision for an AI-empowered city?

William D. Eggers, Executive Director, Deloitte Center for Government Insights. AI will be a key component of future cities—creating more efficiency, improving public services, and increasing mission impact. AI can enable more tailored, fast interactions with residents and businesses, as well as real-time information. However, trust is essential for AI-enabled transformation. Cities must make sure their AI systems embody fairness, transparency, and impartiality, minimizing potential risks.

Miguel Eiras Antunes, Global Smart Cities & Urban Transformation Leader, Deloitte. Cities are adopting automated processes and operations and following data-driven planning approaches. Using AI, technology-powered infrastructure supports cities in automating operations, creating efficiencies, solving problems, and delivering better services. While AI chat assistants are common, cities will evolve to digital platforms as "city brains" to orchestrate urban activity, provide event correlation, root cause analysis, predictive analytics, incident management, and operational insights. With anonymized citizen data and 5G technology, maximizing data value and improving decision-making with AI and analytics will be crucial for developing cognitive cities.

Peter Pirnejad, City Manager, Los Altos Hills, CA. We started by training our team on the basics of AI. We then created an AI Use Policy and then did more intermediate training. We are using AI in two ways. More generally as an assistant or aid with tools such as ChatGPT and Copilot. In addition, we use it with AI-enabled applications that span a range of areas such as

license plate readers for public safety and content creation in Constant Contact. AI is an essential and growing tool in both direct and indirect applications of every aspect of local government.

Bayan Konirbayev, Advisor to the Mayor of Almaty city, Kazakhstan. The biggest advantage of AI is in the development of future scenarios for the city's infrastructure, behavior analysis of the citizens living in the city, and insights into the territorial expansion of the city. Another application is the work with different databases in the city, such as those related to video monitoring systems, water/energy/food supply monitoring, etc., and how to merge them and develop data correlation analysis.

Professor Pascual Berrone and Professor Sampsa Samila, IESE Business School, Spain. AI could become the backbone of urban infrastructure, optimizing everything from traffic flow to energy consumption. In our vision, an AI-empowered city will integrate seamlessly systems that communicate and adapt in real time to enhance quality of life, efficiency, and sustainability. Such a city will leverage AI to provide personalized public services, predictive maintenance for infrastructure, and enhanced public safety.

Bob Leek, CIO, Clark Country, Nevada. I see AI as a "how" and not a "what." For a large county like ours, the ability to take large unstructured data archives and extract and gain insights from them will inform the design and evaluation of programs as well as every aspect of the services we provide to the public. For years, the promise of data architecture and building with the end in mind always seemed to be very hard to execute upon, usually resulting in disappointment. Now, we can take these tools and gain insights in a way we've always wanted to be able to do.

Øyvind Tanum, Head of Smart City, Trondheim, Norway. In order to develop Trondheim as a smart and sustainable city, the use of data and AI is crucial. We are exploring different pathways to utilize the potential of AI, including but not limited to developing data fabrics, predicting mobility patterns, predicting sick leave in the health sector, measuring air quality, predicting road maintenance, and engaging with citizens and integrating large language models where it makes sense.

Jerry Power, Co-founder, i3-iot. There is a big opportunity for AI in cities. Cities have relatively fixed budgets determined by their tax base AND a growing demand for technology to improve operations. The name of the game for cities is and will continue to be "doing more with less." AI has the ability to help cities do that. However, cities are not companies. Cities have to operate transparently, and they have to be able to protect the privacy of their constituents. Unless these civic needs are met, citizens will reject efforts to deploy AI at the peril of elected officials. That is the biggest AI challenge for cities; it is not the technology itself but gaining civic acceptance."

2. **What do you see as the main benefits of the use of AI in cities? How will it help cities to become future ready, i.e., resilient, sustainable, efficient, and digitally enabled?**

Peter Pirnejad, City Manager, Los Altos Hills, CA. AI is a tool like any other. It expands, accelerates, and augments human effort. Whether we use it to respond to common questions, create background information and inspirational context to build on, or to extend our abilities with translation and dictation applications, the limits are endless.

