CitCom.AI

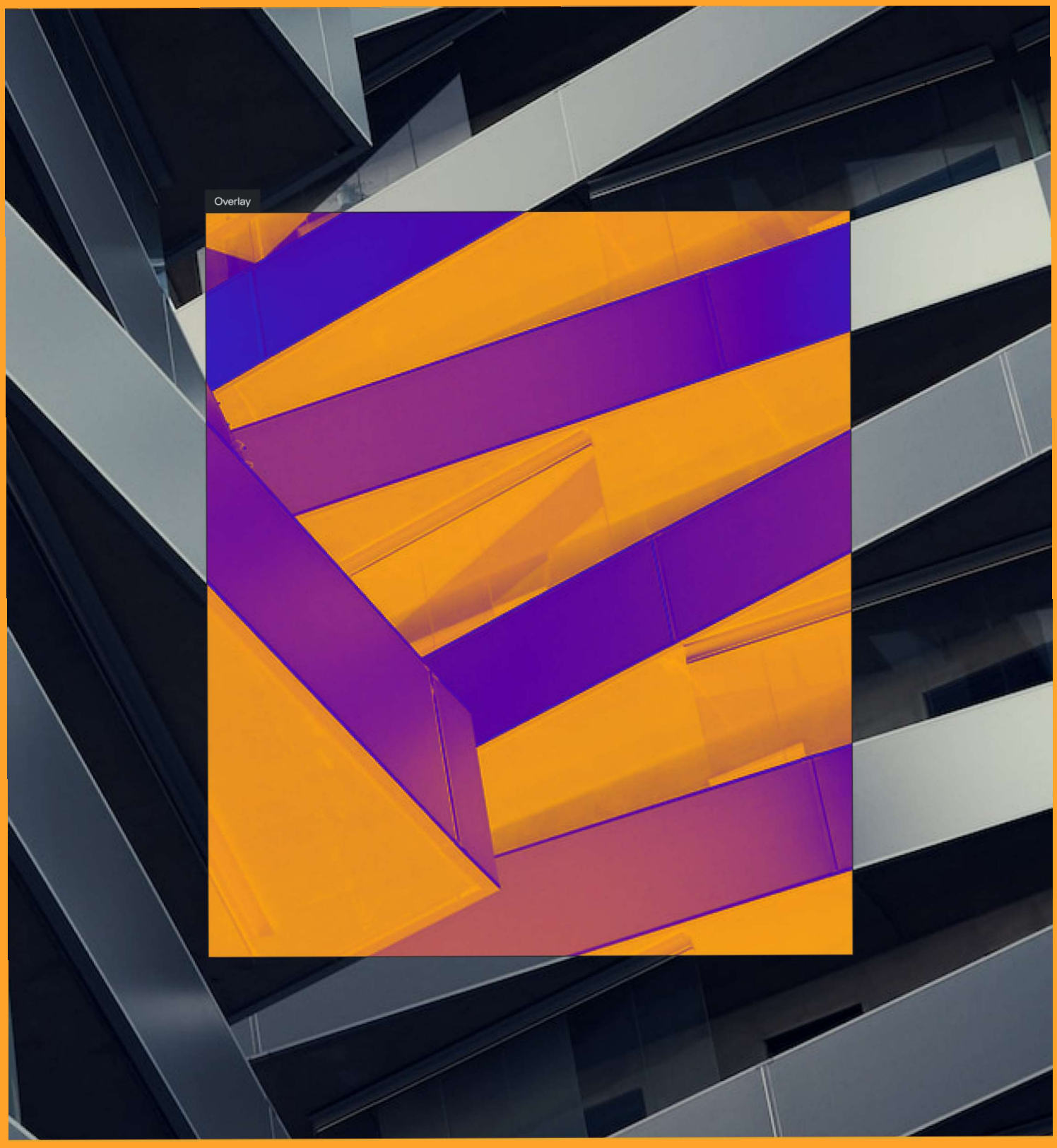
WP5 - Market Dialogue

European AI Market Report

Author: Sophie Meszaros (IMEC-SMIT-VUB)
Reviewers: Petra Dalunde (RISE), Beatriz Garcia-Olivares (Universitat de València)
Contributors: Bernat Adrià (València Innovation Capital), Mar Ferrer Sáez (València Innovation Capital), Lydia Montandon (FIWARE Foundation), Martine Delannoy (Digitaal Vlaanderen), Alberto Celani (Politecnico di Milano), Juan A Sanchis (Universitat de València)

Testing AI
in Smart Cities and
Communities

17.12.2024



CitCom.ai European AI Market Report

Author: Sophie Meszaros

Acknowledgments

The second version of the CitCom.ai European AI Market Analysis was based on the first version released in 2024 February. The first version was coordinated, edited and contributed to by Sophie Meszaros and Laurens Vandercruysse (IMEC-SMIT-VUB). The following people have contributed to the first version which serves as the base of this document: Martine Delannoy (Digitaal Vlaanderen), Bernat Adrià (Las Naves), Lydia Montandon (FIWARE Foundation), Alberto Celani (Politecnico di Milano), Mar Ferrer (Las Naves), Eridona Selita (Imec), Thomas Thue Sørensen (CDK), Peter Mombartz Brændgaard (CDK), Søren Bernt Lindegaard (CDK), Petra Dalunde (RISE), Gwenaelle Berthie (SystemX), Pascal Lhoas (LIST), Rafael Magdalena (UVAL), Adrian Salcedo (UVAL), Andrea Bonetti (UVAL).

CitCom.ai wishes to extend this acknowledgement to the experts who provided this analysis with their insights about the European AI market trends and challenges, and explained testing needs. The organisations that participated included: AI, Data and Robotics Association (ADRA), European Digital SME Alliance, European Observation Network for Territorial Development and Cohesion (ESPON), Confederation of Laboratories for Artificial Intelligence Research in Europe (CAIRNE), European AI Startup Landscape, GovTech, Joint Research Centre (JRC), European Commission (Unit B2 Interoperability, Directorate-General Informatics – DG DIGIT), Fondazione Bruno Kessler (FBK), EIT Digital, Big Data Value Association (BDVA), Leading Innovation & Knowledge For Society (Links) .

Revision History

Author Name, Partner Short Name	Description	Date
Sophie Meszaros, (IMEC-SMIT-VUB)	First draft	12.12.2024
Petra Dalunde (RISE) Beatriz Garcia-Olivares (Universitat de València)	Review	17.12.2024
Sophie Meszaros, (IMEC-SMIT-VUB)	Resolved comments pertaining to information clarity/relevance	17.12.2024

Table of Contents

Summary

The "CitCom.ai European AI Market Report" examines the European AI landscape with a specific focus on smart cities and communities. It introduces the CitCom.ai Testing and Experimentation Facility (TEF) as a flagship European initiative designed to advance the safe, ethical, and effective deployment of AI technologies. The TEF's role is defined by its ability to test solutions in real-world environments, ensuring compliance with regulatory frameworks and addressing societal needs. This report's structure interweaves thematic analysis with actionable insights, serving as a guide for policymakers, industry leaders, and researchers navigating the evolving European AI ecosystem. It combines granular detail with a strategic perspective, making it a crucial resource for understanding the intersection of AI, governance, and community development.

The document begins with a description of CitCom.ai's objectives, emphasizing its alignment with European AI strategies and smart city goals. The methodology outlines the research process combining literature reviews, workshops, and expert interviews that were used to map market gaps and inform the TEF's design. Structured into thematic domains—POWER, MOVE, and CONNECT—the report presents an overview of regional supernodes responsible for innovation in energy, mobility, and connectivity across Europe. These sections include analyses of technological applications, market challenges, and use cases such as energy optimization, urban mobility solutions, and water management innovations. Subsequent chapters provide insight into the European AI Landscape, highlighting legislative contexts, funding mechanisms, and the interplay between regulation and innovation. The report addresses critical elements of European AI standards, emphasizing their importance in fostering trust and scalability. It further explores stakeholder dynamics, categorising public and private sector roles while detailing challenges and opportunities in AI adoption. The final sections make use of expert input and analyse market needs and challenges, discussing trends and future directions for AI in public and private sectors. Testing and experimentation, the cornerstone of the TEF, are presented as indispensable for validating AI solutions. The document concludes with actionable recommendations for fostering collaboration, ensuring compliance, and driving sustainable innovation across Europe.

Introduction

The CitCom.ai Testing and Experimentation Facility (TEF) is part of a broader European initiative to ensure that AI technologies are developed and deployed in a safe, ethical, and effective manner. CitCom.ai specifically focuses on AI applications in smart cities and communities, such as urban mobility, connectivity, and power systems. Its primary role is to serve as a "filter" that tests AI and robotics in real-world or simulated environments to evaluate their readiness for societal integration and their compliance with European principles. This initiative establishes a lasting TEF for AI across European regions supporting Europe's leadership in the development of smart cities and communities.

The foundational activity of this TEF is the CitCom.ai Market Analysis, a joint effort of European organisations to map the current European AI market. The guiding principle of this work is to map the European context by concretizing the regulatory environment, funding instruments, state of the existing European AI market, and potential European end-users (both communities and organisations) while introducing CitCom.ai and reflecting on its role in Europe's AI market . Figure 1 displays stakeholders around CitCom.ai[1].

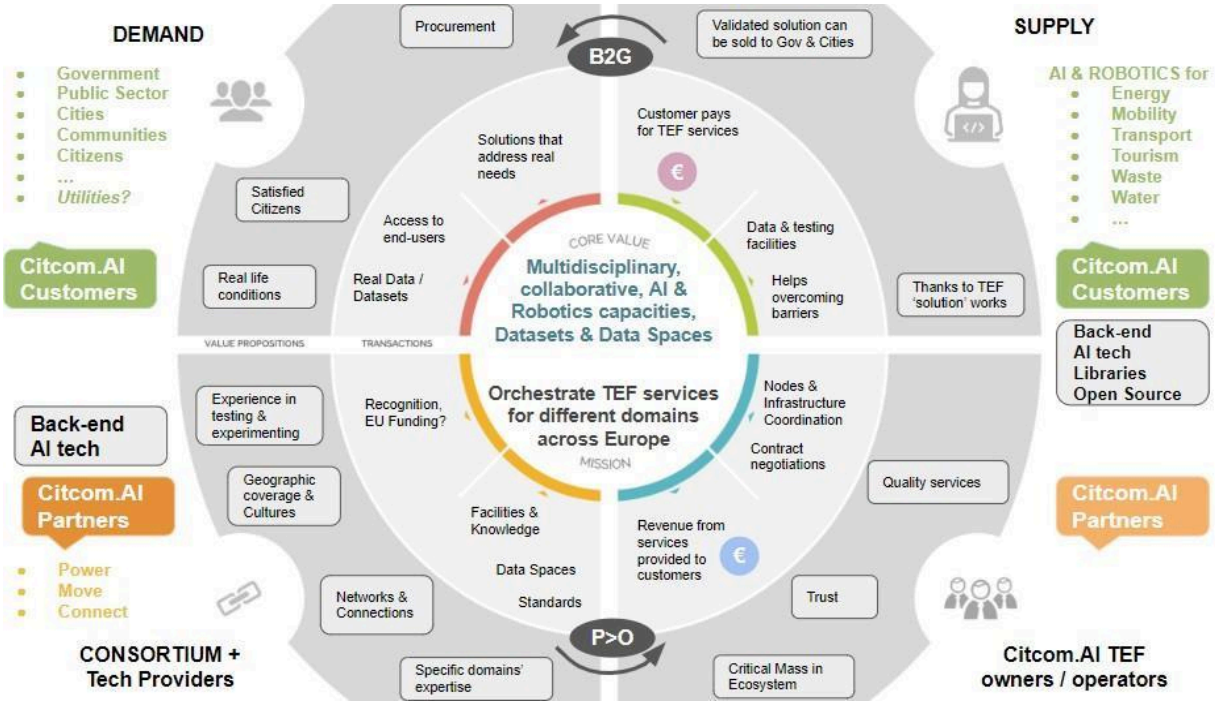


Figure 1 CitCom.ai Stakeholders

CitCom.ai focuses on three application domains 'POWER', 'MOVE', and 'CONNECT' by defining respective prominent subthemes and contextualization through use cases. These domains are assessed on a regional basis, called the supernodes. The Nordic super node covers Denmark, Sweden, and Finland and presents the 'POWER' domain. The Central supernode covers Belgium, France, Luxembourg, and the Netherlands and outlines the 'MOVE'

[1] The figure is based on the platform innovation kit: https://platforminnovationkit.com/

domain. The South supernode covers Spain, Italy, Poland, and Germany and studies the ‘CONNECT’ domain.

