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AI-powered Utility Management for Sustainable and Smart Cities

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Summary

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Introduction

Introduction and objectives of the Roadmap report

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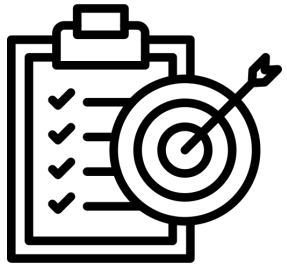
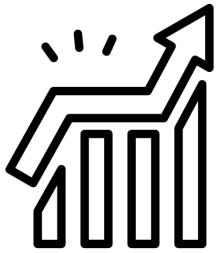
This report was developed as part of a broader initiative to identify and capitalize on market opportunities within the **AI-powered Utility Management for Sustainable and Smart Cities** sector. The report serves as a guide that maps out the market potential, challenges, and strategic actions necessary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



The primary goal of the AI-powered Utility Management for Sustainable and Smart Cities Roadmap Report is to equip companies and stakeholders within the 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, 11 of the most promising European ventures in AI-powered Utility Management 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.

Danu Robotics manufactures recycle-able waste sorting robots and computer imaging systems, controlled by AI.

eGate is an IoT data analytics and condition monitoring service that enables wireless and real-time condition monitoring and analysis throughout the building lifecycle.

With Globeholder AI's Geo-Embeddings As A Service is one API Call Away. ML/AI teams can increase their accuracy by up to 37%!

Precise cable mapping and documentation during cable installation

PowerUP revolutionises clean energy solutions with their smart electric generators, powered by hydrogen fuel cell technology. Reliable backup power with zero emissions, contributing to a greener, more resilient future.

LOUHE gathers essential data sources from campuses and buildings and creates intelligent situational awareness utilizing machine learning and Explainable AI.

Markedroid is a cleantech company that provides seamless Virtual Power Plant (VPP) orchestration solutions to households.

Nivel helps cities regulate shared micromobility. Smart, digital regulations make cities tidier, safer and more accessible.

We are the cleantech company Ozonium from Tampere, Finland! We provide Ozone-based solutions for bars, restaurants and taprooms for more ecological and sustainable beertap cleaning.

ScanwAi is a technology company specialized in AI-assisted digital solutions for infra maintenance and supervision.

SPACENT solves inefficient space use by making shared space accessible for all office workers. We create opportunities for space partners by diversifying their income and gaining new clients

Market opportunity Stakeholders

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Investors

Digital Heart Capital

Fark Labs Innovation

Grid.vc

Kiilto Ventures

Qbic

Sarsia Seed

SmartFin Capital

Taaleri Plc

Lead Customers

Inagros

Market opportunity Stakeholders

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Network partners

Aalto University

ClassiusAI Oy

e-Combinator

INTRASENSORS BV

Market opportunity Mentors

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Petri Rinne
Coventures

Hovik Torkomyan
36 Growth Marketing

Hannele Mennala
MovED

Petri Laine
Innovestor Ventures

Pontus Stråhlman
Voima Ventures

Jussi Teijonsalo
Grid.vc

Methodology

Starting point

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We state here some of the underlying assumptions and 'facts' about the AI-powered Utility Management for Sustainable and Smart Cities sector that serve as the basis and context of this analysis.

- **Increase in Urbanization**: Urbanization continues to rise, leading to more complex demands on utilities—water, electricity, waste management, and transportation—in cities. By 2050, approximately 68% of the global population is expected to live in urban areas.

- **Need for Sustainability**: Sustainable resource management is essential to address environmental concerns, reduce carbon footprints, and enhance resilience against climate change-related events. Many cities have committed to net-zero carbon emissions targets and sustainable development goals (SDGs).

- **Growth of Smart City Investments:** The global smart city market is projected to exceed $1.3 trillion by 2030. Investments are fuelled by technological advancement and a focus on sustainability, highlighting the importance of smart utilities.

- **Regulatory Pressure for Sustainability:** Governments worldwide are introducing stringent environmental regulations for cities. Carbon pricing, waste reduction mandates, and targets for renewable energy establish frameworks that emphasize sustainable practices.

- **Cybersecurity Concerns:** As smart city infrastructures expand, the cybersecurity market adapts to address vulnerabilities. Protecting data privacy and preventing cyber threats are critical for maintaining trust and ensuring system resilience.

Methodology

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

1. *Market trends and opportunities*
2. *Challenges and needs in sector*
3. *Key technologies and technology infrastructure*
4. *Competitive structure of sector*
5. *Risks for start-ups*
6. *Customer segments and distribution channels*
7. *Scaling and growth*
8. *Roadmap, i.e. evolution of sector*

- Surveys: Collected 10 survey responses to gather initial insights. The survey included 11 structured questions.
- Challenges queries for start-ups: We collected challenge statements from applying start-ups, and organized them by Market Opportunities and category, and analysed the interviews for expert insights for these categories of challenges.
- 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

10 Survey responses

37 Stated challenges by applying start-ups analysed

Validation

Total of 20+ Participants

Results, Insights, Roadmap

Opportunities and market trends: Significant opportunities for AI-driven innovation in utility management. (1)

