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AI-Powered Digital Services for Sustainable and Smart Cities

Roadmap report

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Summary

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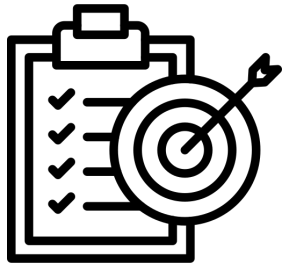
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Introduction

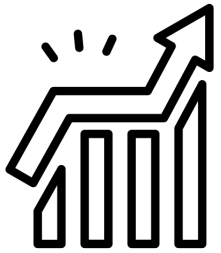
Introduction and objectives of the Roadmap report

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This report was developed as part of a broader initiative to identify and capitalize on market opportunities within the **AI-Powered Digital Services for Sustainable and Smart Cities** sector. The report serves as a guide that maps out the market potential, challenges, and strategic actions necessary for the successful scaling of businesses in this sector.



The primary goal of the **AI-Powered Digital Services for Sustainable and Smart Cities** Roadmap Report is to equip companies and stakeholders within the smart city industry with the knowledge and tools needed to navigate the **transition towards more efficient, sustainable, and competitive market positions**.



Main function of the report is to highlight opportunities that the participating startups may have not recognised. It provides a structured approach to understanding market dynamics, customer needs, and emerging trends, thereby helping businesses position themselves effectively in the evolving marketplace.

Overview of the Participants

Ventures

Following the evaluations by the selection panel, 10 of the most promising European ventures in **AI-Powered Digital Services for Sustainable and Smart Cities** *were chosen through a competitive process. Companies were selected based on leadership potential, product/technology strength, market opportunity, go-to-market strategy, and business clarity.*

Kelluu revolutionizes aerial monitoring with autonomous airships, delivering high-resolution data that's more affordable, accurate, eco-friendly, or available to you faster than any current method.

Breeze Technologies is a technology leader for air quality sensors, air quality data and air quality analytics software. The company leverages the internet of things and artificial intelligence to help cities and businesses create better clean air action plans and a more liveable environment.

Clean Sea Solutions designs and builds autonomous waterfront clean up tech to stop new plastic reaching our oceans.

Blueberry Software is a leading provider of Cybersecurity and Machine learning solutions. Headquartered in Sofia, Bulgaria, we are designing and developing end to end embedded system architectures, AI solutions for IoT systems, Cybersecurity consulting and more.

SizeWise is fully integrated into the retail environments with no app download. Reduce returns, increase conversions, while providing great customer experience!

CLIC RECYCLE recycles and reutilizes waste into sustainable, innovative, and circular design solutions that decarbonize and care for the planet. Opting for sustainable beauty industries, sustainable ports, regenerative agriculture and many more applications.

Find the perfect second-hand jackets, shirts and other treasures for your loved one. Join us in making sustainability fashionable.

Deeptraffic is an innovation-driven, deep-tech spin-off company of CERTH-HIT, providing solutions and technologies that enable dynamic traffic management as a service, focusing on connected and automated vehicles.

Take full control of the climate impact of your projects with quality-assured 3D climate calculations. Reduce emissions efficiently at every stage directly from your models to meet legal requirements and sustainability targets.

Caidio is a Finnish climate tech startup that develops data-driven technologies to optimize the quality and productivity of global concrete construction.

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DATAPHORIA

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öyler
Smart & Sustainable New Built Environment

AE4RIA
Alliance of Excellence for Research and Innovation on Aephoria

TRMNL4.

ACE
Innovate Collaborate Accelerate

ΟΙΚΟΝΟΜΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ
ATHENS UNIVERSITY OF ECONOMICS AND BUSINESS

Rythmisis
National Institute of Artificial Intelligence, Personal Data and Digital Governance Law

SFF START FOR FUTURE

G-Gravity

THE BEACON

Market opportunity Mentors

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Emanuil Genov
GoingVC



Roy Nyberg
Start-up entrepreneur and Mentor



Panagiots "Panos" Bechrakis
Mentirosa



Nikolaos Sifonios
Match BALL Venture



Dimitris Doukakoros
Estate Brains



Thomas Esser
Thomas Esser Consulting



Petri Rinne
Coventures



Panos Kalogiorgas
Deloitte



Harris Kontogiannis
JPMorgan Chase



Anastasis Stamatis
Dataphoria



Zoe Fragou
Fragou Zoe

Methodology

Starting point

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We state here some of the underlying assumptions and 'facts' about the AI-powered digital services for sustainable and smart cities that serve as the basis and context of this analysis.