Key Value Propositions of the CitCom.ai TEF

Real-world Testing Environment: It provides AI solution providers with the ability to test their technologies in urban-like settings. This includes applications like autonomous vehicles or municipal service robots, ensuring that technologies meet safety, ethical, and functional standards before market deployment.

Harmonizing Innovation with Regulation: CitCom.ai works in line with the EU's regulatory frameworks, such as the AI Act and the AI Liability Directive, to ensure compliance with stringent European standards. This helps AI solutions transition from labs to the market efficiently while aligning with societal goals and legal expectations.

Fostering Collaboration: The facility promotes partnerships between private companies, public entities, and policymakers. This ecosystem supports innovation while considering public acceptance, data privacy, and security concerns.

Boosting Market Uptake: By offering a space to refine and validate AI solutions, CitCom.ai accelerates the adoption of AI technologies in the European market. It aids startups, SMEs, and larger enterprises in optimizing their products and fostering consumer trust.

Cross-sector Relevance: Though focused on smart cities, it complements other TEFs in sectors like healthcare, manufacturing, and agriculture, creating a comprehensive European framework for AI development.

While this document serves to inform European stakeholders of the smart and sustainable cities and communities AI domain, it also provides intelligence to CitCom.ai to identify required services, its customers, relevant technologies, marketing, and communication strategies, and to contribute to the building of its infrastructure.

Methodology

Methodologically, this study was first conducted by way of document analysis. Reviewed documents can be split into three main categories:

- Academic literature such as peer-reviewed journal articles, books, and conference papers;
- Grey literature such as policy studies, publications, strategy documents, and working documents from prominent (inter)national organisations;
- Information on and from past EU-funded projects in the realm of smart cities and communities.

The initial version of the CitCom.ai European AI Market analysis revealed gaps in the literature that the project aims to address. To explore these gaps, an internal workshop identified key questions about AI adoption requirements in the public sector and development conditions for the private sector within smart communities. This effort informed a second iteration of the analysis, which incorporated findings from 14 expert interviews. These interviews, designed using a deductive approach, focused on market challenges, current and future trends, and testing requirements. Thematic analysis was conducted across key areas, including the European AI market in the public and private sectors and the role of the TEF. The interview materials are attached as an annex to this document.

Overview of CitCom.ai TEF

CitCom.ai put forward three regions as TEF sites catering for specific innovation themes. Each region is led by a supernode and supported by sub-nodes that complement the service offering of the super node in a certain theme.

Theme	Super Node	Sub-nodes
POWER/Nordic Node	Denmark	Finland
		Sweden
MOVE/ Central Node	Belgium	France
		Luxembourg
		The Netherlands
CONNECT/ Southern Node	Spain	Germany
		Italy
		Poland

Power

The power sector with services for solutions in (but not limited to) **energy, environmental monitoring, and cybersecurity.**

The EU is committed to reducing fossil fuel dependency and promoting electrification and renewable energy integration. Citizens are becoming more involved in energy initiatives, transitioning from passive consumers to active participants in renewable energy projects. Nordic countries are leading these efforts, optimizing infrastructure and enhancing cybersecurity. [2][3]

Energy
Europe relies on various energy resources such as gas, wind, solar, hydro, nuclear, and biomass, with Transmission System Operators (TSOs) and Distribution System Operators (DSOs) managing grid operations. These entities traditionally focus on energy supply rather than innovation. As such, TSOs prioritise stability, and hence, their digitalisation efforts differ across Europe. DSOs, particularly in district heating, exhibit more diversity. However, the sector

[2] https://energy.ec.europa.eu/system/files/2017-03/eecsp_report_final_0.pdf
[3] https://energy.ec.europa.eu/system/files/2021-04/nccs_report_network_code_on_cybersecurity_0.pdf

must address critical challenges such as sustainable energy production, storage, and integration.

Environmental Monitoring

The demand for localized, high-frequency environmental data has grown, driven by a more informed population, national goal-setting, emissions targets, legislation, and media attention. However, the key challenge in environmental monitoring within Smart Cities lies in bridging the gap between data collection and turning those measurements into actionable insights.

Environmental monitoring technologies include: continuous monitoring, high-frequency observations, data harmonisation across sampling devices, low-cost and low-power hardware, wireless networking capabilities, data visualisation and content-management platforms, standardised interfaces, the application of new battery and renewable energy technologies, the deployment of "off-the-shelf" multi-modal sensing devices.[4]

Cybersecurity

With digitalisation *cybersecurity* has become a concern, particularly for energy infrastructure like power grids. Effective measures, such as threat assessments, real-time monitoring, and AI-driven security frameworks, are crucial to protect against cyber-attacks and ensure system stability. Between 2021 and 2027, the EU aims to invest up to €4.5 billion in cybersecurity through programs like Horizon Europe and the EU Recovery and Resilience Facility. Industrial companies, such as Accenture, IBM, and General Electric, play a key role in providing technical solutions to meet EU cybersecurity standards.

Examples of relevant EU committees and other organisations	ENISA, EE-ISAC, ERNCIP, the European Network of Transmission System Operators for Electricity (ENTSO-E), the European Network of Transmission System Operators for Gas (ENTSOG), the European Cybersecurity Organization (ECSO), CCE, the Union of the Electricity Industry (Eurelectric)
Examples of market players	Accenture, IBM Corporation, General Electric, Vestas, Mitsubishi Power, Hitachi Energy Ltd, Nordex, Ansaldo Energia, Baker Hughes, and Elliot Ebara, DNV

Use cases

Cyber security for energy devices connected to internet
The digitalization of the electricity system, driven by connected devices like solar cells, electric cars, and heat pumps, enhances energy balance but also exposes the system to cyber threats. While energy companies have cybersecurity measures in place, individual users often

[4] https://www.mdpi.com/1424-8220/20/11/3113

lack the necessary protections, making the entire system vulnerable to coordinated attacks. Research by RISE[5] shows that connected heat pumps in Sweden could cause significant disruption in a synchronized cyber attack. To safeguard the system, stronger cybersecurity practices are needed, including regular updates, secure passwords, and user education. A coordinated approach involving authorities, suppliers, installers, and users is essential to mitigate these risks.[6]

Dynamic rating of transformers

In Denmark's Triangle Area, TREFOR's[7] DSO grid uses IoT sensors to monitor power quality and temperatures of 0.4/10 kV transformers every second. AI techniques, like time-series analysis, predict transformer temperatures 24 hours in advance, enabling DSOs to operate transformers above rated capacity without overheating.
The project demonstrates the importance of collaboration between companies to create digital services. It also ensures GDPR compliance through data anonymization. The system integrates IoT, data hosting, and AI to optimize grid management and enable more efficient operations.[8]

Temperature optimization of district heating centrals

In the Heatman project[9], district heating providers like TREFOR, Brønderslev, and Fredericia integrated AI-based forecasting into their SCADA systems. Using consumption data, AI optimizes temperature and pressure set points in the grid, reducing heat losses and improving efficiency. Machine learning and time-series analysis help fine-tune the system, addressing bottlenecks and lowering costs.
The project also developed a shared infrastructure that allows multiple AI solution providers to connect with SCADA systems, fostering innovation and competition to benefit utility companies.

Intelligent heat pump control

In the Flexible Energy Denmark project[10], Neogrid Technologies ran a Living Lab in Aalborg, using AI to optimize residential heat pump operations for comfort and cost savings. By analyzing consumption data with time-series and reinforcement learning, the AI system adjusted indoor temperatures to optimize heat pump efficiency based on market electricity prices. Neogrid also aggregated data from multiple households to operate virtual power plants in the electricity market.
For the CitCom.ai project, this approach offers inspiration for a unified platform that allows multiple AI solutions to be tested, enabling providers like Neogrid Technologies or Danfoss LeanHeat to focus solely on AI services.

[5] https://www.ri.se/sv/centrum-for-cybersakerhet/var-forskning/rise-video-cybersakerhet-i-framtidens-energisystem
[6] ttps://www.ri.se/sites/default/files/2023-04/CfCs_Rapport_Cyberhot-mot-elsystemet.pdf
[7] https://www.flexibleenergydenmark.com/media/noabpi2t/trefor.pdf
[8] https://www.digitalenergyhub.com/en/sprints/sprint-1/
[9] https://heatman.dk/
[10] https://www.flexibleenergydenmark.com/

Load profiling in the DSO-grid for future tariffs
In the EnergyLab Nordhavn[11] project, large-scale consumption data from the Radius-Cerius utility in Copenhagen was analyzed using load profiling and clustering techniques to identify demand patterns in the DSO grid. This analysis provided valuable insights into peak loads and customer behavior, enabling the utility to refine tariff structures based on customer groups and time-of-use. The project highlights the potential of using data-driven approaches not only for forecasting but also for developing more accurate tariffs that encourage flexible energy usage, optimizing grid performance and cost reductions.

Predictive and preventive maintenance for large-scale heat pumps
In the SVAF project[12], a hybrid heat pump was integrated into Greater Copenhagen's district heating, using seawater and sewage water. This system faces challenges with heat exchanger contamination from sewage, reducing efficiency. To solve this, a Digital Twin with anomaly detection was created, learning normal conditions to identify when cleaning is needed. Developed by the Technological Institute for HOFOR, the tool aids in better maintenance and operation. The project highlights the potential of Digital Twins for predictive maintenance and optimization of distributed energy resources.

Move

Mobility sector with services for solutions in (but not limited to) **urban mobility algorithms and smart intersections, electromobility and autonomous driving**.

The MOVE supernode is designed to advance transportation systems, emphasizing logistics and mobility in urban areas. It integrates principles of sustainability, quality of life, safety, security, accessibility, and climate impact reduction, including mitigating CO2 emissions. Recognizing cities as dynamic ecosystems where physical, socio-cultural, and technological infrastructures shape daily life, MOVE underscores the transformative potential of well-managed urban mobility to enhance socio-economic and cultural vitality[13].

Urban Mobility

Since traditional urban planning is challenged by the complexity of (over)populated and interconnected cities, it can use AI and IoT technologies like real-time data collection and analysis, optimizing infrastructure, enhancing safety, and improving efficiency. For instance, smart intersections powered by AI adapt traffic signals to real-time conditions, reducing congestion and improving road safety. Intelligent systems provide drivers and passengers with

[11] http://www.energylabnordhavn.com/uploads/3/9/5/5/39555879/d.6.1.2b_v2.pdf
[12] https://www.hofor.dk/baeredygtige-byer/udviklingsprojekter/fremsynet-fjernvarme/store-varmepumper-fjernvarm e/
[13] https://doi.org/10.1007/s00146-022-01502-2

real-time updates on traffic and road conditions, enabling informed decision-making and efficient travel.

While urban mobility faces challenges such as data privacy, security, bias[14], lack of computing capacity[15] and the need for standardization, it also presents a variety of benefits. Solutions within 'AI-powered Mobility Assistance' include a hybrid of automated and assisted driving, AI-powered traffic management systems, and intelligent video analytics. These systems will provide real-time communication and coordination between vehicles and urban infrastructure, assisting drivers, identifying traffic bottlenecks and inefficiencies, and optimising traffic flow to reduce delays[16][17][18].