Andrea Sorri, Segment Development Manager, Smart Cities – EMEA, Axis Communications. AI can be a way for cities to improve big data management. AI can enable data analysis in a smart way, for making quicker and better fact-based decisions. Cities can mitigate the risk of the scarcity of data analysts by using AI. The intelligence can be built into products/devices doing the initial analysis on the edge and only sending relevant data forward (thereby saving data storage and transfer).

Bayan Konirbayev, Advisor to the Mayor of Almaty city, Kazakhstan. Cities must be prepared for different scenarios of climate change, local disasters, geopolitical crises, and other disruptions. AI could differentiate pessimistic, real, and optimistic scenarios and anticipate consequences not only in one month or one year, but also decades. Based on this, a municipality could plan the budget and resources needed; customize territorial development master plans of the city; anticipate and influence local residents' behavior; and provide new adapted services, such as new transport, utility, and entertainment infrastructure. But to enable this, the city government will have to use new data sources, like GPS, video cameras, and telecommunications data, on one platform in order to track seasonal and situational differences.

Professor Pascual Berrone and Professor Sampsa Samila, IESE Business School, Spain. There are multiple benefits including improved resource management, enhanced public services, and increased operational efficiency. AI can help cities predict and mitigate risks, optimize energy usage, and streamline transportation systems. This will lead to more resilient, sustainable, and efficient urban environments that are digitally enabled and capable of adapting to changing needs and circumstances.

Øyvind Tanum, Head of Smart City, Trondheim, Norway. If used in a smart way, AI will enable cities to make better and faster decisions and in general tackle greater complexity and amount of information.

Jean Barroca, Global Public Sector Digital Modernization Leader, Deloitte. AI has the power to catapult cities into the future. By leveraging data-driven insights, AI can revolutionize urban planning and resource management, from predicting trends and managing traffic to planning infrastructure, making cities more resilient and sustainable. AI's role in energy optimization and traffic reduction, for example, underscores its contribution to sustainable living. As we weave AI with cloud computing and IoT, we're not just creating connected cities, but equipping them to tackle complex issues like climate change. The result? A smarter, future-ready urban landscape that elevates the quality of life for all residents.

3. What do you see as the most effective AI use cases for cities? Can you provide any specific examples of how a city is successfully using AI today?

Andrea Sorri, Segment Development Manager, Smart Cities – EMEA, Axis Communications. Today cities use AI for forensic search and traffic optimization. With the use of AI, hours of video can be searched for forensic evidence in just minutes, saving time and resources and improving accuracy. Through AI analysis of traffic information, traffic authorities can understand why congestion and flows and can better steer traffic and traffic lights for an optimized real-time traffic flow. It can also add value for environmental analysis when collecting data about weather, flooding, pollution, and more.

Bayan Konirbayev, Advisor to the Mayor of Almaty city, Kazakhstan. Some uses include AI video surveillance systems; prediction of payments activities through online transactions; and monitoring of migration flows inside the city in different periods in order to plan for any overload of city infrastructure. Almaty city is using AI in all of these ways.

Professor Pascual Berrone and Professor Sampsa Samila, IESE Business School, Spain. The opportunities for AI use in cities are endless. AI can transform urban environments through smart traffic management, waste reduction, energy optimization, enhanced public safety, and much more. An example is the clerk's office of San Jose in California, which has implemented an AI-powered translation platform. This platform provides real-time translation and captions to mobile phones, computers, and video displays, allowing non-English speakers (about 40% of its population) to participate in city governance. This initiative, produced by Wordly, demonstrates AI's ability to make city services more inclusive and accessible, ensuring all residents can engage fully with their community.

Bob Leek, CIO, Clark Country, Nevada. We have a number of use cases underway. The most promising ones are to free up all of the services through an evolved version of a chatbot using a digital assistant and to apply translation services to most aspects of the work that we do, including document translation and real-time translation services for in-person interaction with the public that comes to our locations.

Øyvind Tanum, Head of Smart City, Trondheim, Norway. One specific use case is that we probably save two million Euros a year by using AI to calculate and collect real estate tax. We use AI to analyze and categorize citizen engagement processes, including linking it to the UN Sustainable Development Goals and local political objectives.