- Cities are composed of an enormous number of activities and functions that already are in daily use by the people that live and work in those cities – in other words, there are already existing solutions to much of what happens in a city.
- Urban infrastructure, which various 'smart city' solutions typically intend to improve, has been built over centuries and decades, and thus consists of a variety of legacy systems – making it sometimes challenging to introduce new technologies.
- City functions touch many stakeholders, from the early planning stages through construction down to use – thus, new technologies that are to be inserted in service processes need to take into account many interests.
- Cities can have much cultural, geographic, size, economic and political diversity, but at the same time there are many functions in which cities are similar – potentially providing a large market for a start-up bringing a new solution to make cities smarter and more sustainable.

Methodology

- 5 in-depth interviews were conducted with industry stakeholders to extract expert opinions across the following categories:

1.Market trends and impact
2.Competitive advantage and uniqueness (value proposition)
3.Customer segments and relevance
4.Channels and delivery
5.Revenue streams and financial viability
6.Risks and challenges
7.Competition

- Surveys: Collected 14 survey responses to validate and quantify the insights gathered from interviews. The survey included 13 structured questions.

- Business Model Analysis: 10 venture business model canvases evaluated to assess strategic approaches and innovation in the sector.

- Validation process involved the engagement of D2XCEL stakeholders, to ensure the accuracy of the findings. Stakeholders, mainly interview participants, provided the feedback on the final version of the report. This step ensured that report information, as well as the analysis, is aligned with experts opinion.

- The gathered data was analyzed by focusing on key categories, identifying strategic opportunities and potential barriers. The analysis provided a comprehensive view of the sector, enabling the development of targeted insights for growth and scalability.



5 Stakeholder interviews



14 Survey responses



10 Venture Business Model Canvases analyzed



Validation through stakeholder feedback

Total of 20+ Participants

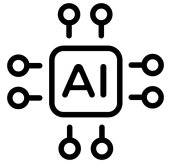
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Results, Insights, Roadmap

Opportunities, Market trends: New capabilities for data collection, processing as well as using data to automate the management of work processes creates wide and diverse range of opportunities (1)

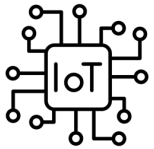
AI-powered digital services are an **emerging field of activity**, taking advantage of recent advancements in information technology, to **enable cities become more sustainable and smart**. The ability to **gather**, **process**, and **analyze** large **datasets through AI** is a central trend. In practical terms, this includes for example **optimizing city logistics**, **transportation routes**, **pollution control**, and making **predictive recommendations** to improve city infrastructure and sustainability.



Optimizing city logistics, predictive infrastructure recommendations



Energy efficiency, resource management, pollution reduction



IoT devices and 5G, to enable real-time data collection



Optimizing mass transportation and delivery routes



Reduction of carbon footprints and waste



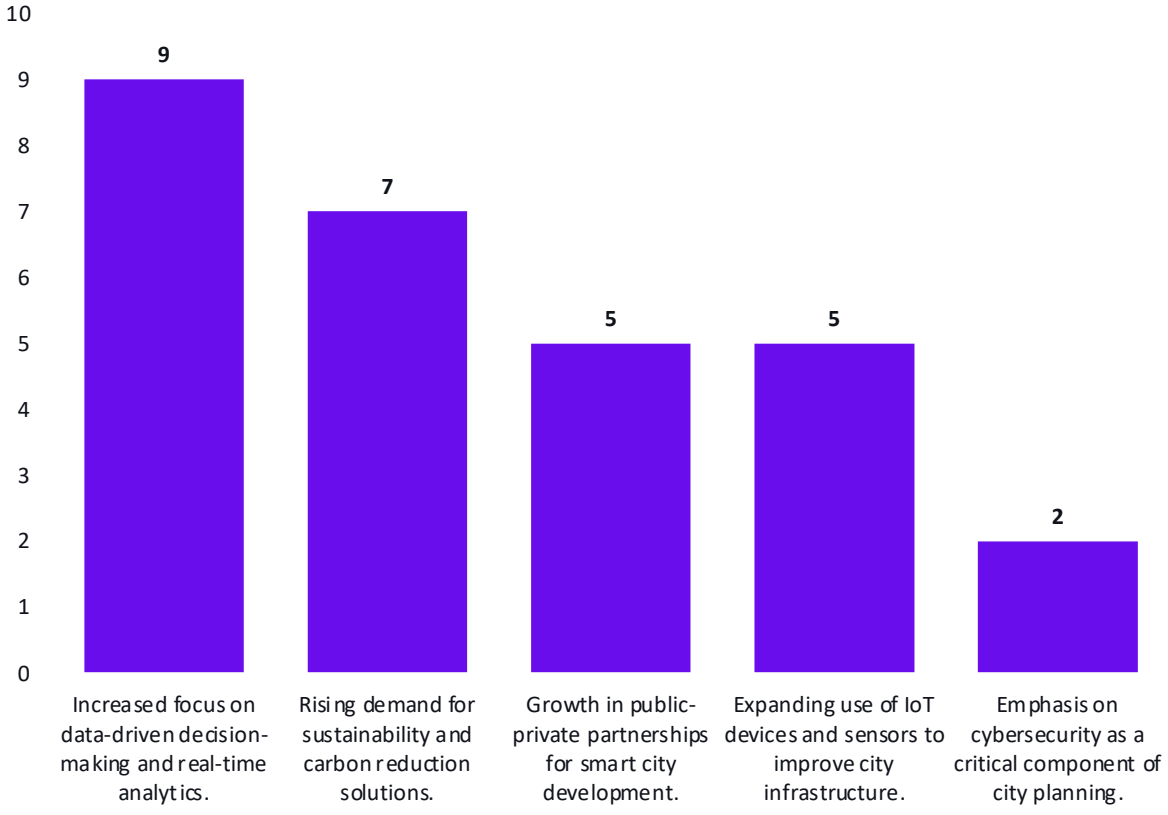
Collaboration between municipalities and private companies