Electromobility

With road transport accounting for 25% of the EU's greenhouse gas emissions, the electrification of vehicles is a key strategy to meet European targets, including a 55% reduction in CO2 emissions from new cars by 2030 and zero emissions by 2035. Electromobility encompasses a transport system powered by electricity, including battery electric vehicles (BEVs) and plug-in hybrids, which rely on either external grid-supplied energy or self-generated electricity. While challenges persist, such as high initial costs, grid capacity limitations, and the deployment of charging infrastructure, advancements in AI and smart grid technologies are creating opportunities to optimize energy use, manage demand, and integrate vehicle-to-grid solutions. For example while the high upfront cost of electric vehicles (EVs) is generally more expensive than internal combustion engine vehicles. However, the Total Cost of Ownership (TCO), including fuel and maintenance savings, often offsets this within five years[19]. To address the cost gap, countries like Germany offer subsidies of up to €9,000 for EVs under €40,000[20], while Norway provides tax exemptions. Other nations, including France, the UK, Spain, and Italy, also incentivize EV purchases. Manufacturers are responding by planning more affordable models priced below €25,000.

Automated driving

Automated driving is powered by advancements in Connected and Automated Mobility technologies. Automated vehicles are classified by the SAE J3016[21] standard into six levels, ranging from Level 0 (no automation) to Level 5 (full autonomy in all conditions). These levels help define the capabilities and limitations of automated driving systems, providing a framework for understanding their development stages. The evolution of digital technologies, such as AI, IoT, and advanced sensors, underpins this development, enabling real-time data collection, processing, and decision-making. Automated vehicles promise significant benefits, including improved road safety, optimised traffic flow, and enhanced fuel efficiency. However, achieving

---

[14] https://link.springer.com/article/10.1007/s43681-022-00138-8

[15] https://link.springer.com/chapter/10.1007/978-981-15-8983-6_41

[16] https://vinotion.com/vidigest/how-intelligent-video-analytics-can-help-solve-some-of-the-worlds-biggest-urban-mobility-challenges/

[17] https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0140589

[18] https://www.rst.software/blog/9-use-cases-of-ai-in-urban-mobility-that-can-power-smart-cities

[19] https://doi.org/10.1016/j.enpol.2021.112564

[20] https://alternative-fuels-observatory.ec.europa.eu/transport-mode/road/germany/incentives-legislations

[21] https://www.sae.org/news/2019/01/sae-updates-j3016-automated-driving-graphic#:~:text=The%20J3016%20standard%20defines%20six,%2Dvehicle%20(AV)%20capabilities.

high-level automation requires overcoming challenges like sensor accuracy, cybersecurity threats, regulatory updates[22], and public acceptance. Collaboration between car manufacturers, technology providers, and infrastructure stakeholders is essential, as is the modernisation of road infrastructure to support vehicle-to-infrastructure communication.[23]

Use cases

Automated parking control system[24]
Amsterdam's automated parking control system uses AI-equipped “scan cars” with video cameras to scan license plates and verify permits through the National Parking Register, ensuring compliance with parking regulations across 150,000 city spaces. Cases without valid permits are flagged for human inspectors, who verify errors or special situations, combining automation with human oversight. While effective, the system raises concerns about privacy, misidentification, and neighborhood profiling, as cameras may capture sensitive data about individuals and properties. To address these risks, the city focuses on transparency, accountability, and mechanisms for citizen recourse to ensure responsible and trustworthy operations.

SAM project[25]
The SAM project is a large-scale French initiative to develop and test autonomous vehicles (AVs), involving over €100 million, nearly 50 vehicles, and 11 regions. It explores six use cases: autonomous driving, valet parking, passenger car services, shared mobility, public transport, and last-mile delivery. The project evaluates safety, operational domains, user and road user acceptance, behavior, environmental impacts, traffic integration, service performance, and societal and economic effects. It aims to assess how AVs interact with traffic, influence demand, impact safety, and operate under varying conditions, ultimately shaping France's AV deployment strategy at local and national levels.

Local Digital Twins for energy
This use case develops an interactive tool for city managers to plan charger locations, forecast energy demand, and balance it with photovoltaic investments. By integrating mobility, building, weather, and energy data, the tool models demand and supply, helping cities evaluate energy balance scenarios.

Vehicle-Integrated photovoltaic
This project supports transportation agencies in electrifying bus fleets by looking at for instance battery range variability caused by driver behavior, driving conditions, and weather. It

[22] https://www.lawcom.gov.uk/document/automated-vehicles-final-report/

[23] https://www.acea.auto/files/ACEA_Position_Paper-European_Transport_Policy_after_2020.pdf

[24] https://algoritmeregister.amsterdam.nl/en/automated-parking-control/

[25] https://www.sam-evra.fr

incorporates Vehicle Integrated Photovoltaic Technologies (ViPV) to provide additional energy and reduce variability. This tool can then assess the benefits of photovoltaic investments and their effects on bus operations, using transit data and solar irradiation models to deliver a visual, comprehensive analysis for planning electrification strategies.

Battery-enabled EV chargers assessment

This initiative is an assessment service to evaluate the performance of EV chargers under real-world conditions. Using controlled environments, modeled distribution networks, and Hardware-in-the-Loop infrastructure, it generates high-resolution time series data to analyze charger performance. Models detect anomalies and specific situations, offering insights to cities, communities, and charging point operators for effective EV charging infrastructure deployment.

Optimization of EV charging networks

This initiative focuses on optimizing charger occupancy to support cities, communities, and CPOs in planning effective electromobility investments. By analyzing data from existing charging transactions, it identifies factors influencing occupancy and translates this insight to predict charger usage accurately. A tool can provide an interactive interface for stakeholders to evaluate expected occupancy at specific locations, incorporating metadata and contextual factors like parking patterns, map layers, and weather data. This helps stakeholders make informed decisions about charger deployment while considering various constraints.

EV-related emissions

This project addresses the carbon footprint of electric vehicles (xEVs) by providing tools for drivers and fleet managers to monitor and manage emissions. While xEVs emit no tailpipe emissions, their overall carbon impact depends on manufacturing processes and the electricity source for charging. By analyzing energy generation data and charging transactions, the tool quantifies emissions for each trip and offers recommendations to adjust charging behaviors, helping users minimize their environmental impact.

Connect

Connectivity sector with services for solutions in (but not limited to) **pollution, greenhouse gas emissions and noise management; urban development management; water and wastewater management; integrated facility management; drone delivery management; and tourism management.**

The CONNECT supernode focuses on securely integrating citizens, infrastructures, AI, and robotics services within cities and communities. By utilising digital technologies such as IoT, cloud computing, big data analytics, and AI, CONNECT aims to enhance quality of life, optimise

resource use, and promote environmental sustainability in urban areas. It fosters collaboration among diverse stakeholders and provides access to data and infrastructure for real-life AI experimentation, accelerating the digital transformation of cities and advancing the development of smarter, more sustainable communities.

Pollution, greenhouse gas emissions and noise management

Pollution, greenhouse gas emissions, and noise are critical environmental challenges that significantly impact human health and quality of life, particularly in urban areas. Air pollution is the largest environmental health risk in Europe, contributing to conditions such as asthma, heart disease, and stroke, and causing an estimated 238,000 premature deaths annually due to fine particulate matter. Noise pollution, recognised by the WHO as a severe health threat, is responsible for thousands of premature deaths and new cases of cardiovascular disease each year. Greenhouse gas emissions, including carbon dioxide, exacerbate climate change and further degrade air quality. AI offers transformative solutions, such as sensors and predictive models that monitor and forecast air and noise pollution, identify sources, and provide actionable insights for data-driven policies. These technologies also enhance public awareness through real-time information, while innovations like noise cancellation and traffic flow optimisation help mitigate urban pollution and improve living conditions. For instance, AI-powered acoustic sensors can detect noise sources and enforce regulations, and noise cancellation technologies can actively reduce unwanted sounds. Additionally, AI can also assist in tracking emissions, supporting regulatory compliance, and promoting accountability in reducing carbon footprints.

Urban development management

Urban development management involves planning, designing, implementing, and evaluating projects and policies to improve the quality of life, sustainability, and resilience of urban areas. It addresses key sources of urban emissions, such as transportation, energy consumption in buildings, electricity generation, and waste management, with a focus on achieving climate neutrality. Examples of the integration of AI in urban development are predictive energy demand analysis, optimisation of renewable energy generation, and energy-efficient building refurbishment. By leveraging spatial big data and advanced analytics, AI also supports sustainable building management, urban planning, and mobility solutions. Beyond sustainability, AI technologies are being used to enhance public safety through predictive policing, emergency response optimisation, and surveillance analytics, making cities safer and more secure. However, AI systems face challenges in predicting citizen behaviour related to energy consumption and mobility. Enhancing digital literacy is crucial for fostering citizen participation in smart city initiatives and ensuring inclusive, human-centric decision-making. Despite challenges[26] like data integration, digital infrastructure requirements, and limited citizen engagement, AI-driven urban development enables more efficient resource use, informed policy assessment, and enhanced living conditions.

Water and wastewater management

Water and wastewater management is focused on the sustainable use, treatment, and distribution of water resources within urban and community settings. It addresses critical

[26] https://www.europarl.europa.eu/RegData/etudes/STUD/2021/690882/IPOL_STU(2021)690882_EN.pdf

challenges such as water scarcity, wastewater treatment, and sustainable water management, which are particularly pressing in many Southern EU regions. With ambitious sustainability goals outlined in the EU Green Deal, water management must integrate innovative solutions to optimise infrastructure and resource utilisation while maintaining environmental sustainability. AI technologies enable real-time monitoring, predictive analysis, and rapid response mechanisms to critical situations. Examples include real-time detection of pipe bursts in water distribution networks, automated asset condition assessment using AI and computer vision, predictive wastewater treatment plant control, smart alarms for proactive wastewater network management, real-time forecasting of sea currents, Bayesian networks for proactive asset management, and computer vision for opportunistic rainfall monitoring[27]. These advancements not only improve operational efficiency but also support behavioural change campaigns promoting responsible water usage and enhance recycling processes. Still, many communities are unfamiliar with the potential of AI in water management, necessitating focused efforts to educate stakeholders about its applications. This is especially important because each community has unique water management challenges, requiring tailored AI solutions that align with specific local conditions, regulatory frameworks, and infrastructure capabilities.

Integrated facility management (IFM)

IFM is a holistic approach to managing organisational systems and processes through a single technology-driven platform, often outsourced to a comprehensive service provider[28]. By consolidating services such as maintenance, safety, cleaning, and neighbourhood mobility under one contract, IFM streamlines operations, reduces costs, and enhances communication and collaboration. It introduces a performance-based control system where service quality is measured against agreed-upon indicators rather than prescriptive instructions. The integration of AI within IFM enables innovative solutions like smart contracts, which allow users to pay based on service usage, and automates high-risk and manual tasks to minimise errors and improve efficiency. Despite challenges like fragmented data ownership and siloed operations across stakeholders[29], IFM, supported by AI, is transforming neighbourhood management by fostering agility, leveraging actionable insights, and ultimately improving the quality of life for urban residents.

Drone delivery management

Delivery management by drones leverages AI to optimise flight paths and coordinate operations across multiple drones. However, the implementation of such systems faces significant regulatory challenges, as obtaining permissions from national aviation authorities can be a lengthy and complex process. For instance, in Italy, authorisation for a single day of drone flights can take over six months to secure, alongside extensive paperwork, and as such drone delivery remains in a testing phase[30]. Despite these challenges, the potential of drone-based delivery systems remains promising, with plans to revisit their feasibility as regulatory conditions evolve.

---

[27] https://iwa-network.org/wp-content/uploads/2020/08/IWA_2020_Artificial_Intelligence_SCREEN.pdf

[28] https://www.enternest.com/blog/what-is-integrated-facilities-management

[29] https://re.public.polimi.it/handle/11311/1034387

[30] https://www.unmannedairspace.info/latest-news-and-information/drone-delivery-trial-underway-in-italy/#:~:text=Italian%20regulator%20ENAC%20granted%20the,on%20the%20island%20of%20Procida.