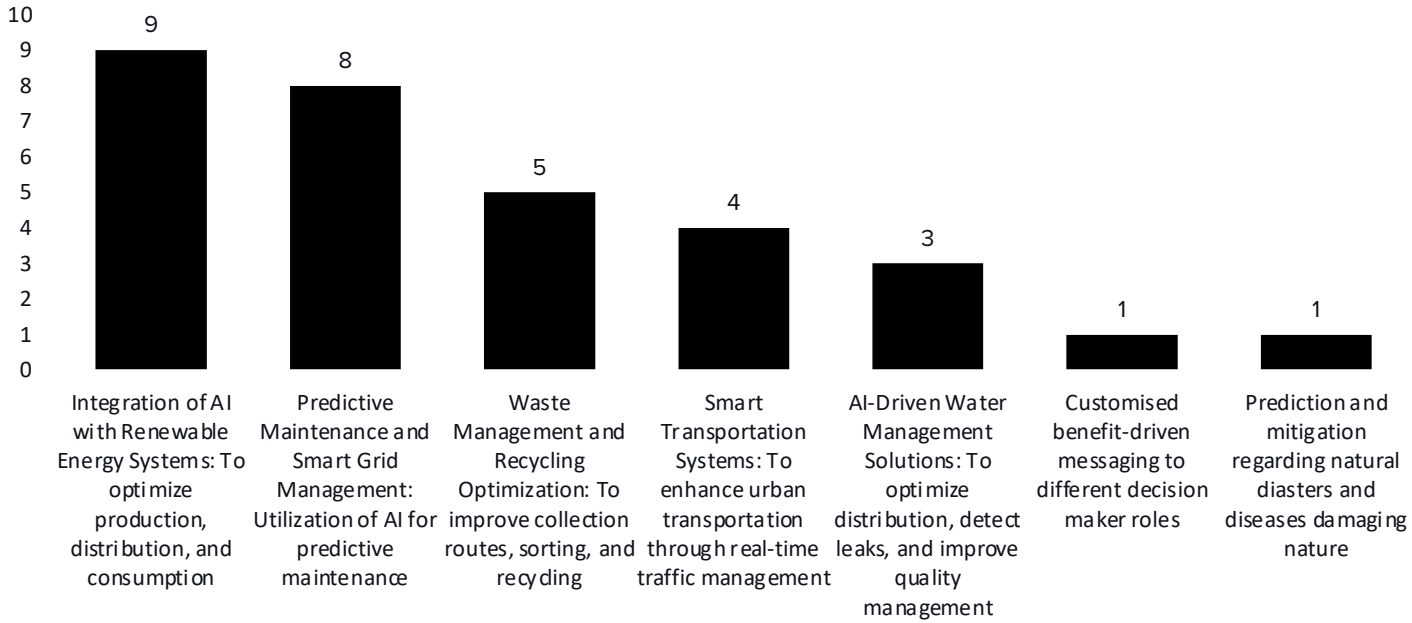
AI creates significant potential opportunities in utility management, enabling a transition towards more sustainable and smarter city management. Areas like **predictive analytics**, **energy storage optimization**, **grid decentralization**, and **cybersecurity management** can all be enhanced by AI.
More broadly, these effects can bring about a **more decentralised energy system**, but also a **more fragmented energy market**, thus with opportunities for smaller companies. The types of services that AI could facilitate are **smart asset optimisation** or resource allocation, perhaps supporting grid stability and maintenance, along with various **energy efficiency solutions**.

Mikko Kiertonen

Advisor, Liquido Ventures, Critical Infrastructure Expert

"A major challenge for the future of utility management and smart cities is the secure transfer of critical data. Cybersecurity becomes the top concern, requiring advanced solutions capable of protecting critical infrastructure"

*Which **market trends** do you believe are most important for startups in the area of AI-powered utility management for sustainable and smart cities?*



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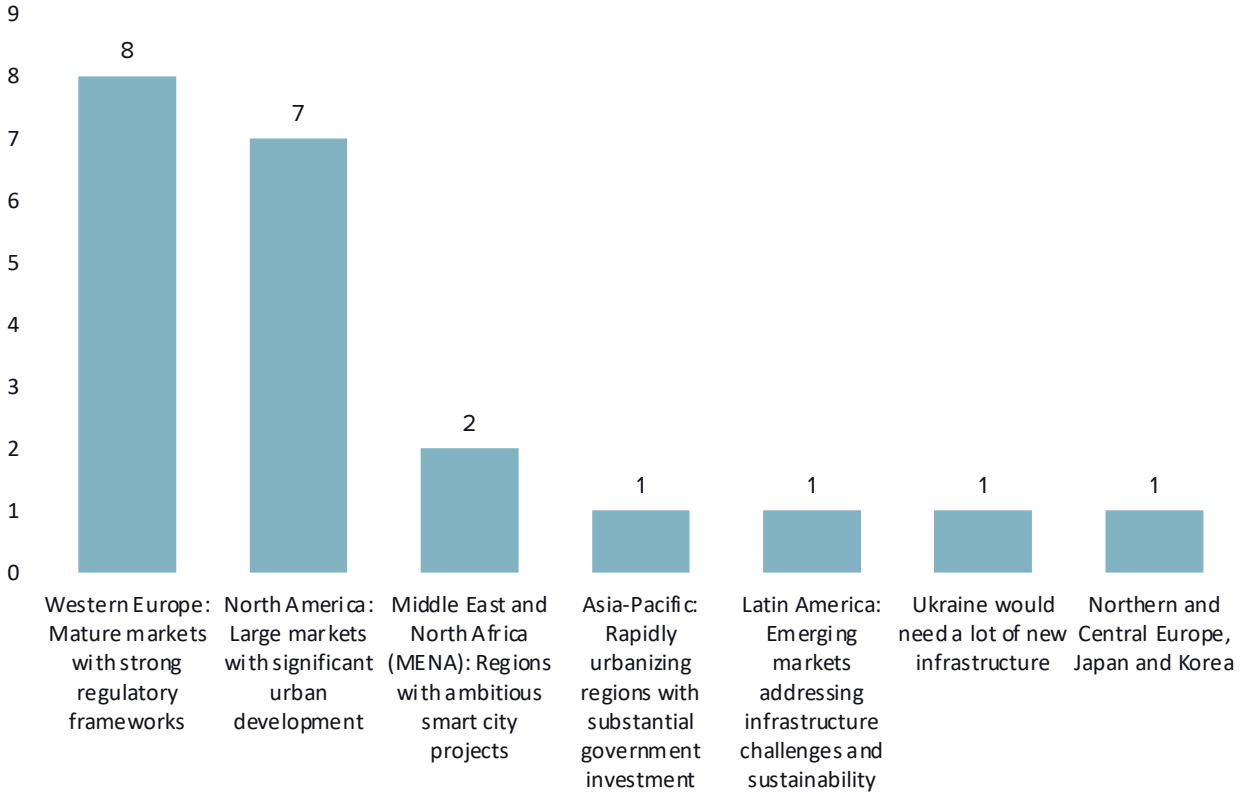
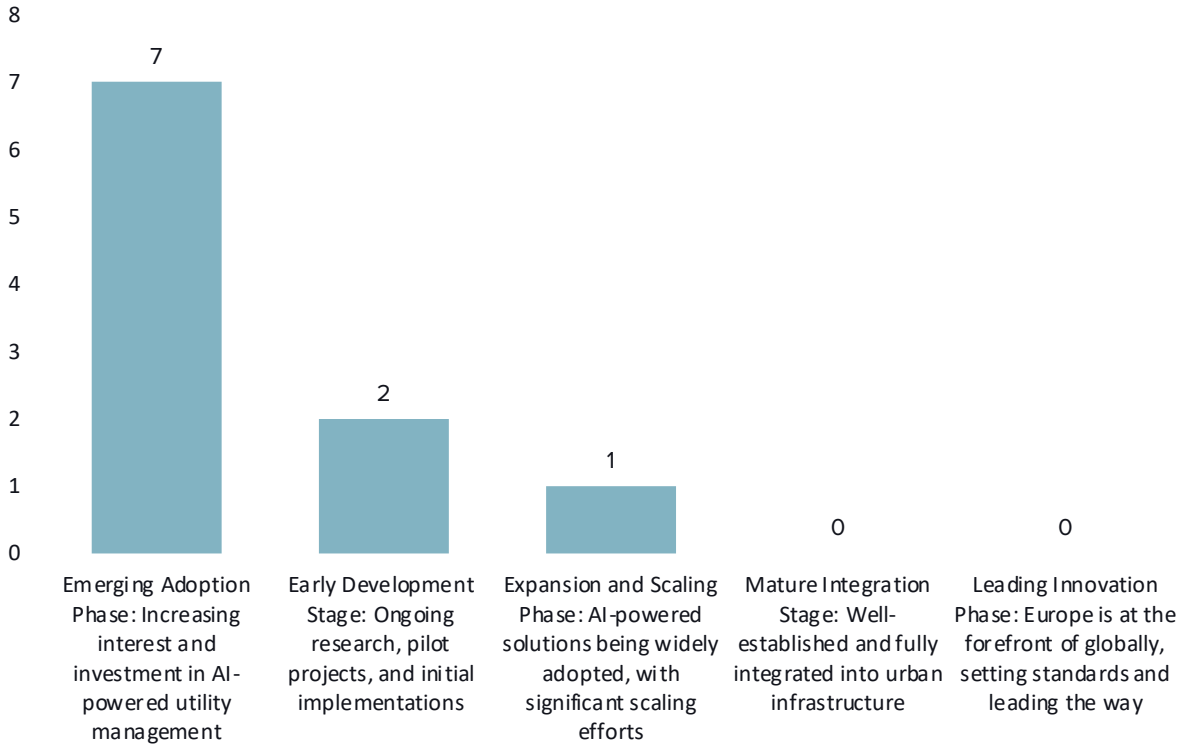
Opportunities and market trends: Significant opportunities for AI-driven innovation in utility management. (2)