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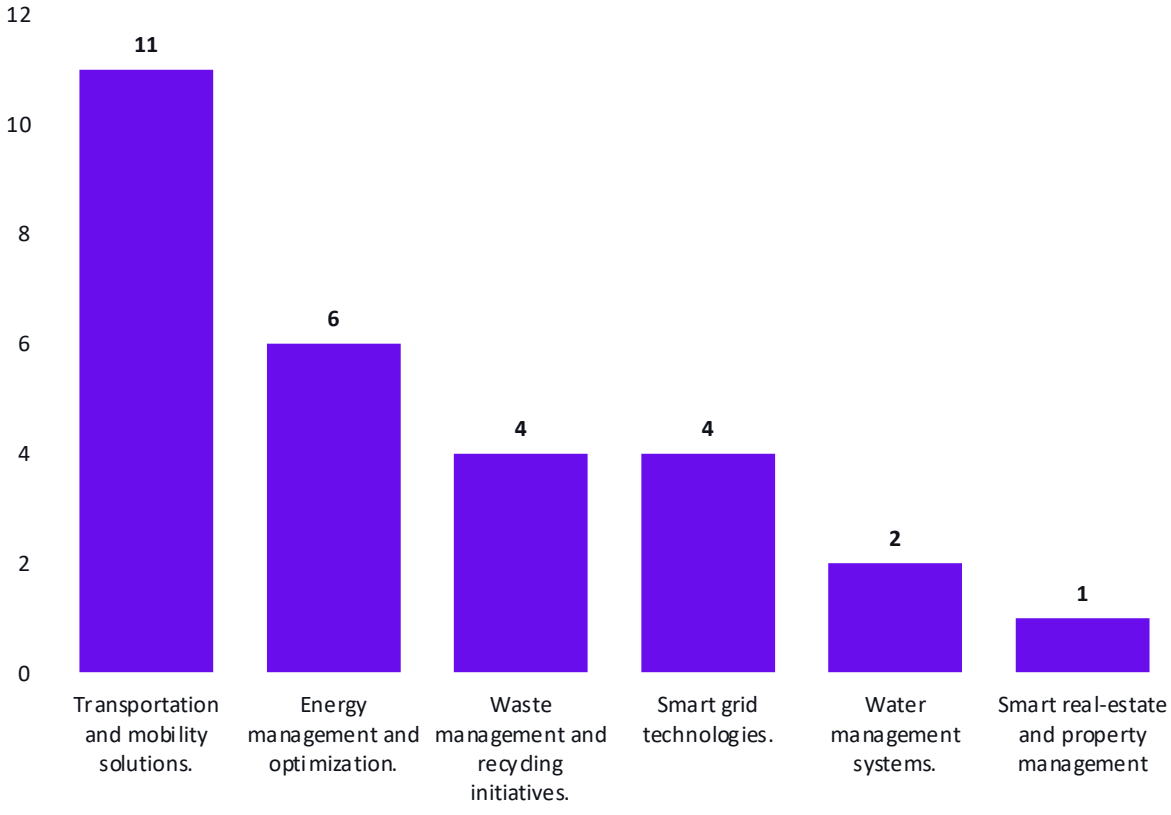
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Opportunities, Market trends: New capabilities for data collection, processing as well as using data to automate the management of work processes creates wide and diverse range of opportunities (2)

Market trends *believed to be* ***most important*** *for* ***startups*** *in the AI-powered digital services for sustainable and smart cities sector based on survey responses.*



Sectors *within AI-powered digital services for sustainable and smart cities considered to hold the* ***most promise for future growth*** *according to survey participants.*