Miguel Eiras Antunes, Global Smart Cities & Urban Transformation Leader, Deloitte. Cities globally are harnessing AI's power to refine operations, enhance safety, and amplify efficiency. Integration of advanced technologies like UAVs, real-time video analytics, and biometric systems allows cities to optimize functions spanning security, emergency response, and public event management.

In the US, for example, cities are improving efficiency by tracking snowplows and street sweepers in real time. Embedding sensors in vehicles for data collection on location, road conditions, and effectiveness enables better fleet management. When this data is merged with social media feeds, traffic reports, and doppler radar via cloud-based technology, it empowers city managers to make superior, prompt decisions on truck routing and positioning.

Peter Pirnejad, City Manager, Los Altos Hills, CA. There are too many use cases to speak of. I provide training in this area to cities across the US. Some direct examples include Hamlet for translation of video to actionable minutes, Citibot for the use of a knowledgebase to answer questions, and Flock Safety to detect and analyze license plate and car makes against a database of known suspects.

4. How are cities using generative AI (a type of AI that generates content and ideas from large sets of data) to help achieve their urban goals? Which use cases for Gen AI do you think will provide the most value for cities?

Bayan Konirbayev, Advisor to the Mayor of Almaty city, Kazakhstan. A master plan is the most important instrument for the city government. When a city grows naturally without supervision, a lot of problems will occur, like non-balanced migration that can have an impact on transport infrastructure and social infrastructure (such as hospitals, clinics, schools,

universities, libraries, public places, etc.). Historically, a master plan has been developed only from the perspective of certain people in the city. But "big data" analysis with Gen AI support will change the whole way that a city is managed. The idea is to have a master plan with decision support from data and Gen AI.

Professor Pascual Berrone and Professor Sampsa Samila, IESE Business School, Spain. Cities use generative AI to design more efficient infrastructure, create predictive models for urban planning, and enhance citizen engagement through personalized services. The most valuable use cases include automated urban design, dynamic simulation of city development scenarios, and real-time generation of public information tailored to individual needs.

Bob Leek, CIO, Clark Country, Nevada. I think that the use of Gen AI will start with low-hanging fruit informed by success stories from jurisdictions that use Gen AI in their creation of solutions, services, and improvements. I also think there will be a number of less-than-successful attempts, and jurisdictions will benefit from hearing about and learning from those, maybe even more so than the successful ones.

Jean Barroca, Global Public Sector Digital Modernization Leader, Deloitte. Generative AI holds the potential to revolutionize city operations and citizen services. Its applications range from chatbots and virtual assistants providing swift access to government services, to optimizing city operations through data analysis. This advanced form of AI goes beyond traditional natural language processing, delivering accurate, context-aware responses that enhance citizen interaction.

One of the key benefits of generative AI is its capacity to analyze data and highlight areas for improvement. Consider a Deloitte task analysis that revealed US federal workers spend over 1.1 billion hours annually on tasks like documentation and compliance. Similar trends likely exist at the city level, suggesting a substantial opportunity for process enhancement. Our research indicates that AI could augment 85% of such tasks, heralding a transformative shift in government functioning that boosts efficiency and reimagines citizen engagement.

Peter Pirnejad, City Manager, Los Altos Hills, CA. The most readily available and widely used use case is chatbots that use a large language model powered by locally controlled and curated knowledge like a website or knowledge base.

Andrea Sorri, Segment Development Manager, Smart Cities – EMEA, Axis Communications. Gen AI could be used to create textual descriptions of video streams that can be stored as another data layer to be of use for effective search of information or for automatically creating reports on, for example, people movement, traffic flow, or air quality in the city.

5. How are cities employing AI with other technologies—such as modern cloud-based IT platforms, IoT, blockchain, and digital twins—to create a future-ready city?

Professor Pascual Berrone and Professor Sampsa Samila, IESE Business School, Spain. Cities integrate AI with cloud-based platforms to manage data efficiently, IoT for real-time data collection, blockchain for secure transactions, and digital twins to simulate and optimize urban processes. For example, authorities in Spain are building the country's first digital twin of Campo de Cartagena, a natural coastal region in Murcia. This digital twin will visually compare changes to water, vegetation, and the environment over time, and run simulations to predict and prevent disasters such as flooding, pollution, and the effects of climate change. It will also model the impact of urban growth.