*Where do you see the **greatest opportunities** for European start-ups for growth in the area of AI-powered utility management for sustainable and smart cities?*



*What is the **state of the area of utility management** for sustainable and smart cities currently, and leading to AI-powered solutions, in its long-term evolution, in the European context?*



Technology: Recent technological advancements have brought new tools for utility management in cities (1)

AI is the main, while not the only, technology in modern city management. AI has significant capabilities in the prediction and analysis of datasets, enabling optimisation for better sustainability of urban functions. Also cybersecurity and energy storage solutions are important in utility management for sustainable cities.

Predictive Analytics and Maintenance	AI is highlighted for its capability to process large datasets to detect patterns, predict trends, and support proactive resource management
Integration with legacy systems	Technologies that enable AI solutions to connect with older infrastructure and existing sensors are noted as crucial for gradual modernization
Edge Computing and Cloud-Based Systems	Efficient data processing is emphasized, balancing cost-effective edge intelligence with sophisticated tools in centralized cloud systems
Cybersecurity	Advanced cybersecurity solutions are identified as essential for protecting critical infrastructure, with robust monitoring tools deemed equally important
Energy Storage Solutions	Technologies supporting storage, including batteries, heat storage, or water storage systems, key in optimizing energy use with fluctuating market prices
Smart City Applications	AI analysis of vast datasets, e.g. traffic patterns, pollution levels, weather impacts, and infrastructure construction effects, generating insights for city optimization

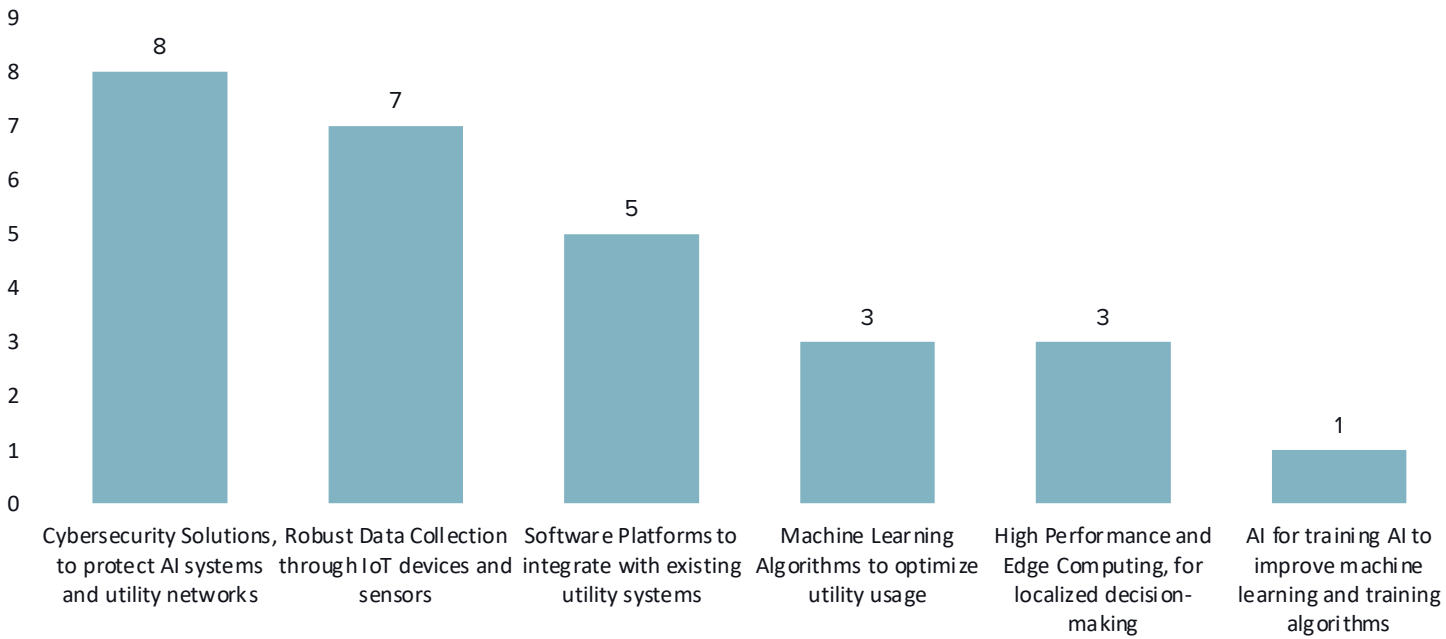
Technology: Recent technological advancements have brought new tools for utility management in cities (2)