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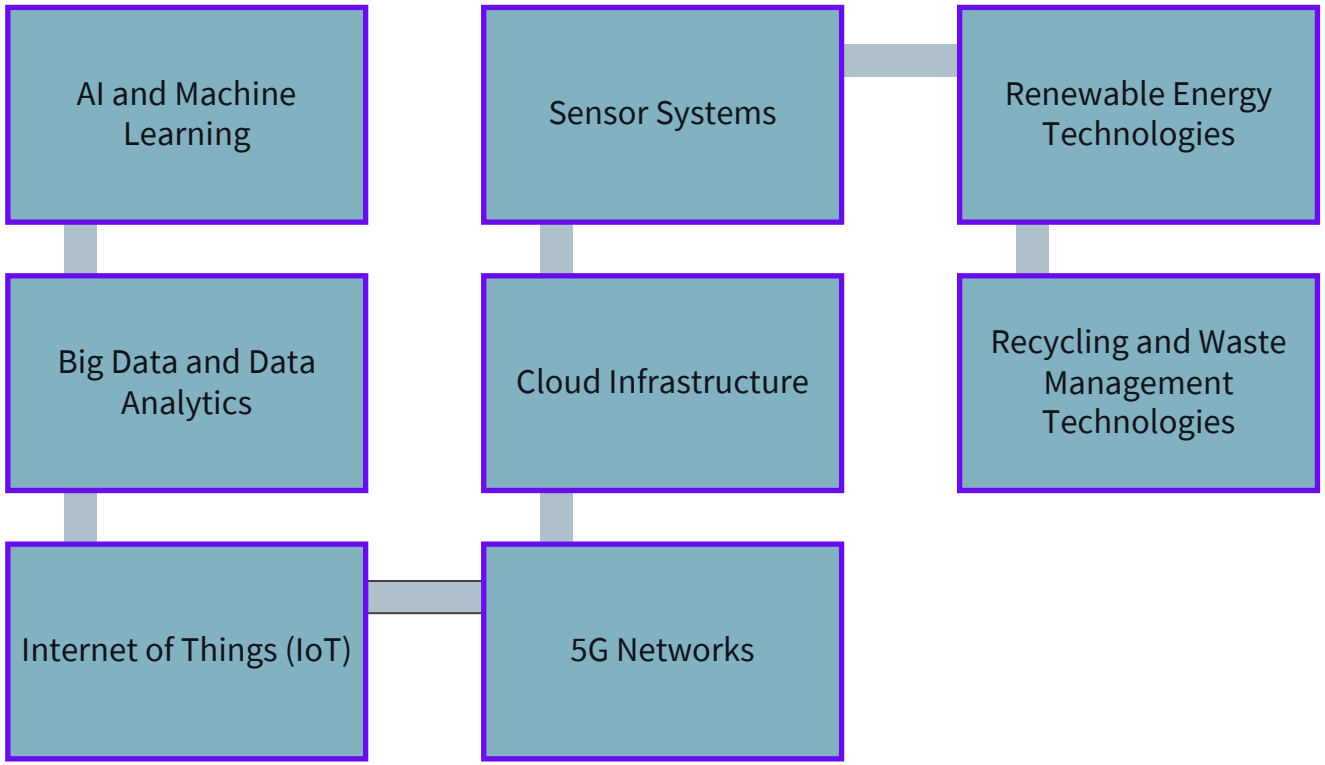
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Technology: AI, Sensors and Data Integration as Catalysts for Growth in the Sustainable and Smart City Sector

These technologies collectively form the backbone of AI-driven smart city initiatives, **enabling the efficient management** of urban resources and **improving sustainability**, and **critical for the growth** of AI-driven digital services.





Nick Fannin

Director of Partnerships at Start for Future

*" Especially in the Smart Cities part... **things** that until a few years ago **we called machine learning**, **now we call AI**. The whole part of making predictions, recommendations e.g. about **sprawl, logistics in a city, optimizing routes to improve pollution**... anything I can gather from large datasets and make recommendations from them, **now also sticks with AI**."*



Dora Trachana

Partner at Uni.Fund

" Cloud infrastructure, AI models, machine learning to know the citizen's habits, hydrogen technologies - hydrocarbon mining -, recycling technologies"

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Scaling: Strategic partnerships and customized but easy-to-use solutions as route to rapid growth (1)

By focusing on scalability, strategic partnerships, and data-driven insights while delivering customized, easy-to-use solutions, start-ups can position themselves for rapid growth in this sector.