In addition, Stuttgart, Germany, is developing a digital twin platform that will visualize and analyze data from IoT sensors across the city to promote sustainability and enhance the quality of life for its 600,000 citizens. This platform will monitor water quality, flood levels, and parking space occupancy, enabling the city to optimize operations and make informed decisions for the future.

Bob Leek, CIO, Clark Country, Nevada. I believe that AI will invade every aspect of all technologies. I expect my software and hardware partners to incorporate improvements in their solutions embedded with AI. For a long time, the concept of "smart devices" has been prevalent; with AI, those devices become even smarter. Then, collecting all of that data and creating views informed by the data and analyzed by tools will result in more focused efforts in areas like water conservation, air quality improvements, early warning and detection of anomalies, and so on.

Jean Barroca, Global Public Sector Digital Modernization Leader, Deloitte. Cities around the world are increasingly adopting advanced technologies to enhance urban living and become future ready. Among these technologies, AI, blockchain, and digital twins play pivotal roles. Blockchain is revolutionizing urban management by enhancing energy efficiency, smart mobility, and public administration. For smart mobility, blockchain, coupled with IoT, enables real-time tracking, optimizes routing, and supports secure, seamless payment across transportation modes, contributing to sustainable and efficient transport networks. The city of Dubai, for instance, is pioneering blockchain applications, aiming to move all government transactions onto a blockchain, anticipating significant financial and environmental benefits.

Digital twins provide a bridge between reality and virtuality. Technically, the digital twin solves the problem of scattered or weak integration experienced in traditional smart cities. Digital twins will become increasingly powerful in enabling data-driven decisions and will have a high adoption rate among city governments, with a promise of making cities more resilient.

Peter Pirnejad, City Manager, Los Altos Hills, CA. AI is used in sophisticated forms of cybersecurity, cloud storage, and other IT-related uses. More generally, AI and Gen AI are used in applications that directly affect government services. The detection of voice and translation of video and other complex unstructured data into structured data that you can react with is making unbelievable advancements in human intelligence augmentation and allowing us to engage and interact with the world around us as if we had an army of intelligence at our disposal.

Andrea Sorri, Segment Development Manager, Smart Cities – EMEA, Axis Communications. AI used with camera streams can feed valuable data into digital twins' solutions and produce "what – if" applications/simulations in the digital twins with relevant real-world data.

Bayan Konirbayev, Advisor to the Mayor of Almaty city, Kazakhstan. The huge amount of data needed will create a big demand for CPU, GPU, and "cold" storage systems, which will not be feasible to implement on premises (because of the high cost of implementation). Therefore, cloud solutions will be required. Blockchain technology will work as one source of the truth, working as a ledger, for example, for anti-fraud and anti-corruption purposes. IoT as a data source will have the strongest impact on the transport industry. Digital twins are the most important instrument for the development of the city's master plan, so that construction companies will be able to avoid mistakes and save on cost.

6. Which are some of the biggest concerns and challenges around the use of AI in cities? How can cities overcome these obstacles?

Bob Leek, CIO, Clark Country, Nevada. The biggest concern that I see is how to define the amount of risk a county is willing to take in adopting and adapting to these new technologies. The battle to be a desired destination for businesses and residents, and in our case here in Clark County (Las Vegas) to attract conferences and conventions, will be won through the best use of the intelligence and wisdom that comes out of the use of AI.

Øyvind Tanum, Head of Smart City, Trondheim, Norway. Privacy, security, increasing complexity, and lack of knowledge are all big concerns. Also, the fact that technology is developing a lot faster than use cases and know-how. Some solutions to these challenges include knowledge programs, using pilots, close connections to research facilities, and fast feedback loops. The idea is to fail fast, fail safe, and fail cheap.