Petri Rinne

Entrepreneur in Residence, Coventures Oy

" I mean there's great opportunities for startups to create interesting technologies to tackle those problems but of course you need to be able to connect with the right decision makers, tackle some kind of local legislations and compliance issues, integrate with legacy systems. "

*Which **technology needs** do you think are critical for the future in the area of AI-powered utility management for sustainable and smart cities?*



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Scaling: Taking advantage of AI in utility management offers opportunities for rapid growth (1)

AI-powered utility management offers extensive growth opportunities, particularly in balancing resources, enhancing sustainability, and leveraging data-driven insights, while market fragmentation, legacy systems, and long adoption cycles are some of the concerns that must be overcome.

Market Dynamics and Sustainability: Growth potential from solutions addressing fluctuating energy prices, grid stabilization, renewable energy integration, and CO2 reduction, also legislative shifts and sustainability measures.

Collaboration Between Industry Players: Collaborations between startups and established players allow small firms to innovate while leveraging the networks, funding, and scale of larger entities. Create purpose-built solutions and pilots tailored to smart city contexts.

Legacy Infrastructure and Emerging Technologies: Ability to enhance and integrate AI with existing legacy systems, rather than completely replacing them. Solutions that connect old infrastructure with AI-powered systems are crucial for scaling.

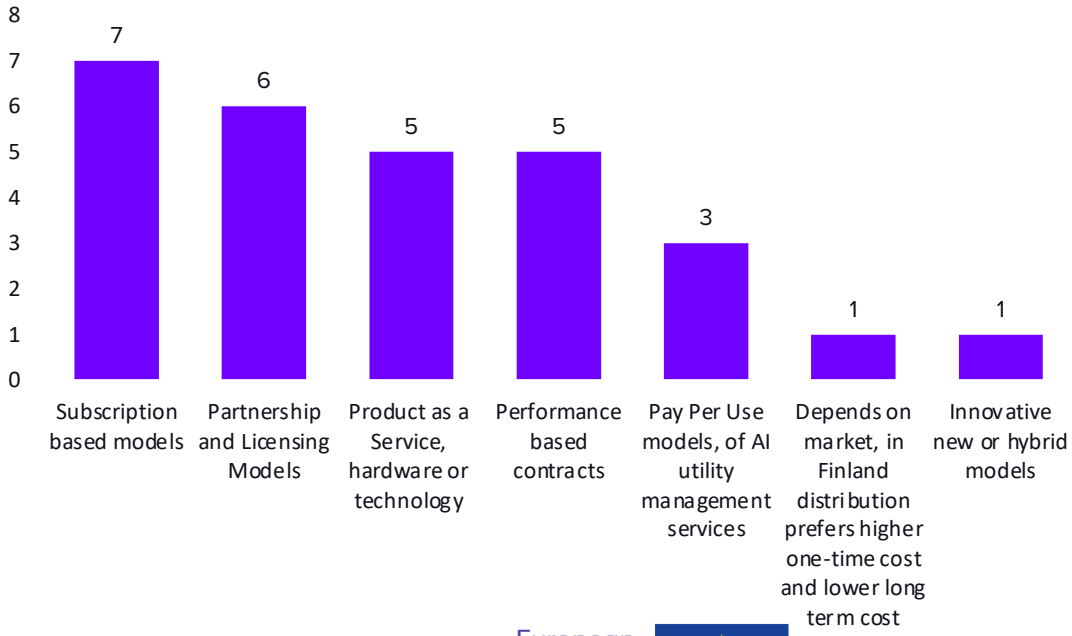
Challenges in Scaling: Hurdles exist, e.g. fragmented markets, extensive procurement processes, lengthy sales cycles, and delivering on AI promises. Growth depends on strategic positioning, managing expectations, and demonstrating value to end customers and collaborators.

Mikko Kiertonen

Advisor, Liquido Ventures, Critical Infrastructure Expert

"There's significant growth potential, but it's essential for major players to collaborate with start-ups. Their commitment to funding and pilot projects is key to developing next-generation solutions."