- Proof of Concept and Market Validation – in specific context of each city
- Tailored Solutions and Customization - every city is unique!
- Public-Private Partnerships - access to funding, resources, and infrastructure
- Focus on Key Sectors - high-growth sectors like logistics, transportation, energy management
- Engagement with Policymakers – to align their services with future urban needs
- AI and Data-Driven Value - offer tangible, data-backed benefits
- Simplicity and User Experience - holistic solutions, intuitive user experience
- Revenue Models - sustainable and scalable, such as subscription-based



Nick Fannin

Director of Partnerships at Start for Future

*"Anything to do with **scaling needs a backing**. The ecosystem in Europe is a bit... **we're not America where there's a certain support, set up in a certain way**. In Europe we are still learning how to do scaling; **we have not yet learned how to do it**. Let alone in Smart Cities and Sustainability..."*

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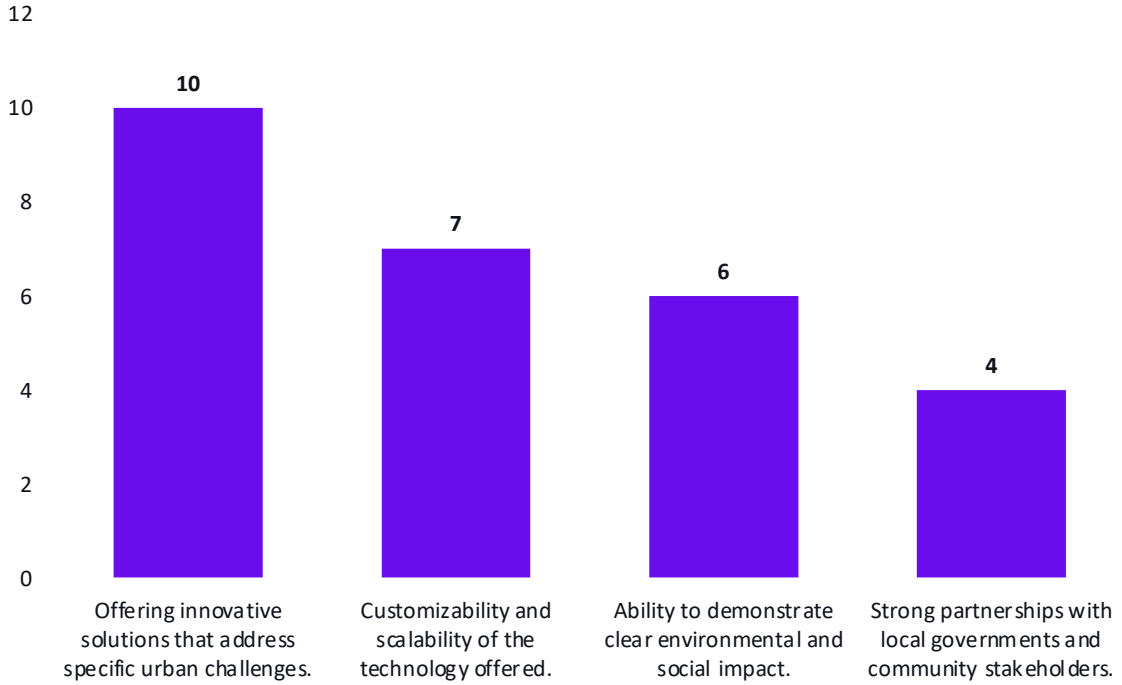
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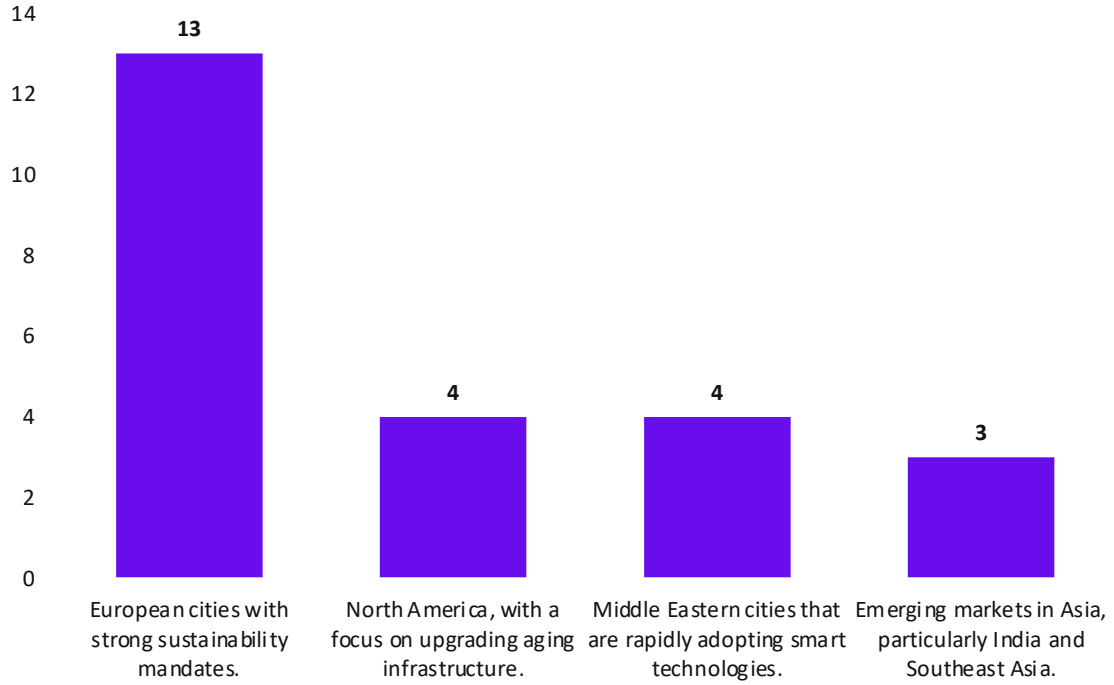
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Scaling: Strategic partnerships and customized but easy-to-use solutions as route to rapid growth (2)