Tourism management

Tourism management is an economic driver in the EU, contributing to GDP and employment, particularly in Southern European countries. As tourism evolves, the concept of Smart Tourism, derived from Smart City initiatives, integrates advanced technologies like AI to optimise resources, ensure sustainability, and enhance governance. The sector faces challenges such as managing large volumes of diverse and fragmented data, addressing digital literacy gaps among certain demographics like elderly tourists, and ensuring privacy and ethical considerations in AI implementation. Innovations like facial recognition systems for streamlined travel, data-driven dashboards for personalised visitor experiences, and AI algorithms for sustainable tourism strategies highlight the transformative potential of digital solutions. By leveraging AI, tourism management can offer tailored experiences to visitors, optimise resource use, and promote sustainability while addressing the pressing challenges of digital transformation and environmental impact. Advanced systems like Aruba Happy Flow[31] demonstrate how AI can streamline and secure the travel process using facial recognition, with strong privacy safeguards adhering to GDPR principles. Similarly, MyHelsinki Open API[32] and HERIT-DATA[33] show the importance of open, accessible data for managing tourism flows and improving heritage site sustainability

Use cases

AI to drive the benefits of green infrastructure in society
The NINFA[34] project by Green Urban Data provides an innovative tool that identifies tree species using high-resolution satellite imagery. In the Mediterranean basin pilot project, the tool utilized deep learning-based image segmentation to automatically identify key tree taxa and evaluate green infrastructure ecosystem services. This approach addresses limitations of traditional methods, such as incomplete access to urban forest inventories and the high cost and effort of manual data collection and analysis.

Brain4it[35]
Brain4it is an open-source platform designed for developing AI applications for the Internet of Things (IoT), enabling intelligent and automated management of city sensors and actuators. Developed by the City Council with staff participation, it supports interoperability with other software and integrates with municipal and public management systems. Operating as an AIaaS when deployed in the cloud, Brain4it adapts to dynamic environments and communicates with devices and platforms using protocols like HTTP, MQTT, and XMPP. It includes tools for natural language processing, computer vision, and predictive analytics, with

[31] https://www.icao.int/Meetings/TRIP-Symposium-2018/Documents/STEENBERGEN.pdf
[32] https://www.hel.fi/static/kanslia/elo/4-jenny-taipale-myhelsinki-open-api.pdf
[33] https://herit-data.interreg-med.eu/
[34] https://greenurbandata.com/2023/02/06/ninfa-ia/
[35] http://brain4it.org/

real-time monitoring through dashboards. Its versatility has proven valuable in smart cities, robotics, domotics, IT management, and other domains.

Connecta València[36]: Smart and sustainable tourism territory (2021)

The Valencian province implemented intelligent systems across more than 200 municipalities to enhance the tourist experience while collecting valuable data on tourism, mobility, and carbon emissions. Specifically, it integrates public transport systems and focuses on reusing existing tourist information, gathering new data through smart devices, and improving the management of tourism, mobility, and environmental impact. The provincial data network analyses tourism's impact, offering insights into visitor behaviour and mobility to create sustainable, demand-driven experiences. It also ensures transparent, universal access to public data, fostering industry growth, entrepreneurship, and administrative interoperability. The project uses sensors, antennas, meteorological stations, and software tools to collect and manage this data effectively.

AI4water[37]

The AI4WATER project aims to optimize water resource use, address agricultural water scarcity, and enhance food security through a DT implemented in an irrigation sector in Lleida, Spain. This DT simulates and analyses water flows and crop growth, enabling better planning and improved agricultural sustainability while maximizing yields. It incorporates data on water usage (human, industrial, and agricultural), environmental water flows, and variables like temperature, humidity, solar radiation, evapotranspiration, and soil moisture to provide a comprehensive model of the water balance in the area.

The Water Innovation Network (WIN)[38]

WIN is a collaborative network of organizations, including water utilities, research institutions, and technology providers, dedicated to driving innovation in the water sector. By fostering knowledge exchange and collaboration in areas such as AI and water management, WIN enables innovators to stay informed about industry trends, case studies, and events, supporting advancements in water-related technologies and practices.

Development of a prediction model for the COVID-19

This is a prediction model for the spread of the COVID-19 pandemic (both temporally and spatially) that leverages AI tools and multi-agent modelling. This system represents residents as digital "agents" who navigate spaces based on real-world behaviours, such as living, working, and resting. The spread of illness is influenced by interactions among these agents, with the model incorporating variables like mask-wearing, social distancing, and remote activities. Calibrated using real-world data, this versatile model can simulate the dynamics of

[36] https://www.cellnex.com/pt-pt/trends/smart-sustainable-tourism/
[37] https://agrotech.upc.edu/ca/shared/esdeveniments-1/poster_albacete_ai4water_final-1.pdf
[38] https://waterfriendlyfarming.com/win-project/

viral or bacterial pandemics in various contexts.

Air quality monitoring system using IoT sensors and LoRa system
The municipality of Zuromin uses proprietary WUT sensors to collect data on air pollutants and environmental conditions. These sensors collect diverse data, including methane compounds, sulfur, ammonia, temperature, soil conditions, and wind direction. An AI-based computing system processes this data to analyse and interpolate the spatial distribution of air pollutants. The system, developed under the Human Smart City program[39], demonstrates versatility and can be applied to monitor air quality in any location.

Video surveillance system with proprietary AI tools enabling edge computing
An advanced video surveillance system was developed for the WUT main campus, integrating standard CCTV cameras with proprietary AI tools and edge computing for near real-time image processing. This system improves the quality of surveillance and thereby supports campus security, campus revitalization and space planning efforts.

[39] https://www.popt.gov.pl/en/site/learn-more-about-the-programme/search-through-the-projects/human-smart-cities-projects/

European AI Landscape in Smart Cities and Communities

European Legislation

The European Commission's (EC) "A Europe Fit for the Digital Age" strategy, as one of six priorities identified in the Commission's work programme, provides the overall framework for the European Union's (EU) efforts relating to Europe's digital transformation[40]. Flowing from this strategy, the "Shaping Europe's Digital Future" plan lists three priority areas for action throughout the 2020-2025 timeframe, as detailed in the EC's official 2020 communication[41]. These areas are: "Technology that works for people," "A fair and competitive digital economy," and "An open, democratic and sustainable society"[42]. To help realise these broad EU digital policy objectives and ambitions, the Digital Europe Programme (DIGITAL) (2021-2027) was established to provide the necessary financing[43] . Specifically, strategic funding of 7.5 billion euros is to target "five key capacity areas: Supercomputing, AI, cybersecurity, advanced digital skills, and ensuring a wide use of digital technologies across the economy and society"[44]. Together, the described strategy, plan, activities, and funds, also support the EU's vision for smart and sustainable cities and communities[454647]. The EU's Smart Cities Strategy, Urban Agenda, Research & Innovation initiatives, and Horizon Europe's Smart and Climate-Neutral Cities mission programme use digital technologies and data to improve resource efficiency, reduce environmental impact, and solve urban challenges for higher living standards in human-centric smart cities and communities. As such, the smart and sustainable cities and communities vision combines human-centricity, sustainability, digital transformation, and green growth objectives.

In line with the EC's ambitions, CitCom.ai TEF was launched to enable the transition toward smart and sustainable cities and communities by supporting the creation of accessible data platforms[48] and providing widespread testing and experimentation of needs-driven smart city solutions. By actively engaging SMEs and startups, the TEF ensures a competitive and inclusive market for innovation. To further advance the EU's goals, the TEF emphasizes the importance of networking, information sharing, and policy coordination, enabling the replication and scaling of successful solutions across Europe.

What follows is a schematic overview of the legislative context into which the CitCom.ai TEF is introduced. For the purposes of this report, European Commission legislative initiatives were

[40] https://eur-lex.europa.eu/resource.html?uri=cellar%3Af1ebd6bf-a0d3-11ea-9d2d-01aa75ed71a1.0006.02/DOC_2&fo rmat=PDF
[41] https://www.europarl.europa.eu/legislative-train/theme-a-europe-fit-for-the-digital-age/file-digital-age-strategy
[42] https://commission.europa.eu/system/files/2020-02/communication-shaping-europes-digital-future-feb2020_en_4.pdf
[43] https://digital-strategy.ec.europa.eu/en/activities/digital-programme
[44] https://digital-strategy.ec.europa.eu/en/activities/digital-programme
[45] https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/hor izon-europe/eu-missions-horizon-europe/climate-neutral-and-smart-cities_en
[46] https://www.eumonitor.eu/9353000/1/j4nvirkkkr58fyw_j9vvik7m1c3gyxp/vjlp5mcvyjzp
[47] https://ec.europa.eu/regional_policy/sources/policy/themes/urban-development/agenda/pact-of-amsterdam.pdf
[48] https://digital-strategy.ec.europa.eu/en/policies/smart-cities-and-communities

clustered into six general themes: Data, Platforms, AI, Identity and access, Privacy and security, Interoperability.

Data	
● Establish human-centric and fundamental rights-based EU data economy ● Improve data access to drive innovation	
Data Governance Act[49] 2022	● Establish EU data sharing/governance rules to move towards data spaces ● Build trust for data sharing through ● e.g. data intermediaries ● Set up European Data Innovation Board
Data Act[50] 2023	● Facilitate data access between businesses, government, and individuals ● Increase public sector data openness ● Reduce data lock-in effects and unfair data sharing practises
Open Data Directive[51] 2019	● Mandate public sector data availability as open as possible by default ● Establish harmonised standards for making public sector data available

Platforms	
● Ensure accountability and safety of online services ● Promote fair competition and transparency	
Digital Services Act[52] 2022	● Increase accountability of very large online platforms ● Introduce oversight mechanisms to mitigate risks ● Harmonise rules across EU digital single market
Digital Markets Act[53] 2022	● Set requirements for/ prevent market abuse by large "gatekeeper" platforms ● Maintain competitive and innovative digital market

AI	
● Lead the way in development of human-centric and sustainable AI ● Risk-based regulatory framework to safeguard Union values and trust	
Artificial Intelligence	● Establish risk-based regulatory framework

[49] https://eur-lex.europa.eu/eli/reg/2022/868/oj
[50] https://eur-lex.europa.eu/eli/reg/2023/2854
[51] https://eur-lex.europa.eu/EN/legal-content/summary/open-data-and-the-reuse-of-public-sector-information.html
[52] https://eur-lex.europa.eu/eli/reg/2022/2065/oj
[53] https://eur-lex.europa.eu/eli/reg/2022/1925/oj

Act[54] (2024)	• Ban certain AI systems • Set up conformity assessments, registration, transparency and oversight mechanisms
AI Liability Directive[55] (Proposed)	• Establish EU-wide uniformity in minimum civil law AI-liability rules • Facilitate court-ordered access to AI documentation • Mandate conditional reversal burden of proof for fault
Ethics Guidelines for Trustworthy AI[56] 2019 (Non-binding)	• Issued by the European Commission's High-Level Expert Group on AI. • Framework for AI developers to create systems that are lawful, ethical, and robust.