*Which **types of revenue models** do you find **most sustainable or appealing**, given the current market conditions in the area of AI-powered utility management for sustainable and smart cities?*



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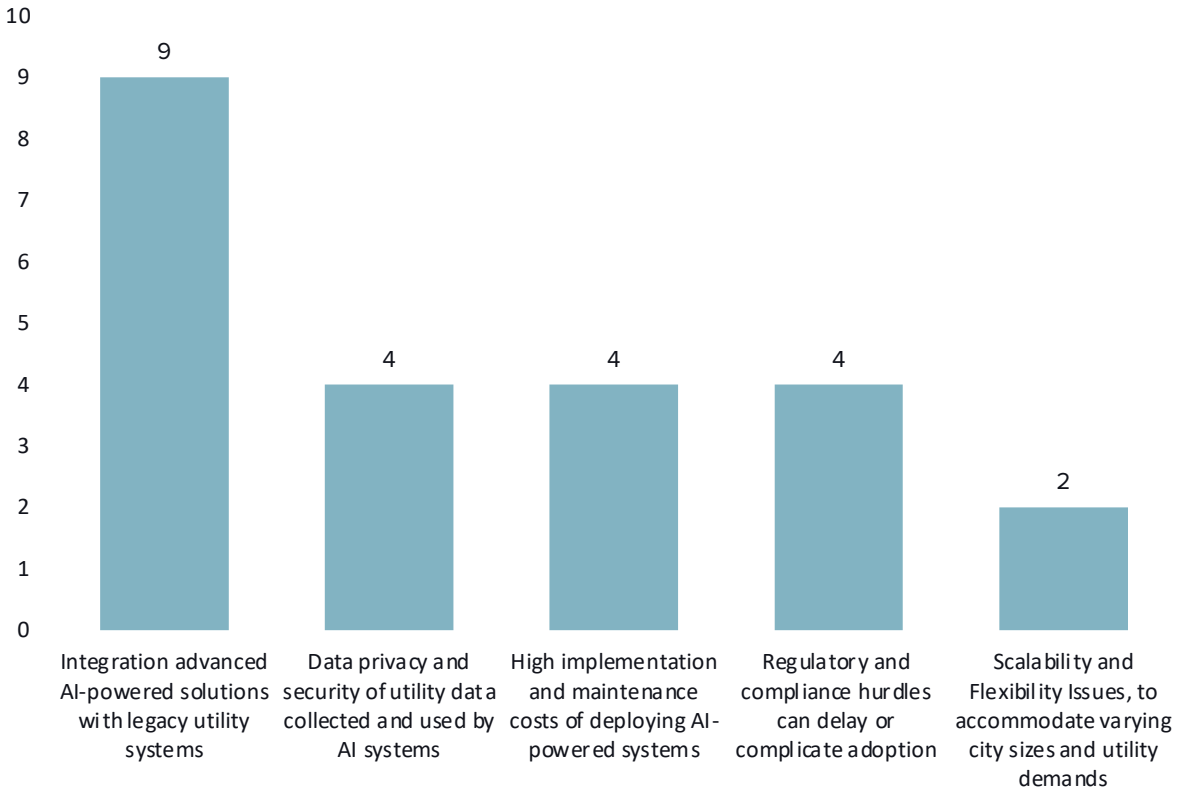
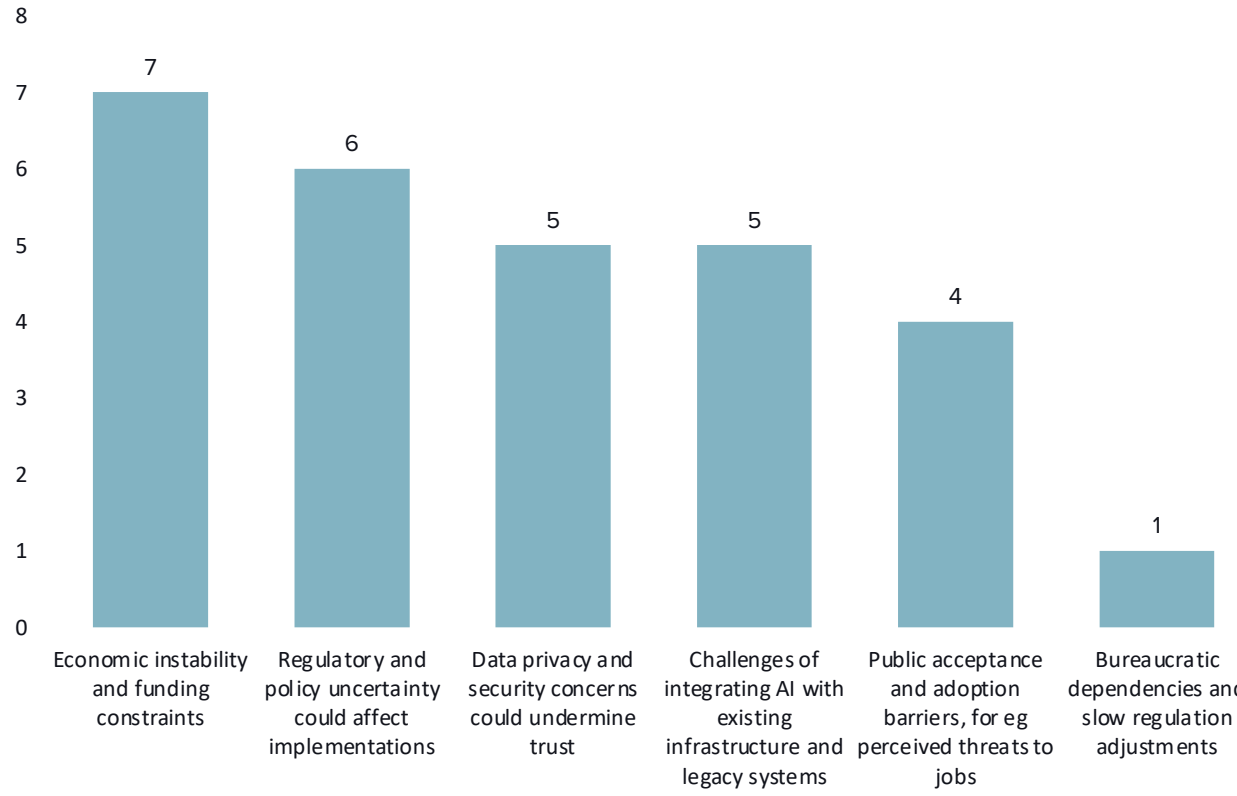
Scaling: Taking advantage of AI in utility management offers opportunities for rapid growth (2)

*What areas of AI-powered utility management for sustainable and smart cities are there still **needs** and/or **challenges** that are not adequately solved or provided for?*



*What do you consider to be the **key risks** that could impact the area of AI-powered utility management for sustainable and smart cities in the next 3-5 years, particularly in the European context?*