*Factors that make a start-up's **value proposition** unique and compelling in the AI-powered digital services for sustainable and smart cities sector.*



***Geographic markets** perceived to offer the **greatest opportunities for growth** in the AI-powered digital services for sustainable and smart cities sector.*



Competition: There are Infrastructure Service Providers in the Sustainability and Smart City Sector – But There Are Opportunities for Start-Ups, Especially with AI

*Start-ups face **competition** from various types of organizations in the sector of AI-powered digital services for sustainable and smart cities. These enjoy many **competitive advantages, e.g. significant resources brought by large scale**, and **brand trust** from already **established market position**.*

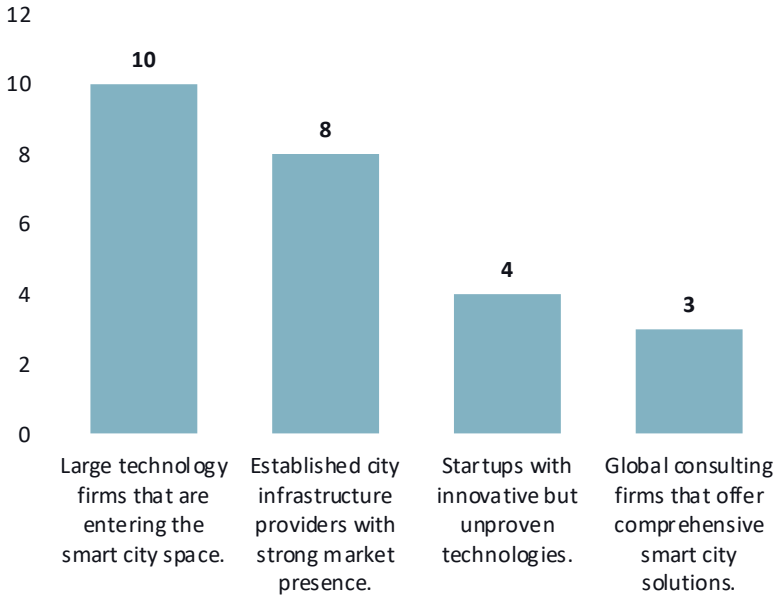


Panos Bechrakis

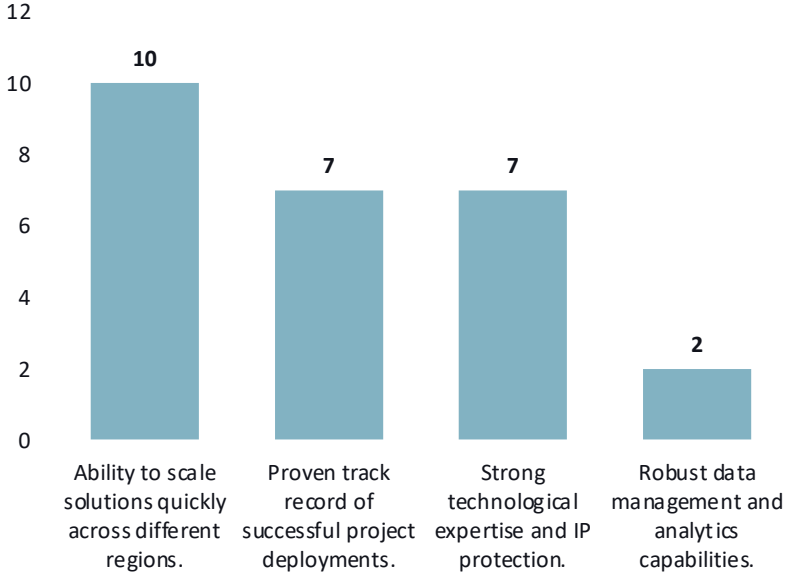
General Manager at Mentirosa P.C.