Identity and access	
• Establish secure and user-friendly digital IDs for EU citizens/businesses in line with fundamental rights • Promote adoption of digital ID solutions	
Single Digital Gateway Regulation[57] 2018	• Centralised EU gateway for information and services • Multilingual interface • Interoperability between national systems • eIDAS integration for electronic identification • Cross-border accessibility
eIDAS2 Proposal[58] 2024	• Expand eIDAS-scope to more trust services • Enhance cross-border interoperability • Introduce digital identity wallets and European Digital Identity concepts • Emphasise security, privacy, consent

Privacy and security	
• Adopt human-centric, fundamental rights-based approach to technology • Ensure secure, safe, and trustworthy environment enabling innovation	
General Data Protection Regulation[59] 2016	• Establish robust, uniform EU data protection standards • Promote accountability and individual data subject rights • Encourage privacy-centric innovation
ePrivacy Regulation	• Harmonise communications sector (and OTT) rules across EU

[54] https://eur-lex.europa.eu/eli/reg/2024/1689/oj
[55] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52022PC0496
[56] https://op.europa.eu/en/publication-detail/-/publication/d3988569-0434-11ea-8c1f-01aa75ed71a1
[57] https://eur-lex.europa.eu/eli/reg/2018/1724/oj
[58] https://eur-lex.europa.eu/eli/reg/2024/1183/oj
[59] https://eur-lex.europa.eu/eli/reg/2016/679/oj

Proposal[60] TBD	• Emphasise user consent over data
Cybersecurity Act[61] 2019	• Establish EU cybersecurity certification framework • Enhance ENISA's role to develop harmonised certification schemes • Enhance cyber incident response
NIS2 Directive[62] 2023	• Expand security requirements to more sectors • Improve incident reporting obligations • Promote cyber certification adoption

Interoperability	
• Guide implementation of interoperable digital public services • Move from guidance to obligation	
European Interoperability Framework (EIF)[63] NA	• Provides 47 recommendations for interoperable digital public services • Outlines 4 layers of interoperability: legal, organisational, semantic, and technical
European Interoperability Framework for Smart Cities and Communities NA[64]	• Focuses on interoperability needs for smart cities • Cultural, legal, technical, semantic, and organisational interoperability layers • Recommends 30 actions to actualize the EU smart city potential
Interoperable Europe Act[65] 2024	• Mandates use of common standards and frameworks • Requires national interoperability frameworks • Establishes interoperability observatory and enforcement

European AI Standards

To support the AI Act, the European Commission has requested the development of AI standards to create a level playing field for AI-driven solutions, particularly for small and medium-sized enterprises (SMEs), while safeguarding fundamental rights. These standards will focus on high-risk AI systems, excluding obligations for general-purpose AI models as defined in the Regulation. Designed to cover the entire lifecycle of AI systems, from inception to post-market monitoring, the standards will be complementary and include horizontal requirements supported by guidance for application in operational environments. They aim to provide explicit, actionable requirements without unnecessary complexity, addressing ten key areas: risk management, data governance and quality, record-keeping, transparency, human

[60] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52017PC0010
[61] https://eur-lex.europa.eu/eli/reg/2019/881/oj
[62] https://eur-lex.europa.eu/eli/dir/2022/2555/oj
[63] https://eur-lex.europa.eu/resource.html?uri=cellar:2c2f2554-0faf-11e7-8a35-01aa75ed71a1.0017.02/DOC_1&format=PDF
[64] https://commission.europa.eu/system/files/2022-11/other_staff_working_paper_en_v2_p1_2249550.pdf
[65] https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX:32024R0903

oversight, accuracy, robustness, cybersecurity, quality management, and conformity assessment.
To ensure adequate preparation time for providers of high-risk AI systems, these standardization deliverables are expected to be finalized and published in the EU Journal well before August 2026, when the obligations under the AI Act come into effect. The main committee responsible for developing these standards is the Joint Technical Committee (JTC) 21 of CEN-CENELEC. The European Commission, in collaboration with the AI Office and Joint Research Centre, is actively supporting this standardization process to ensure its timely and effective implementation.[66]

Funding

AI is set to significantly reshape the global economy, with forecasts predicting a contribution of over €11 trillion by 2030. AI and robotics are also expected to create approximately 60 million new jobs globally by 2025, highlighting their critical role in driving innovation and economic growth[67]. In this context, investment in AI has become a priority for both public and private sectors. Between 2018 and the third quarter of 2023, private AI investments in EU companies totalled nearly €32.5 billion, including €9 billion in 2023 from the EU and the UK. However, this amount is modest compared to the over €120 billion invested in US AI companies during the same period. High-profile investments in US firms like OpenAI and Anthropic have further widened the gap between the EU and the US in private AI funding.
Despite these challenges, Europe has made notable progress in public investment. The EU's Digital Europe programme has allocated €2.1 billion for AI between 2021 and 2027[68]. This progress comes against the backdrop of a global slowdown in AI investment and a decline in the creation of AI unicorns in 2023 and 2024[69]. The Brussels-based think tank Bruegel has raised concerns about the sustainability of current AI model cost trends, warning that without a 3% annual productivity growth across advanced economies, the trajectory of these costs could become unsustainable by 2030[70].

Overview of European Funding Initiatives

The European Union has set ambitious goals for 2030, aiming for 90% of small and medium-sized enterprises (SMEs) to reach at least a basic level of digital intensity and for 75% of EU companies to adopt advanced technologies like AI, cloud computing, and big data. To support these objectives, the EU has committed €4.376 billion from the Next Generation EU Recovery and Resilience Facility (NGEU RRF) specifically to AI projects, with 70% of total funding directed toward broader digital transformation efforts. This section outlines key financing programmes within the EU that aim to enhance digital transformation, sustainability, and

[66] https://publications.jrc.ec.europa.eu/repository/handle/JRC139430
[67] https://www.euronews.com/business/2024/04/29/who-in-europe-is-investing-the-most-in-artificial-intelligence
[68] https://www.europarl.europa.eu/RegData/etudes/ATAG/2024/760392/EPRS_ATA(2024)760392_EN.pdf
[69] https://www.startupblink.com/ Global Startup Ecosystem Index Report 2024
[70] https://www.euronews.com/business/2024/11/21/germany-rises-as-france-falls-in-the-global-ranking-for-ai-startups#:~:text=The%20best%20European%20country%20for,map%20and%20research%20centre%20StartupBlink.

competitiveness across European cities, regions, and economies. These programmes focus on four main themes: the development of smart cities and communities, the advancement of AI, the expansion of digital infrastructure and platforms, and the promotion of SMEs. Despite these efforts, Europe's progress in AI adoption remains slower compared to global leaders, highlighting the need for more effective implementation and uptake.

Programme/Facility	**Size**	**Main Objectives related to Digital transformation**
The Digital Europe Programme (DIGITAL)	€7.6 billion	● Expedite digital transformation of Europe ● Promote development of AI, cybersecurity, and supercomputing ● Foster skills, and technology adoption ● Set up data spaces and network of European Digital Innovation Hubs (EDIHs)
Horizon Europe	€94.1 billion	● Strengthen EU technological and scientific foundation ● Fund AI research with €13.6 billion budget ● Establish European Innovation Council (EIC)
InvestEU	€26.2 billion (guarantee)	● Mobilise investments to improve EU competitiveness and digitization ● Support access to funding for SMEs and start-ups (like ESCALAR) ● InvestEU Advisory Hub and Port
Single Market Programme	€4.2 billion	● Improve internal market efficiency ● Strengthen digital single market and competitiveness
Connecting Europe Facility	€33.7 billion	● Promote trans-European networks in transport, energy and digital infrastructure ● Address infrastructural fragmentation and bottlenecks
European Regional Development Fund	€226 billion	● Enhance EU cohesion through funding ● Focus on infrastructure, accessibility, SME's, and networking and communication
Recovery and Resilience Facility	€312.5 billion (non-repayable) €360 billion (repayable)	● Response to COVID-19 pandemic ● Foster green and digital transitions of EU economies ● Allocate at least 20% of recovery plans to digital initiatives
Just Transition Mechanism	€17.5 billion	● Address socioeconomic consequences of achieving climate neutrality by 2050 ● Focus on disadvantaged communities and

		workers in carbon/fossil fuel-intensive sectors
Innovation Fund	ca. €40 billion (2020-2030)	• Implement novel low-carbon technologies and processes • Focus on energy-intensive sectors, carbon capture and storage technologies, renewable energy sources, and energy storage systems • Financed by EU ETS
LIFE programme	€5.4 billion	• Tackle environmental and climatic action concerns • Move towards “sustainable, circular, energy-efficient, renewable energy-based, climate-neutral and - resilient economy” • Priority for high-leverage impact and transferable and replicable project

Overview of European National Funding Initiatives

In 2022, the budgets allocated to ICT by cities and localities in Europe varied significantly, ranging from €10 to €106 per inhabitant annually, highlighting the diverse levels of digital investment across the continent[71]. European member states are responsible for driving AI innovation and uptake, though the EU supports these efforts through its competencies in industrial policy, research and technological development, and digital skills. However, the EU's efforts to coordinate national and Commission measures have faced challenges, including limited governance tools and outdated targets, which have slowed progress in some areas[72][73].
To ensure alignment with EU-wide digital targets, member states are required to adopt national roadmaps and provide investments in AI. The largest investments were announced in the French and German AI strategies. France adopted an AI strategy in 2018 outlining investment of €1.5 billion for 2018-2022, and updated it in 2021 with an additional €1.5 billion for 2022-2025. Germany initially earmarked €3 billion for 2019-2025, and increased the amount by €2 billion in 2020. However, in 2024 Euronews reported that Italy and Spain lead AI investments, accounting for 71% of the total AI-related funding under the NGEU, with €1.895 billion and €1.2 billion respectively. Denmark stands out in relative terms, dedicating 8.7% of its digital RRF budget to AI projects, followed by Spain at 6.4% and Ireland at 5.2% while some countries, including Sweden, the Netherlands, Belgium, and Austria, allocate less than 1% of their RRF budgets to AI[74]. National governments and the EU fund projects to drive specific activities, like AI. An example of this is Denmark’s AI initiative[75]: Since 2019, 15 AI projects are funded annually: 20 focus on regional health, and 20 on municipal services like administration, employment, and climate. Still, most remain unimplemented[76].

[71] https://mxi.nl/kennis/628/ict-kosten-gemeenten-stijgen-in-2022-met-10-euro-naar-106-euro-per-inwoner#:~:text=eu
[72] https://ai-watch.ec.europa.eu/publications/ai-watch-estimating-ai-investments-european-union_en
[73] https://ai-watch.ec.europa.eu/publications/ai-watch-european-landscape-use-artificial-intelligence-public-sector_en
[74] https://www.euronews.com/business/2024/04/29/who-in-europe-is-investing-the-most-in-artificial-intelligence
[75] https://en.digst.dk/digital-transformation/national-uptake-fund-for-new-technologies/
[76] https://digst.dk/media/28384/status-paa-signaturprojekterne-2022.pdf

EU Country	*Indicative findings on European Member States' AI Investments*
Austria[77][78][79][80][81]	Austria's AIM AT 2030 strategy outlines its commitment to advancing AI with a focus on human-centered, ethical, and sustainable development, aligning with European values. Significant progress has been made, with 82% of the 91 measures implemented or in progress as of 2024, supported by increased budgets under the Research, Technology, and Innovation Pact (2021–2023). Funding initiatives include AI for Green, the Data & AI Funding Program, and platforms like the AI Marketplace. Austria also emphasizes collaboration in European AI projects and integration with EU frameworks.
Belgium[82][83][84][85]	Belgium's National AI Strategy emphasizes ethical AI development, cybersecurity, and enhancing competitiveness through AI adoption. The Flemish Government's AI Action Plan allocates €32 million annually, with €15 million for company implementation, €12 million for basic research, and €5 million for training and outreach. The Walloon Region's DigitalWallonia4.ai program invests €18 million per year to accelerate AI adoption, including a €32 million research project running from 2021 to 2026. The Brussels-Capital Region has invested around €44 million in AI since 2017, supporting research and innovation through initiatives like Innoviris.
Bulgaria[86]	Bulgaria's Concept for the Development of Artificial Intelligence until 2030, adopted in 2020, outlines its strategic AI vision but does not specify exact funding amounts. Key initiatives include the establishment of INSAIT[87] in 2022, supported by the government and tech giants (like Amazon Web Services, Google, and DeepMind), and the GATE Institute[88], Bulgaria's first Centre of Excellence in Big Data and AI.
Cyprus[89] [90]	Cyprus's National Artificial Intelligence Strategy, approved in January 2020, emphasizes fostering AI through national funding programs, state incentives, and European funding sources like Horizon 2020. The strategy highlights the creation of a Centre of Excellence for applied AI research and the development of new financial support schemes. Additionally, Cyprus aims to cultivate a vibrant AI start-up ecosystem by establishing an AI accelerator program to support new business ventures. While specific funding amounts are not detailed, these initiatives underscore Cyprus's commitment to

77 https://www.digitalaustria.gv.at/eng/strategy/strategy-AI-AIM-AT-2030.html#:~:text=AIM%20AT%202030%20focuses%20on,essential%20principles%20for%20trustworthy%20AI%20.