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Competition: Traditionally dominated by large companies, utility sector now has new open spaces

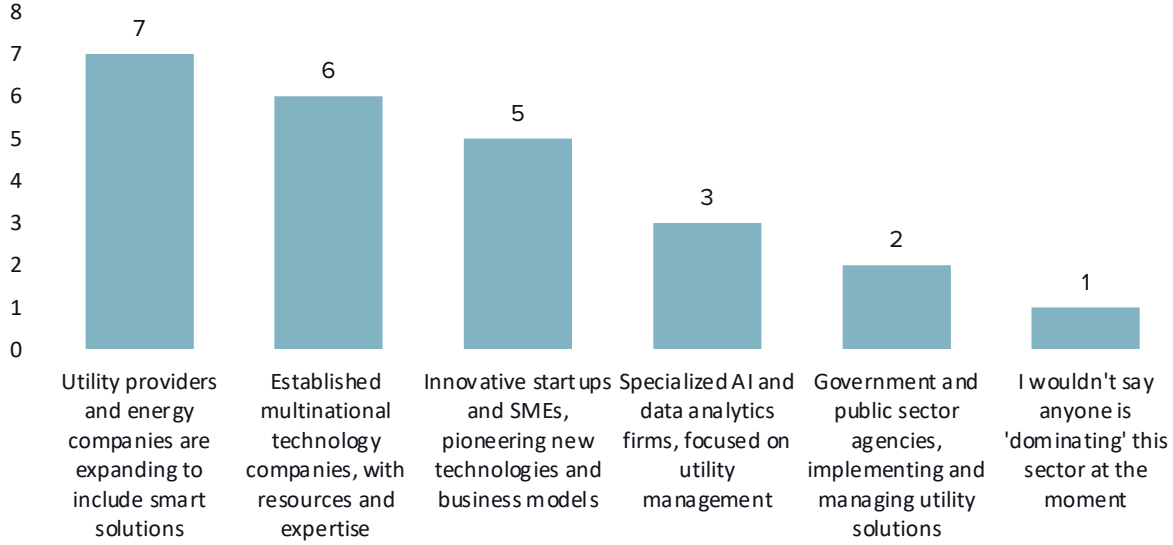
The sector is **highly fragmented**, comprising different segments such as network management, pricing, storage solutions, and more. In traditional utility management, large corporations (e.g., Siemens, ABB) dominate infrastructure-related markets. However, in smart city initiatives, smaller and mid-sized companies often lead pilot projects and offer innovative solutions, with **potential for collaboration between big firms and smaller players**. **Competition differs by region and market context**, with large companies dominating some markets while smaller players have opportunities in others – thus **market research on local dynamics is essential**. Smaller companies and start-ups can compete by **delivering niche, purpose-built AI solutions** that complement or enhance offerings from established companies.

Juho Risku

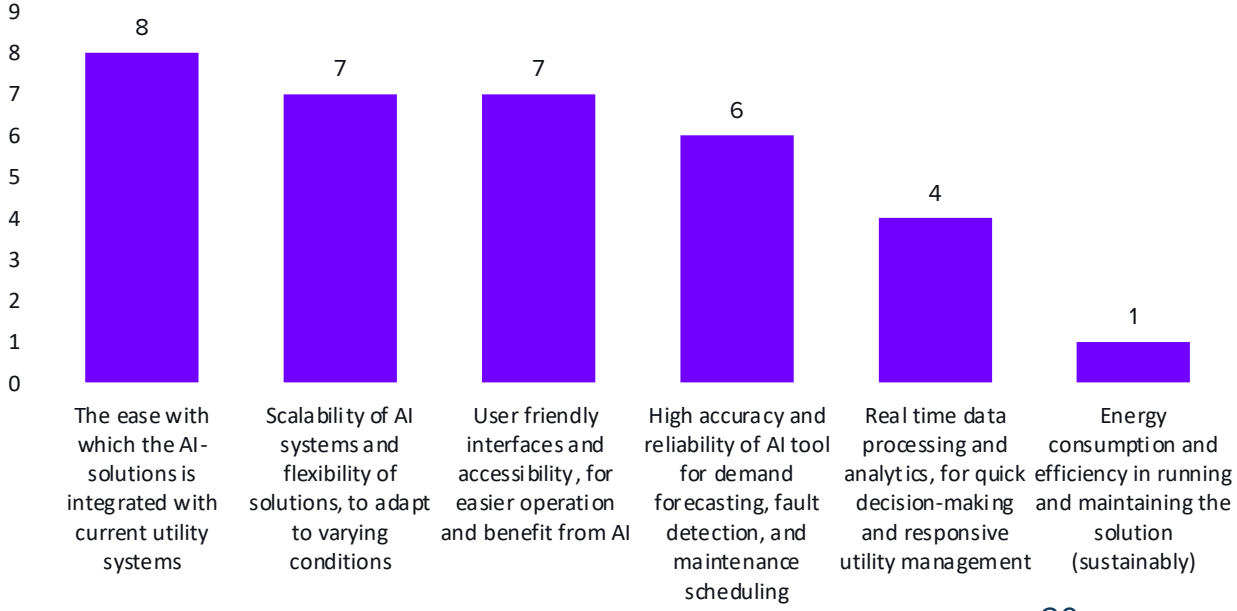
Co-Founder & Partner, Butterfly Ventures

"Yes, there's definitely lots of competition in this space, I mean, and it's very multidimensional. So people are approaching from the kind of a network management side, kind of a pricing side, day trading side, many different aspects…. So the market is rather fragmented here."

*What is the **competitive structure** of the area of utility management for sustainable and smart cities, i.e. what kinds of companies dominate this sector?*



*What specific **attributes or capabilities** do you look for to indicate a **competitive advantage** in the area of AI-powered utility management for sustainable and smart cities?*



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Challenges and risks for start-ups: Plenty of legacy technologies and established firms to navigate (1)

Several challenges highlight that even though AI offers new opportunities, the utility management sector can be a hard sector for start-ups, with legacy systems and established companies dominating the market.