*"You need a holistic thing that is going to be able to **package the idea into a product that people can understand**. You need a very holistic team, a **team with different capabilities** to launch something successfully."*

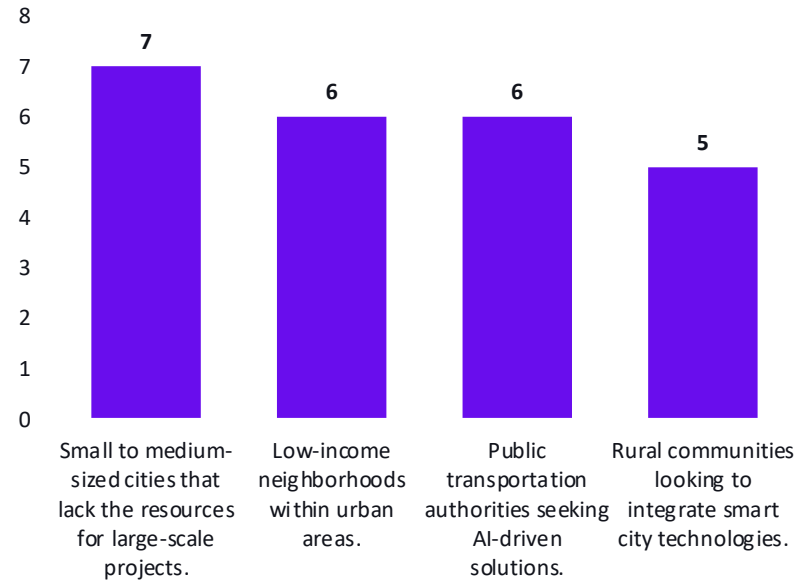
***Main competitors for growth companies** in the AI-powered digital services for sustainable and smart cities sector.*



***Attributes or capabilities** that indicate a **competitive advantage** in the AI-powered digital services for sustainable and smart cities sector.*



***Customer segments** that are **currently underserved** in the AI-powered digital services for sustainable and smart cities sector.*



Challenges for start-ups: Data quality, resistance to change, and infrastructure limitations are some of the related obstacles

There are opportunities for start-ups in this sector, but also several obstacles. ***Creating new services*** *in a city context* ***requires collaboration with many****, but so far the* ***ecosystem has been rather fragmented*** *in many cities.*

Lack of Scalability and Proof of Concept

- Each city has different needs, regulations, and infrastructure. It is difficult to create solutions that can be easily replicated across multiple cities.

Data Quality and Accessibility

- AI systems require continuous streams of high-quality data, but many cities lack the necessary sensor networks or data collection mechanisms.

Complex Regulations and Compliance

- Companies need to ensure their AI solutions comply with various national and local regulations, which can be a time-consuming and costly process

Fragmented Ecosystems

- Smart city ecosystem is fragmented, with many different stakeholders, and achieving alignment between these groups is difficult

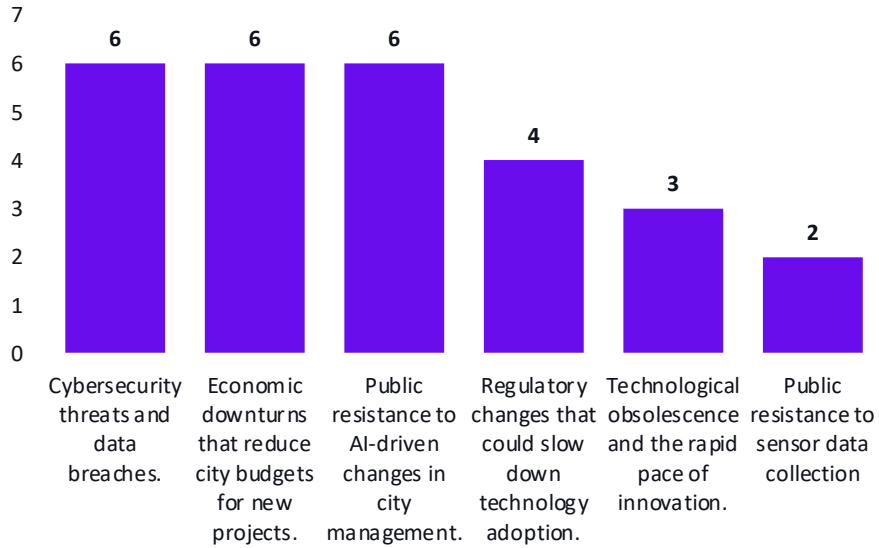


Nikolaos Sifonios

Founder at Match BALL Venture

"The challenges include regulatory compliance (such as GDPR), funding shortages, a lack of skilled professionals, high recruitment costs, and difficulties in integrating with existing systems.

Key risks that could impact the *AI-powered digital services for sustainable and smart cities sector* in the **next 3-5 years**?