78 https://www.bmk.gv.at/en/topics/innovation/publications/technology_reports.html

79 https://digital-strategy.ec.europa.eu/en/factpages/austria-2024-digital-decade-country-report

80 https://www.digitalaustria.gv.at/dam/jcr%3A9b934433-f8e7-452f-bc86-cea60b214839/BMF%20Nationaler%20Fahrplan%202023-final-28112023-barrierefrei_EN_Korr.pdf

81 https://oecd.ai/en/dashboards/countries/Austria

82 https://www.vlaanderen.be/digitaal-vlaanderen/vlaamse-digitale-strategie/vlaamse-ai-strategie

83 https://www.digitalwallonia.be/en/programs/digitalwallonia4-ai/

84 https://www.innoviris.brussels/regional-innovation-plan

85 https://oecd.ai/en/dashboards/countries/Belgium

86 https://ai-watch.ec.europa.eu/countries/bulgaria/bulgaria-ai-strategy-report_en

87 https://insait.ai/

88 https://gate-ai.eu/

89 https://ai-watch.ec.europa.eu/countries/cyprus/cyprus-ai-strategy-report_en

90 https://knowledge4policy.ec.europa.eu/sites/default/files/cyprus-ai-strategy-report.pdf

	advancing AI between 2020 and 2030.
Czech Republic[91][92][93]	The Czech Republic's National Artificial Intelligence Strategy 2030, approved in July 2024, emphasizes strengthening research infrastructure, supporting top scientists, and fostering international cooperation. While specific funding amounts are not detailed, the strategy outlines measures such as enhancing research capacities, providing grants, and involving Czech scientists in international projects. Additionally, the government plans to support the development of digital innovation hubs and streamline public administration services through AI integration.
Denmark[94][95]	Denmark's National Strategy for Artificial Intelligence (2019) focuses on ethical AI development, skill enhancement, and fostering innovation. Key initiatives include the Digital Research Centre Denmark, funded with DKK 100 million (EUR 13.4 million), and a pilot project by the Danish Growth Fund providing EUR 3.1 million to support AI-based businesses. Additionally, EUR 27 million has been allocated to advance AI adoption in the public sector, particularly in healthcare, administration, and the green transition.
Estonia[96][97][98]	Estonia has strategically increased its investment in artificial intelligence (AI) to enhance both public and private sector capabilities. The White Paper on Data and Artificial Intelligence 2024-2030 outlines a commitment of at least €85 million between 2024 and 2026 to integrate AI solutions across various sectors. Earlier, the national AI strategy for 2019-2021 allocated approximately €10 million, which was subsequently doubled to €20 million for the 2022-2023 period.
Finland[99][100][101]	While funding amounts are not detailed in Finland's 'Artificial Intelligence 4.0' Programme (initiated in 2020), the programme emphasizes investments in leading technologies, including AI, and the development of digital capabilities, particularly among SMEs. Additionally, the Finnish Centre for Artificial Intelligence received €8.3 million in flagship funding for 2019–2022.
France[102][103][104][105]	The France 2030 plan allocates nearly €2.5 billion to AI. This investment builds upon the initial National Strategy for AI launched in 2018, which was initially

[91] https://www.mpo.gov.cz/en/guidepost/for-the-media/press-releases/czechia-as-a-technological-leader--government-approved-the-national-strategy-for-artificial-intelligence-of-the-czech-republic-2030--282278/
[92] https://ec.europa.eu/futurium/en/system/files/ged/nais_eng_final.pdf
[93] https://www.mpo.gov.cz/en/business/digital-economy/artificial-intelligence/
[94] https://en.digst.dk/strategy/the-danish-national-strategy-for-artificial-intelligence/
[95] https://ai-watch.ec.europa.eu/countries/denmark/denmark-ai-strategy-report_en
[96] https://news.err.ee/1609250613/estonia-to-invest-85m-in-boosting-ai-uptake-across-public-private-sectors
[97] https://ai-watch.ec.europa.eu/countries/estonia/estonia-ai-strategy-report_en
[98] https://www.helsinki.fi/en/news/artificial-intelligence/significant-boost-ai-research-academy-finland
[99] https://tem.fi/en/artificial-intelligence-4.0-programme
[100] https://www.aka.fi/en/research-funding/programmes-and-other-funding-schemes/flagship-programme/fcai--finnish-centre-for-artificial-intelligence/
[101] https://valtioneuvosto.fi/en/-//1410877/artificial-intelligence-4.0-report-finland-has-the-opportunity-to-lead-the-way-in-the-ethical-digital-and-green-transitions
[102] https://knowledge4policy.ec.europa.eu/sites/default/files/france-ai-strategy-report.pdf
[103] https://world.businessfrance.fr/nordic/ai-race-how-france-is-positioning-itself-as-a-leader/
[104] https://ai-watch.ec.europa.eu/countries/france/france-ai-strategy-report_en
[105] https://www.aiforhumanity.fr/en/

	endowed with €1.5 billion for 2018–2022. The strategy focuses on enhancing research capabilities, supporting AI startups, and integrating AI across various sectors of the economy. Additionally, the establishment of nine AI clusters of excellence, supported with €360 million, underscores France's dedication to advancing AI research and training.
Germany[106][107]	Germany's National AI Strategy, launched in 2018 and updated in 2020, underscores the country's commitment to AI development. Initially, the strategy allocated €3 billion for AI initiatives up to 2025. In June 2020, the German government increased this investment by an additional €2 billion, bringing the total to €5 billion. These funds are directed towards enhancing AI research, supporting startups, and integrating AI across various sectors, with a focus on ethical and human-centered AI applications. The strategy also emphasizes the establishment of competence centers and the promotion of AI literacy among the workforce to ensure responsible AI development and deployment.
Greece[108][109][110]	As of October 2024, Greece is finalizing its National AI Strategy, with plans to present it in the coming weeks. Prime Minister Kyriakos Mitsotakis emphasized the country's commitment to digital transformation and AI integration, aiming to position Greece within the emerging AI ecosystem. While specific funding allocations for AI initiatives from 2020 to 2030 have not been publicly detailed, the forthcoming strategy is expected to outline investment plans to enhance AI research, innovation, and application across various sectors. As such, six flagship projects were proposed, including the creation of an AI center of excellence and the development of a central AI educational platform, aiming to improve public sector efficiency, upgrade education and healthcare, and strengthen national defense.
Hungary[111][112][113]	Hungary's National AI Strategy 2020–2030, adopted in September 2020, emphasizes the importance of national and European funding to support AI development. Key components include establishing the Artificial Intelligence National Laboratory (MILAB) to coordinate AI research and innovation, and creating the National Data Asset Agency to manage public data utilization. The strategy also focuses on fostering AI adoption in sectors like manufacturing, healthcare, agriculture, and public administration, and highlights the need for ethical guidelines and regulatory frameworks to ensure responsible AI deployment. The strategy does not specify exact funding amounts.
Ireland[114][115][116][117]	Ireland's National AI Strategy, titled "AI – Here for Good," (launched in July 2021) emphasizes a human-centric approach and aims to have 75% of Irish

[106] https://www.ki-strategie-deutschland.de/files/downloads/Fortschreibung_KI-Strategie_engl.pdf
[107] https://www.oecd.org/en/publications/oecd-artificial-intelligence-review-of-germany_609808d6-en.html
[108] https://www.iefimerida.gr/english/greece-soon-complete-its-ai-strategy-pm-mitsotakis-tells-eu-commissioner-ivanova
[109] https://www.ekathimerini.com/politics/foreign-policy/1251480/mitsotakis-optimistic-on-ai-growth-in-greece/
[110] https://en.prototothema.gr/2024/11/26/six-flagship-projects-for-artificial-intelligence-in-greece/
[111] https://ai-hungary.com/files/e8/dd/e8dd79bd380a40c9890dd2fb01dd771b.pdf
[112] https://oecd.ai/en/dashboards/countries/Hungary
[113] https://ai-watch.ec.europa.eu/countries/hungary/hungary-ai-strategy-report_en
[114] https://enterprise.gov.ie/en/publications/national-ai-strategy.html
[115] https://www.gov.ie/en/policy-information/0d46a-digital-transition-fund/
[116] https://enterprise.gov.ie/en/what-we-do/innovation-research-development/disruptive-technologies-innovation-fund/
[117] https://enterprise.gov.ie/en/publications/publication-files/progress-report-national-ai-strategy-ai-here-for-good.pdf

	businesses utilizing AI by 2030. To support this digital transformation, the government introduced the Digital Transition Fund, which allocates €85 million over five years (2022–2026) to assist enterprises in adopting digital technologies, including AI. Additionally, the Disruptive Technologies Innovation Fund provides €500 million over the same period to co-fund collaborative projects, many of which focus on AI and related technologies.
Italy[118][119][120]	Italy's National Strategic Programme on Artificial Intelligence (2022–2024) emphasizes strengthening AI skills, attracting talent, and fostering research and innovation. While specific funding amounts are not detailed in the strategy, significant investments are allocated through the National Recovery and Resilience Plan (NRRP). Mission 1 of the NRRP, titled "Digitalization, Innovation, Competitiveness, Culture," allocates €49.2 billion to promote the country's digital transformation, support innovation in the production system, and invest in key sectors such as tourism and culture.
Latvia[121][122][123][124][125]	Latvia's National AI Strategy, released in February 2020, estimates public investments of €25 million annually, with combined public and private sector investments totaling €74 million per year. hese funds are directed towards enhancing AI research, fostering innovation, and integrating AI solutions in public administration and industry. Additionally, Latvia's Digital Transformation Guidelines 2021–2027 support AI development through initiatives in digital skills, infrastructure, and data governance.
Lithuania[126][127][128]	Lithuania's AI Strategy 'A Vision of the Future' (April 2019),emphasizes the establishment of a national AI research center and the development of new funding programs to increase financial support for AI research, aiming to meet European Commission standards. However, it does not specify exact funding amounts. the ICT Sector Roadmap indicates that at least €261.7 million is expected to be allocated to the ICT sector, including AI and Big Data, between 2023 and 2030.
Luxembourg[129][130][131]	Luxembourg's 'Artificial Intelligence: a strategic vision for Luxembourg' (May, 2019) emphasizes human-centric AI, enhancing digital skills, and fostering research and innovation. While specific funding amounts are not detailed in the

[118] https://docs.italia.it/italia/mid/programma-strategico-nazionale-per-intelligenza-artificiale-en-docs/en/bozza/executive-summary.html
[119] https://www.mef.gov.it/en/focus/The-National-Recovery-and-Resilience-Plan-NRRP/
[120] https://www.italiadomani.gov.it/en/home.html
[121] https://knowledge4policy.ec.europa.eu/sites/default/files/latvia-ai-strategy-report.pdf
[122] https://digital-skills-jobs.europa.eu/en/actions/national-initiatives/national-strategies/latvia-digital-transformation-guidelines-2021-2027
[123] https://ai-watch.ec.europa.eu/countries/latvia-0/latvia-ai-strategy-report_en
[124] https://oecd.ai/en/dashboards/countries/Latvia
[125] https://op.europa.eu/en/publication-detail/-/publication/46190fa2-2cee-11ee-95a2-01aa75ed71a1/language-en
[126] https://digital-skills-jobs.europa.eu/en/actions/national-initiatives/national-strategies/lithuania-artificial-intelligence-strategy-vision
[127] https://ai-watch.ec.europa.eu/countries/lithuania/lithuania-ai-strategy-report_en
[128] https://inovacijuagentura.lt/site/binaries/content/assets/analitika/analytical-products-en/ict-roadmap-lithuania-2023---executive-summary.pdf
[129] https://gouvernement.lu/dam-assets/fr/publications/rapport-etude-analyse/minist-digitalisation/Artificial-Intelligence-a-strategic-vision-for-Luxembourg.pdf
[130] https://ai-watch.ec.europa.eu/countries/luxembourg/luxembourg-ai-strategy-report_en
[131] https://gouvernement.lu/dam-assets/documents/actualites/2020/02-fevrier/25-mesr-strategie-recherche-innovation/mesr-strategy-research-innovation.pdf

	strategy, the Ministry of the Economy allocated approximately €62 million for AI-related projects in 2018, up from €27 million in 2017. The Luxembourg National Research Fund invested around €200 million over five years in big data and AI-related research. These investments aim to position Luxembourg as a living laboratory for applied AI, leveraging its robust ICT infrastructure and strategic partnerships to drive innovation across sectors such as finance, healthcare, and sustainable development.
Malta[132][133][134][135]	Malta's National AI Strategy 'Malta – The Ultimate AI Launchpad' (2019) lists 72 action points across three strategic pillars: boosting investment, fostering innovation and startups, and promoting AI adoption in both public and private sectors. While the strategy outlines various initiatives, it does not specify exact funding amounts allocated for AI development.
Netherlands[1][36][137][138][139]	In 2021, the Dutch government allocated €276 million from the National Growth Fund to the AiNed Programme, orchestrated by the Netherlands AI Coalition, to accelerate AI development and application across various sectors. Additionally, the Dutch Research Council supports AI research through programs like ROBUST, which received €25 million in funding in 2023 to enhance trustworthy AI technologies. Meanwhile the Strategic Action Plan for AI estimates an annual governmental budget of €45 million for AI innovation and research.
Poland[140][141][142][143][144]	Poland's Policy for the 'Development of Artificial Intelligence' estimates that national and international coordinated investments for AI innovations, including private venture capital, will total approximately PLN 1.8 billion (around €400 million) by 2023. The policy emphasizes reforming the educational system, supporting AI research and innovation, and fostering national and international partnerships. Poland plans to use different funding mechanisms, including public procurement, with a goal of allocating at least 10% of governmental entities' budgets to AI initiatives. Additionally, the strategy proposes guaranteed credit and loan programs to stimulate AI advancements in Polish industries, complemented by European funding schemes such as Horizon 2020, Horizon Europe, and DEP.
Portugal[145][146]	While Portugal's National Ai Strategy 'AI Portugal 2030' (2019) does not