Resource and Development Constraints:

Start-ups face difficulties in securing resources, conducting R&D, developing a minimum viable product (MVP), and validating solutions at early stages.

Market Entry and Targeting:

Establishing an effective go-to-market strategy, identifying the right target audience, and navigating fragmented markets and value chains are critical hurdles.

Regulatory and Compliance Issues:

Data requirements for AI, local regulations such as those related to GDPR, and cybersecurity concerns present significant barriers.

Integrating Legacy Systems:

The need to incorporate new solutions with existing, aging infrastructure complicates the adoption of AI technologies, requiring refurbishment and compatibility with legacy systems.

Long Sales Cycles and Value Communication:

Selling AI-enabled solutions to traditional sectors involves lengthy sales cycles, rigid decision-making processes, and challenges in demonstrating clearly the added value of AI.

Fragmented Ecosystem and Competition:

The fragmented market and competition from large players make it challenging for start-ups to position themselves and gain visibility amongst potential collaborators and customers.

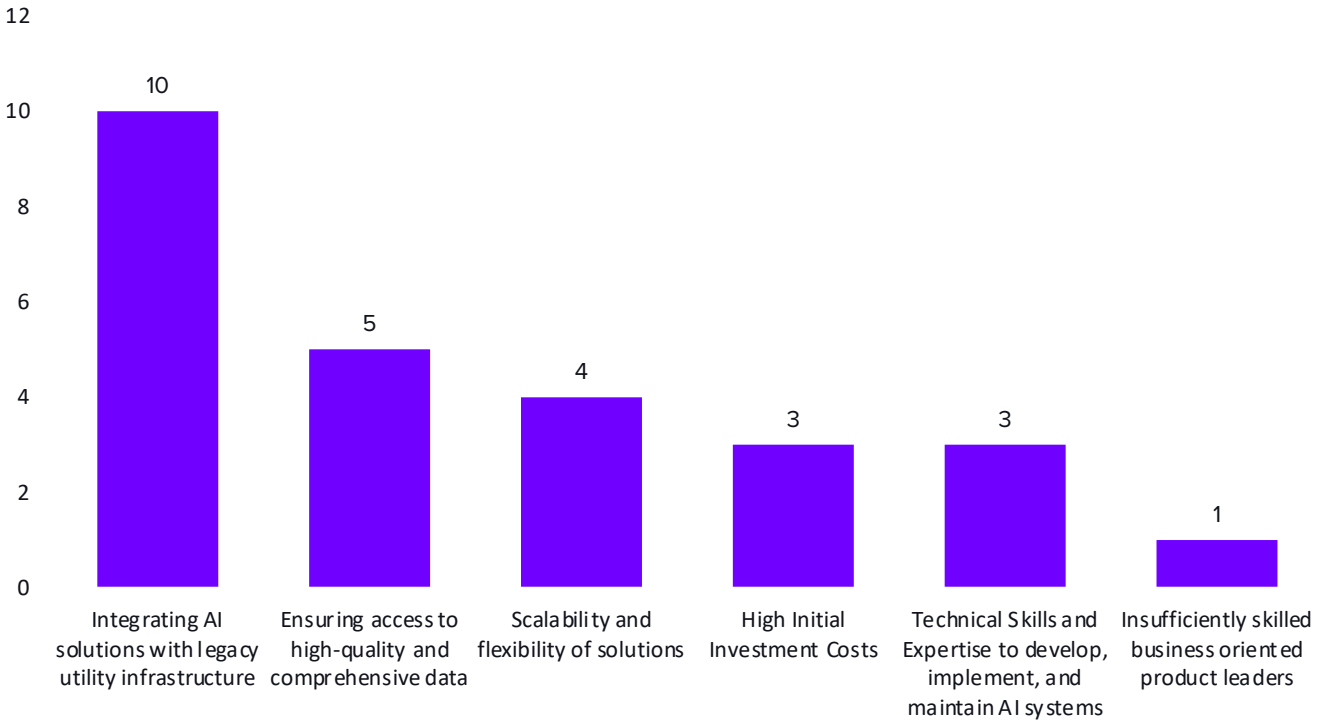
Challenges and risks for start-ups: Plenty of legacy technologies and established firms to navigate (2)

Mikko Kiertonen

Advisor, Liquido Ventures, Critical Infrastructure Expert

"I think one of the biggest risks is the long sales cycle. The end customers are often cities, governments, or large power distribution companies, where decision-making tends to be rigid and slow. As a result, sales processes take time, and companies need to be able to survive long enough to close those deals. Another challenge is demonstrating the cost savings or added value of AI to traditional markets."

*What are the **main technological or operational challenges** that could hinder the adoption of new technologies or operational practices in the area of AI-powered utility management, especially in the European context?*



Customer segments and distribution channels in utility management: Large infrastructure requires partnerships to enter the market

Customer segments and distribution channels in utility management suggest the need for strong partnerships, long-term strategy, and the adaptation of existing business practices within this complex ecosystem.

Customer segments

Large public and private utilities: Municipalities and government bodies, managing energy, water, and waste services. Are active buyers but have extensive and slow procurement processes due to regulatory and risk management factors.

Energy companies and network operators: Electricity, water, and district heating. Have tightly regulated and closed ecosystems where high reliability and strict certification are paramount for market entry.

Industrial and commercial customers: factories, infrastructure operators, and real estate owners seeking energy efficiency and predictive maintenance to reduce costs.

Distribution channels

Partnerships: Building partnerships with large players in the ecosystem is key. Start-ups are advised to map the value chain, identify critical stakeholders, and propose clear value propositions to potential partners.

Public Sector Procurement: Engaging with municipalities and governments requires navigating slow and extensive tender and evaluation processes.