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Risks for start-ups: Cities are complex, so there are various risks for setting up service businesses in this area

*Start-ups face several risks in the AI-powered digital services for sustainable and smart cities sector, requiring **careful risk management strategies**.*

Financial Risk	Many startups struggle with securing the capital necessary to develop, test, and scale their AI-powered solutions.
Regulatory and Compliance Challenges	Compliance with data privacy, urban planning or sustainability regulations is costly and time-consuming, and failure could result in fines or business disruption.
Technological Risk	Integrating new technologies with existing urban infrastructure can be complex and fraught with operational challenges.
Public and Market Resistance to Change	Cultural barriers, skepticism about the benefits of AI, and reluctance to shift from traditional systems to new technology can slow adoption.
Competition from Established Players	These organizations have greater financial resources, better access to infrastructure, and established relationships with governments.



Andreas Zerkoulis

CEO / Co-Founder at Inagros

*"Financial risk, political costs, culture around sustainability, customer culture, there is no signal everywhere in Greece, you don't have electricity everywhere, **there is no infrastructure to set all this up**."*



Nick Frannin

Director of Partnerships at Start for Future

*"High investment costs, corruption, gate keeping, **educating the public to accept change, culture around sustainability.**"*

Customer segments: Urban service providers are existing organisations, but AI-powered digital services can help make those services more efficient and tailored

The most important customer segments *in the sustainable and smart cities –sector are* ***responsible for urban infrastructure functions and services****, and new AI-powered digital services* ***need to be able to facilitate further improvement*** *of these functions and services.*

Municipalities and City Governments

- They are responsible for urban planning, public infrastructure, and sustainability initiatives – and often partner with private companies.

Private Companies in Urban Services

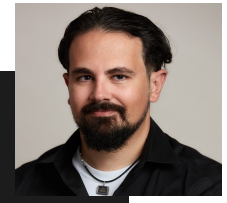
- They manage essential urban services - such as energy management, waste collection, and transportation

Citizens and End-Users

- Engaging citizens is crucial for the success of AI-powered solutions, as their adoption and use drive the effectiveness of smart city initiatives

Real Estate and Construction Companies

- They are involved in the development of smart infrastructure, including eco-friendly buildings, smart housing, and urban mobility solutions.



Panos Bechrakis

General Manager at Mentirosa P.C.

"(Most effective ways to reach customers:) *If you want to gain fast momentum, you go for a partnership. There's not an efficient way to deliver direct to consumers* (in smart city services)."



Nikolaos Sifonios

Founder at Match BALL Venture

"(Most effective ways to reach customers:) *The best approach is through partnerships. One example could be marketing agencies that focus on AI and sustainability, or even pan-European partnerships."*

Roadmap: The evolution of the AI-powered digital services for sustainable and smart cities

Before

- **Limited AI Adoption**: AI technology was primarily experimental, often referred to as 'machine learning', not widely applied in cities.
- **Data Challenges**: Cities struggled to gather reliable, real-time data on transportation, energy, and waste systems.
- **Infrastructure Limitations**: Many cities, especially older European cities, lacked the infrastructure to support smart solutions.
- **Fragmented Efforts**: Few public-private partnerships.

Now

- **AI as a Central Tool**: AI now commonly used to optimize city logistics, transportation, and energy management.
- **Improved Data Collection**: Adoption of IoT devices and smart sensors has improved, enabling better real-time data collection.
- **Emergence of Public-Private Partnerships**: A marked increase in collaboration between governments and private companies
- **Increased Investment**: A rise in funding for AI-powered smart city initiatives
- **Cultural Barriers:** Citizens and city administrations still often skeptical of new AI-driven services

Next years

- **Scalability of AI Solutions**: Solutions will be more customized to local needs while being able to scale across regions
- **Expansion in Key Sectors**: Focus heavily on logistics, transportation, energy management, and recycling
- **Public Education**: Efforts to educate citizens and businesses about the benefits of AI-solutions will ramp up
- **Regulatory Adjustments**: More attention to navigating evolving regulatory frameworks
- **Partnership Models:** PPP likely to become more formalized and integral to city planning efforts.

Beyond next years

- **Fully Integrated Smart Cities**: Largely AI-driven systems for transportation, waste management, energy efficiency
- **Global Expansion**: Expansion beyond Europe and North America into developing regions like Africa, Asia, and Latin America
- **Advanced Technologies**: AI models will become more sophisticated to optimize urban management
- **Sustainability as a Norm**: AI to ensure energy efficiency, and reduce carbon footprints,
- **Overcoming Cultural Resistance:** These services become a normal part of everyday life

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References

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Start-up entrepreneur and Mentor



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Interview participants











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Andreas Zerkoulis

CEO / Co-Founder at Inagros

Nick Frannin

Director of Partnerships at Start for Future

Dora Trachana

Partner at Uni.Fund

References

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Other Market Opportunity Roadmaps



Logistics Market Opportunity roadmap



Sustainable Freight Transportation Market Opportunity roadmap



Sustainable and Circular Construction Market Opportunity roadmap



Large-scale Stationary Energy Storage Market Opportunity roadmap

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THANK YOU!

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