[132] https://www.mdia.gov.mt/malta-ai-strategy/
[133] https://ai-watch.ec.europa.eu/countries/malta/malta-ai-strategy-report_en
[134] https://knowledge4policy.ec.europa.eu/sites/default/files/malta-ai-strategy-report.pdf
[135] https://maltaineu.gov.mt/en/Pages/Press%20Releases/PR104.aspx
[136] https://securityinsight.nl/article-alert/the-netherlands-national-growth-fund-awards-the-dutch-ai-coalition-with-376-million-euros-to-accelerate-the-opportunities-of-ai
[137] https://knowledge4policy.ec.europa.eu/sites/default/files/netherlands-ai-strategy-report.pdf
[138] https://ai-watch.ec.europa.eu/countries/netherlands/netherlands-ai-strategy-report_en
[139] https://www.nlaic.com/
[140] https://knowledge4policy.ec.europa.eu/sites/default/files/poland-ai-strategy-report.pdf
[141] https://www.gov.pl/attachment/928200fa-b1a6-4c0c-b3a8-d1fbf1e1175a
[142] https://ai-watch.ec.europa.eu/countries/poland/poland-ai-strategy-report_en
[143] https://www.gov.pl/web/digital/ai-strategy-for-poland
[144] https://www.oecd.ai/en/dashboards/countries/Poland
[145] https://wwwcdn.dges.gov.pt/sites/default/files/estrategia_inteligencia_artificial_edit.pdf
[146] https://portugaldigital.gov.pt/en/accelerating-digital-transition-in-portugal/get-to-know-the-digital-transition-strategies/national-strategy-for-artificial-intelligence/

[147][148]	specify exact funding amounts, it emphasizes the importance of investments in research, education, and infrastructure to foster AI development. Additionally, the Advanced Computing Portugal 2030 initiative aims to enhance computational capabilities, supporting AI research and applications.
Romania[149][150]	Romania's National Artificial Intelligence Strategy for 2024–2027, approved in July 2024, does not specify exact funding allocations for AI initiatives. The strategy emphasises the importance of integrating AI into the economy and public administration and the Romanian government plans to leverage European Union funding to introduce advanced technologies and encourage extensive use of AI within state institutions.
Slovakia[151][152][153][154]	Slovakia's Digital Transformation Strategy for 2030 (2019) focuses on the importance of building a sustainable, human-centric, and trustworthy AI ecosystem, with specific actions planned for 2019–2022. While the strategy does not specify exact funding amounts for AI initiatives, it highlights the establishment of national platforms for AI research, such as Slovak.AI, to strengthen AI research and education. The strategy describes reforming the education system to include AI education and creating lifelong learning opportunities to enhance digital skills among the workforce.
Spain[155][156][157]	Spain's National AI Strategy (December, 2020) outlines a public investment of €600 million for 2021–2023, focusing on six strategic pillars: enhancing AI research and innovation, fostering digital skills and talent, developing data platforms and technological infrastructures, integrating AI into value chains, advancing AI use in public administration, and establishing ethical and regulatory frameworks. Additionally, the Next Tech Fund, a public-private initiative, supports digital entrepreneurship and AI-focused companies. The 2021 national budget allocated €330 million specifically for AI and the data economy.
Sweden[158][159]	In 2018, the Swedish government introduced a national AI strategy emphasizing research, innovation, and ethical AI development. The innovation agency Vinnova has played a pivotal role, funding AI projects with approximately SEK 1.35 billion (around €135 million), with half potentially sourced from private funding or other national programs. the national budget allocated at least SEK 550 million (about €55 million) for research and innovation in digital technologies and AI through 2024. The Wallenberg AI, Autonomous Systems and Software Program (WASP), launched in 2015,

[147] https://oecd.ai/en/dashboards/countries/Portugal
[148] https://ai-watch.ec.europa.eu/countries/portugal/portugal-ai-strategy-report_en
[149] https://www.euractiv.com/section/politics/news/romanian-government-approves-artificial-intelligence-strategy/
[150] https://oecd.ai/en/dashboards/countries/Romania
[151] https://ai-watch.ec.europa.eu/countries/slovakia/slovakia-ai-strategy-report_en
[152] https://knowledge4policy.ec.europa.eu/sites/default/files/slovakia-ai-strategy-report.pdf
[153] https://mirri.gov.sk/wp-content/uploads/2019/10/SDT-English-Version-FINAL.pdf
[154] https://oecd.ai/en/dashboards/countries/Slovakia
[155] https://oecd.ai/en/wonk/documents/spain-national-ai-strategy-2020
[156] https://commission.europa.eu/projects/national-strategy-artificial-intelligence_en
[157] https://ai-watch.ec.europa.eu/countries/spain/spain-ai-strategy-report_en
[158] https://ai-watch.ec.europa.eu/countries/sweden/sweden-ai-strategy-report_en
[159] https://wasp-sweden.org/about-us/

	represents Sweden's largest research initiative in this field, with total funding of SEK 6.2 billion (approximately €620 million), primarily from the Knut and Alice Wallenberg Foundation. Currently, Sweden is part of three European TEFs, hosts five EDIHs which amount to €12,5 million of investment. Sweden also committed to launching an AI factory with a national contribution of €1230 million in 2025.

European AI Initiatives and Resources

Concrete targets of the EC revolve around four themes: government, skills, infrastructure, and business[160]. To support this, a variety of European projects, initiatives and movements that are funded by different European funding programmes and/or are endorsed by European institutions. The projects, initiatives, and movements are established to respond to European challenges and to realise the solutions that are described in legislations and funding programs as well as to elaborate on the needs and requirements of cities, regions and communities. These include:

Government	Governance schemes, technical challenges, risks
Skills	Capacity building, Knowledge-sharing, social inclusion
Infrastructure	Data availability/access/quality, interoperability
Business	Stakeholder mapping, Cross-border collaboration, sustainability

Below is a list of initiatives and projects that provide tangible resources for smart communities' stakeholders to tackle one or more of the above mentioned areas.

Initiative	Main Focus	Activities
AI4Europe & AI on Demand Platform	AI research and innovation	• Comprehensive AI Repository • Collaborative community platform • Funding & Support for SMEs & StartUps • Implementation of Industry-led pilots
AI factories (deployed in 2025)[161]	develop, deploy, and scale AI applications across sectors	• selected the sites that will host the first European AI Factories: Finland, Germany, Greece, Italy, Luxembourg, Spain and Sweden. • bring together computer power, data, and talent

[160] https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en

[161] https://eurohpc-ju.europa.eu/selection-first-seven-ai-factories-drive-europes-leadership-ai-2024-12-10_en

CommuniCity/Organi City/SynchroniCity	Citizen-centered solutions, inclusion	● 100 tech pilots to empower marginalized communities ● Framework for community-driven innovation ● Define common challenges ● Inclusive and sustainable models for replication and scaling across Europe
Digital Solutions for the New European Bauhaus	Sustainability, inclusivity	● Inventory of digital initiatives and solutions ● Knowledge-sharing and capacity building activities
Digital Transformation for Regions	AI and Big Data solutions	● Awareness raising for AI and big data applications for public services ● Capacity building, mutual learning
DRural	Digital marketplace for rural areas	● Improving quality of life in rural ● areas ● Development of digital marketplace for rural areas
DUET	Digital Twin using open data	● Open and scalable LDT prototype ● Leverage cloud and ● high-performance computing to impact policy cycle
EDIHs	Digital challenges, competitiveness	● Access to technical skills ● Test before you invest ● Innovation services ● Boost networking, cooperation, and knowledge transfer
Enterprise Europe Network	support network for SMEs with international ambitions	● Capacity building and support ● Reduce regulatory burden and improve market access ● Access to financing
European AI Alliance	Expert community consulting on ethical AI development	● Membership upon request ● Best practices/strategies ● Input on AI regulatory framework ● Collaboration between stakeholders of the quadruple helix
EuroHPC JU mission	Develops and deploys world-class supercomputing and data infrastructure in Europe	● Joint effort between the European Commission, EU Member States, and private partners ● A European HPC ecosystem, including hardware, software, and applications

		• Provide HPC access to a wide range of public and private users
European Digital Innovation Consortium (EDIC)	Cross-border digital initiatives	• A legal entity established by at least 3 European Member states • Advance LDTs deployment across Europe via its shared procurement activities
European Data Spaces for Smart Communities	Cross-sectoral cross-domain data space	Provides a: • data space blueprint (incl.: multi-stakeholder governance scheme, technical building blocks with a list of technical specifications, reference architecture) • Capacity-building resources • Roadmap to deploy a data space • Networking via its Stakeholder Forum • Funds Data Space deployment
Gaia-X	Federated data economy	• Architecture specification and open-source tools • Creation of federated services for data spaces • Community Engagement • Lighthouse projects - supports projects that use Gaia-X principles
Interoperable Europe Portal	EU's centralized hub for interoperability resources	• Resource repository • Community engagement • Support service • all information related to cross-border interoperability of trans-European digital public services
Living-in.EU Movement	Digital transformation support	• Technical, legal, funding, education & capacity building, monitoring & measuring working groups for European communities • Develops the Minimal Interoperability Mechanisms (MIMs) Plus[162] to be used to create interoperable solutions, applications and services • Launched the LORDIMAS[163] tool • Knowledge-hub & networking activities

[162] https://living-in.eu/groups/commitments/technical
[163]https://gis-portal.espon.eu/arcgis/apps/experiencebuilder/experience/?id=975e0dd3bcf84aa9810f0f5b5f7b9b65&page=page_13&views=view_104

Local Digital Twin Toolbox	Local Digital Twin development	● Definition of minimum conditions for Local Digital Twin elements ● Foster deployment of MIMs Plus (ref.Living-in.EU) compliant solutions
NetZeroCities	Climate neutrality support	● Strategies, funding, resources to reach climate neutrality ● Pilot programs for knowledge sharing
Scalable Cities	Smart Cities and Communities demonstration of innovations	● Action grants ● Knowledge-sharing platform ● Capacity building programs ● Networking events
SEMIC (Semantic Interoperability Community)	semantic interoperability among interconnected e-Government systems	● Provides legal, technical and organisational resources (tools, standards, best practices) ● Community engagement (e.g.: annual conference)
Technical Support Instrument (TSI)	AI-ready public administration' project	● Computing and data infrastructure enhancement. ● Interoperability and IT/data governance. ● Digital skills development. ● Regulatory mapping for compliance with EU digital legislation, including the AI Act.