Miguel Eiras Antunes, Global Smart Cities & Urban Transformation Leader, Deloitte. The integration of AI in cities raises concerns, including privacy and data security, bias and fairness, job displacement, and ethical considerations. Cities can overcome these challenges by implementing robust data protection regulations, developing fairness and bias mitigation techniques, investing in workforce reskilling, and ensuring transparent AI decision-making processes. Public engagement and education are crucial, as is fostering collaboration between government, industry, and academia to drive innovation and share best practices.

Peter Pirnejad, City Manager, Los Altos Hills, CA. The biggest concerns around the use of AI are deep fakes and scams. We are seeing a growing number of scams and cybercrimes that have AI-embedded technology that are able to negotiate their way through a conversation or digital engagement in a way that opens access to identify theft. This has resulted in countless losses both reported and unreported. These heinous acts are being perpetrated on our most vulnerable populations, such as the elderly.

Andrea Sorri, Segment Development Manager, Smart Cities – EMEA, Axis Communications. One concern is related to ethics and privacy when the technologies used are sound and video streams in city surveillance systems or traffic-monitoring systems. How can citizen trust be guaranteed while still retrieving valuable data? The challenge is more related to how city leaders communicate with citizens than the actual use of AI.

Bayan Konirbayev, Advisor to the Mayor of Almaty city, Kazakhstan. Data protection is the most important issue, to prevent use of fake data or direct access to citizens' data. Cities will require a strong policy on cybersecurity and creation of the role of a chief cybersecurity officer at the city level. Another challenge is the proliferation of different types of databases, which need to be connected in an optimal way to enable valuable data analysis and correlation.

Professor Pascual Berrone and Professor Sampsa Samila, IESE Business School, Spain. Key concerns include data privacy, security, and the digital divide. Cities can overcome these obstacles by implementing robust cybersecurity measures, ensuring transparent data governance, and promoting digital literacy and inclusion programs to ensure equitable access to AI benefits.

7. What actions should cities take now to become AI ready? What does a roadmap to AI empowerment look like for cities?

Peter Pirnejad, City Manager, Los Altos Hills, CA. It starts with the training of your council, community, and staff. Then you need to develop use policies that dictate and ensure, to the public, how you intend to use the technology to improve and expand public service. Finally, explore, pilot, pivot, and iterate on the use of Gen AI and AI-enabled solutions and test the impacts and enhancements they have on the quality of service you offer to your constituents.

Andrea Sorri, Segment Development Manager, Smart Cities – EMEA, Axis Communications. It is critical to get the right and enough resources to manage the dialogue with citizens. Also, cities must prioritize among all the possible use cases and work across departments within the city, to achieve full cross-functional operations.

Bayan Konirbayev, Advisor to the Mayor of Almaty city, Kazakhstan. I have several suggestions, including:

- Create a unified data warehouse as a single source of truth
- Create a data lake as a sandbox for hypothesizes testing
- Appoint a Chief Digital Officer, Chief Data Officer, or Chief Security Officer with all necessary resources to become a resilient city
- Create a data regulation policy with data governance rules that are obligatory for all stakeholders
- Work with businesses through the public-private partnerships to ensure that solutions and policies are sustainable even when city governments change hands
- Confirm a budget for the digital development

Professor Pascual Berrone and Professor Sampsa Samila, IESE Business School, Spain. To become AI ready, cities must include AI as part of their overall long-term strategy. This means ensuring that AI initiatives are not just piloted but are also scaled effectively, avoiding past mistakes such as those where smart initiatives were started but never fully implemented. Investing in digital infrastructure, fostering public-private partnerships, and developing regulatory frameworks that promote ethical AI use are essential steps. Cities should also focus on establishing robust data governance policies, upskilling the workforce, and promoting digital literacy and inclusion programs. Creating a culture of innovation that embraces technology-driven solutions will be crucial for leveraging AI to improve urban living, enhance services, and ensure inclusive growth.

Bob Leek, CIO, Clark Country, Nevada. The roadmap to AI empowerment is not much different than the roadmap for any application of technology. It requires that the county has a clear sense of its strategic plan and a vision for the future, a number of tactics needed to achieve those outcomes, and applying AI technology in ways that ensure that those objectives can be achieved in ways that may have been more difficult or take longer in the absence of the availability of those technologies.

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