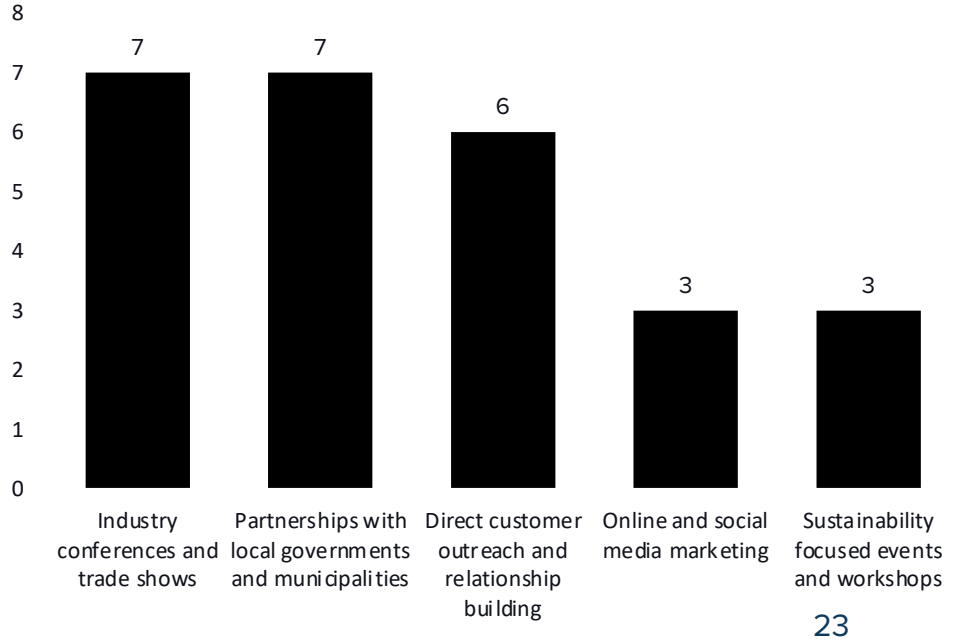
Conferences and Seminars: Decision-makers, particularly in large organizations, often attend these events, creating opportunities for start-ups to establish rapport and trust over the long term.

Mikko Rusama

Former city of Helsinki Director of Digitalisation

"It's probably also difficult to enter the market here, as they are quite closed ecosystems, where such big decisions are perhaps rarely made. Such a high reliability requirement is emphasized, and there are also strict regulations and certification requirements."

*Which **channels** do you believe are **most effective** for reaching and engaging customers in the area of AI-powered utility management for sustainable and smart cities?*



Roadmap: The evolution of Utility Management

Past

Traditional resources and manual processes

- Utility management initially relied on traditional resources such as oil, gas, coal, and nuclear energy
- Systems focused on one-way distribution without dynamic control. Processes were largely manual, with basic mechanical meters in place and limited competition due to monopolistic structures.
- Chernobyl incident, which shifted perceptions of nuclear power
- Emergence of wind power in the early 2000s, followed by solar power later as technology matured.

Present

Renewables and early AI tools

- Growing adoption of digital technologies, e.g. smart meters for real-time consumption tracking and remote reading.
- Energy production is more decentralized, incorporating e.g. wind and solar.
- Sustainability and CO2 reduction efforts are driving innovation, with AI-powered tools beginning to optimize consumption, production, and system efficiency.
- Challenges persist, such as cybersecurity risks and integration of legacy infrastructure.

Short-term Future

New solutions create a more dynamic systems

- Enhanced renewable energy integration with solutions for grid balancing, energy storage, and optimization using AI.
- Start-ups and major players are collaborating to create dynamic systems, leveraging renewable sources alongside storage solutions such as batteries or thermal storage.
- Smart technologies like virtual power plants are expected to become more prevalent to provide decentralized and responsive energy management.

Long-term Future

Decentralised, completely sustainable systems

- Holistic sustainability by maximizing AI's potential in predictive maintenance, energy efficiency, and grid management.
- Technologies will likely overcome challenges related to legacy infrastructure, enabling sophisticated hybrid systems that integrate old and new equipment.
- Decentralized solutions, including off-grid communities and democratized power distribution systems, may dominate.
- Advanced cybersecurity measures will ensure secure, critical infrastructure operations

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Challenge-to-Action Framework

Challenge Description	Category	Start-ups with challenge	Mentor & Stakeholder insight	Start-up action plan
Securing funding for R&D, scaling, GTM, or marketing efforts.	Funding	9	Importance of lean, phased market entry to manage costs and risks. Scaling success is linked to building strong partnerships.	Develop a staged funding plan. Build partnerships with major market players. Prioritize local market expertise.
Scaling solutions globally while navigating technical, operational, and regulatory complexities.	Scaling	7	Adapt to variations in market maturity, e.g. local regulatory and compliance requirements. Integrate with legacy systems.	Design scalable technologies compatible with existing infrastructure. Connect with established players. Focus on transparency.
Building traction and shortening sales cycles in target markets (especially public and international).	Sales	6	Trust-building through long-term engagement. Hiring experienced team members. Demonstrating measurable ROI.	Start with detailed market research to determine target verticals and customer needs. Build local sales capabilities and trust.
Developing and refining product offerings (e.g., AI software, waste management, smart infrastructure).	Product	5	Focus on creating robust go-to-market strategies and building trust with stakeholders through long-term engagement.	Conduct thorough market research. Collaborate with local professionals. Balance marketing-driven promises with the delivery of realistic, scalable solutions.
Finding strong partners to grow internationally and locally.	Partners	3	Strong strategies include phased entry through pilot projects, fractional sales outsourcing, and using AI or other tools to analyse opportunities.	Attend industry events to build direct relationships. Develop clear benefits for partners. Map key players to understand their needs.
Driving adoption in traditional industries and aligning with public systems.	Adoption	3	Foster long-term relationships through consistent engagement via conferences and seminars, mapping and understanding local ecosystems and value chains.	Establish a phased go-to-market strategy emphasizing clear value propositions and ROI. Understand local regulations.
Attracting talent to support development, implementation, and customer use cases.	Talent	2	Key elements are attractive compensation packages, **h**iring professionals with prior experience and investing in collaboration and pilots.	Ensure co-founders and team members can maintain financial stability. Leverage networks and recruitment from relevant industries.

Other Market Opportunity Roadmaps

Circular Models for Cities and Regions roadmap

Sustainable Mobility roadmap

Renewable Energy Production roadmap

Supply Chain Management & Trade Finance roadmap

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