Stakeholders

For the development of smart cities and communities, it is important to not solely count on local authorities to implement innovative urban projects. A key role in the creation of an open information society, which is the basis for the development of smart cities, is also played by business - especially so-called high-tech companies -universities and community organisations. Such a development model is ensured not only by infrastructural investments, but, above all, the development of smart cities stimulated by social participation. What follows is a list of possible actors which, through merging and vaguening of roles, might account for part of the future demand in the smart cities and communities realm:

Public Sector Organisations[164]	
Core government	A defined territorial authority Includes all structural parts of the government like departments, ministries, or branches Reports directly to the central authority

[164] https://www.theiia.org/en/content/guidance/mandatory/standards/public-sector-definition/

	Closest to citizens Establish policies and services that promote quality of life
Agencies	Deliver public programmes, goods or services May be a separate legal entity & operate with a partial degree of independence Publicly funded
Public enterprises or corporation	Created by government authorities in EU countries to manage in/directly public services The public services can be related to the government's other activities
Industry (Corporations, SMEs, Start-ups)	Drives the formation of a 'critical mass' The only stakeholders subsidised by TEFs
Academia/ Research Organisations	Input through practical (interdisciplinary) technical and non-technical research
Civil society	Provides social participation that involves gathering data, transforming it into knowledge, and activating community engagement

> *"The data that the different AI systems could utilize often lie in different departments, some in private, some in the public sphere, often hidden or locked both for good and for bad reasons"*
> *Martin Gauk, ESPON*

CitCom.ai aims to create a collaborative ecosystem involving diverse stakeholders. **Public institutions**, such as local, regional, and federal governments, act as key interveners, striving to improve mobility services and advance policy agendas. Cities like Differdange in Luxembourg, or Paris and Lyon in France are examples of those 100 cities that target climate neutrality by 2030[165]. Despite their pivotal role, these institutions often face resource limitations, including a lack of expertise to keep pace with digitalization. **Academic and research institutions**, like IMEC[166] and Luxembourg Institute of Science and Technology (LIST)[167], conduct cutting-edge research on AI applications. They focus on transferring knowledge to other organizations, but their innovations often remain in lab environments without validation in real-world settings. **Service providers** range from traditional operators, such as public transport or taxis, to emerging providers like car-sharing and micro-mobility companies, like Tier Mobility and Lime. These providers integrate new technologies, optimize services, and promote multimodality while navigating regulatory challenges. Startups, SMEs, and large companies, such as Nvidia, Panasonic, or OTIV, act as **technology providers**, focusing on AI-driven solutions in different domains. They face barriers such as data scarcity, regulatory constraints, and the need for real-world validation of their algorithms. **Incubators and accelerators**, like Plug & Play and

[165] https://labo.societenumerique.gouv.fr/en/articles/nine-french-cities-among-100-smart-and-climatically-neutral-cities-selected-by-the-european-commission/
[166] https://www.imec-int.com/en
[167] https://www.list.lu/

Agoria & Sirris, help organizations transition to digital and AI technologies, supporting members in overcoming challenges related to data access and compliance with EU regulations. **Knowledge institutes, networks**, **NGOs and interest groups** such as United Nations, ICLEI Europe[168], Eurocities[169], OASC[170], or ERTICO-ITS Europe[171], assist by sharing best practices, promoting AI adoption, fostering sustainable partnerships and efficient data exchange, and addressing resource gaps in skills, tools, and funding. While some, like Stroum Beweegt[172] in Luxembourg, act as national initiatives that federate dynamic actors. **Citizens** contribute through associations, like Fietersbond[173] in Flanders, advocating for public interests and pressuring policymakers. In places where structured organizations are absent, cities increasingly involve citizens directly, as demonstrated by Luxembourg's "Mobilitéitsplang fir Muer"[174].

Public Sector

The focus of the public sector is on the common good. To bring this about they develop policies, deliver public services and manage the public domain. In high-income countries the public sector contributes to between 20% to 30% of GDP, with the highest shares in Scandinavia[175]. There is a growing interest in this spending which is increasingly monitored through financial reports, supplemented with reports on social benefits and public value[176]. Innovation should be a fundamental activity in the public sector, as it holds the potential to enhance performance, boost public value, meet citizen expectations, adapt to user needs, improve service efficiency, and reduce costs[177]. However, the extent of innovation relies heavily on factors such as strategic innovation management, governance, the origin and approach to generating ideas, organizational culture, the traits of individual bureaucrats, and the tools and capabilities available to support innovation[178]. The nature and scale of innovation depend on its origin: elected representatives often pursue larger, outward-facing changes, while public service initiatives are typically smaller and focus on internal processes[179].

Obtaining Innovative Solutions in the Public Sector

AI adoption is driven by a combination of organizational, technological, and external factors. Internally, in-house expertise, a clear AI strategy, leadership support, and an innovative culture play crucial roles. Technological drivers include the perceived benefits and trustworthiness of AI systems. Externally, citizen needs and pressures are key motivators, while national policies, competition, and private-sector collaborations have a comparatively smaller impact.

---

168 https://iclei-europe.org/
169 https://eurocities.eu/
170 https://oascities.org/
171 https://ertico.com/
172 https://stroumbeweegt.lu/en/homepage/
173 https://www.fietsersbond.be/
174 https://www.vdl.lu/en/getting-around/notre-plan-de-mobilite-pour-demain/citizen-participation
175 https://doi.org/10.1016/j.respol.2018.12.001
176 https://doi.org/10.2139/ssrn.3140932
177 https://www.urban-response.org/system/files/content/resource/files/main/innovation-in-the-public-sector.pdf
178 https://doi.org/10.1093/oxfordhb/9780199560530.013.0015
179 https://doi.org/10.1016/j.respol.2018.12.001

For smart cities and communities, alternatives to directly procuring products or services include exploring non-technological solutions, opting for service contracts, developing in-house solutions, reusing solutions from other cities, or leveraging external support, such as consultants or open-source communities, for a limited time. The latter is common when standard solutions are unsuitable or require integration with complex legacy systems. Procurement governs public purchasing, but cities often adopt AI via partnerships and innovation projects. Partnerships let cities test new tech with external funding before investing, while innovation projects help companies understand real-world use cases and enter public markets.

Governance[180]

According to JRC, governance practices are designed to align organizational goals with the deployment of AI technologies and are categorized into procedural, structural, and relational dimensions. Procedural practices involve establishing ethical guidelines, technical standards, and compliance measures. Structural practices focus on defining roles, responsibilities, and organizational structures to manage AI initiatives. Relational practices emphasize building partnerships and engaging stakeholders to foster collaboration and inclusivity. These frameworks operate at three levels: strategic, aligning AI initiatives with overarching public administration objectives; tactical, managing resources, policies, and risks associated with AI projects; and operational, ensuring day-to-day compliance and performance. This structured approach ensures transparency, accountability, and effectiveness in AI governance.

	Procedural	**Structural**	**Relational**
Strategic level (Top management, long term)	Developing ethical AI guidelines, Compliance protocols, Establishing accountability procedures	Defining data stewards, Establishing independent ethics committees, Developing an ethical code of conduct, Establishing a cybersecurity department	Establishing communities of practice , Stakeholder education and training, Experimentation and idea generation, Fostering knowledge transfer
Tactical level (Mid-level management, mid to short term)	Minimising authorisation to access data, Developing explainability frameworks, Monitoring AI usage, Developing AI protocols for standardisation, Ensuring security of algorithmic operation, AI lifecycle	Safety barriers to prevent misuse, Establishing algorithmic registries, Defining project ownership, Developing a steering group, Elimination of algorithmic censorship	Negotiating and contracting with vendors, Promoting society-in-the-loop activities

[180] https://publications.jrc.ec.europa.eu/repository/handle/JRC138702

	management processes		
Operational Level (Teams and individuals, day-to-day activities)	Data management, Establishing system and data integration protocols, Developing processes for elimination of bias, Establishing algorithmic transparency processes, Model reusability	Process-based interactions between people and AI, End user participation in AI development and evaluation, Ensuring human monitoring and supervision of AI decision-making	Promoting collaborative efforts between stakeholders, Educating users to develop trust towards AI

Procurement

To ensure a level playing field for businesses across Europe, EU law establishes minimum harmonized public procurement rules. These rules govern how public authorities and certain public utility operators purchase goods, works, and services. They are incorporated into national legislation and apply to tenders above specific monetary thresholds. For lower-value tenders, national rules apply, but they must still align with the general principles of EU law[181]. Public procurement follows a structured process of identifying needs and risk classification, prioritizing requests, setting criteria, and budgeting. Contractors are expected to adhere to the defined criteria by implementing the algorithmic system according to terms and conditions covering data quality, data rights, algorithmic quality, transparency, data protection, development and operations, risk management, inspections, and expenses. To support this procedure, the EC launched a platform to help public buyers procure trustworthy, fair, and secure AI solutions by sharing experiences, knowledge, and tools[182]. Still, procurement processes can pose the issue of lock-in mechanism, whereby a public organisation heavily invested as a client of both AI system services and AI-related know-how becomes increasingly dependent on the vendor over time[183]. The process itself is often viewed as too rigid for yielding the desired outcomes:

"One of the biggest bottlenecks is procurement.(...) There are different ways to go about it and there's something that in Lithuania is very much used, but now will also be tested more broadly through the GovTech4All StartUp challenges (more: GovTech4All Startup Challenge | Interoperable Europe Portal). It's called design contest and it's basically an innovative procurement approach for digital solutions, a method traditionally applied in architecture (more: New approaches to Public Procurement: The role of design contests | Public Buyers Community). There is also the possibility of negotiated procedures when you can invite a few companies to submit an initial tender which the buyer may request to be further revised in a subsequent negotiation round to eventually go with the best; but still, it's not easy."

[181] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014L0024
[182] https://public-buyers-community.ec.europa.eu/communities/procurement-ai/resources?field_theme_target_id%5B%%205D=8
[183] https://publications.jrc.ec.europa.eu/repository/handle/JRC138702

For this reason, CitCom.ai will investigate the use and added value of a TEF label to make procurement easier.

In-House

While procurements also require AI procurement literacy from the responsible personnel, administrations can also opt for building in-house solutions. Research indicates that public sector organizations adopting AI-powered tools are more likely to procure technology from external vendors rather than develop it in-house, due to the expertise and high upfront costs involved[184]. So, procurement-related competencies are deemed critical at every stage of AI technology acquisition[185] . While emphasizing the need for a multidisciplinary approach, JRC proposed the following categories of competences for AI in the public sector:

Technological competences	
Attitudinal competences (know-why)	Technology inquisitiveness Positive attitude towards AI Technical design thinking Data-oriented culture
Operational competences (know-how)	Database management Data governance Data collection Data modelling Data quality assessment Data analysis Data visualisation Data sharing Choice of AI architecture Choice of machine learning techniques AI-related software programming Algorithm training Compliance with AI technical standards Prompt engineering
Literacy competences (know-what)	Basic data literacy Understanding of causal analysis and decision theory Understanding the fundamentals of machine learning Understanding of AI computer vision Understanding of natural language processing Understanding of applied maths Understanding of AI software development cycles

Managerial competences

[184] https://www.sciencedirect.com/science/article/pii/S0007681319301582
[185] https://dl.acm.org/doi/10.1145/3598469.3598516

Attitudinal competences (know-why)	Leadership Foresight Risk proclivity AI benefits understanding User centricity Multidisciplinarity Project ownership
Operational competences (know-how)	Risk anticipation and migration Choice to delegate to AI Knowledge brokering Cross-team collaboration Data supported decision-making Coordination Intergroup translation Partnership development Change management
Literacy competences (know-what)	*Non were identified*

Policy, legal and ethical competences	
Attitudinal competences (know-why)	Empathy Critical technology assessment Awareness of ethical implications Awareness of sustainability implications Design thinking
Operational competences (know-how)	AI-compatible policy formulation Auditing Dissemination Collaboration with domain experts Collaboration with AI ethicists
Literacy competences (know-what)	AI procurement literacy Understanding legal and ethical frameworks Understanding of public policymaking and theory Specialised legal expertise Privacy and security literacy

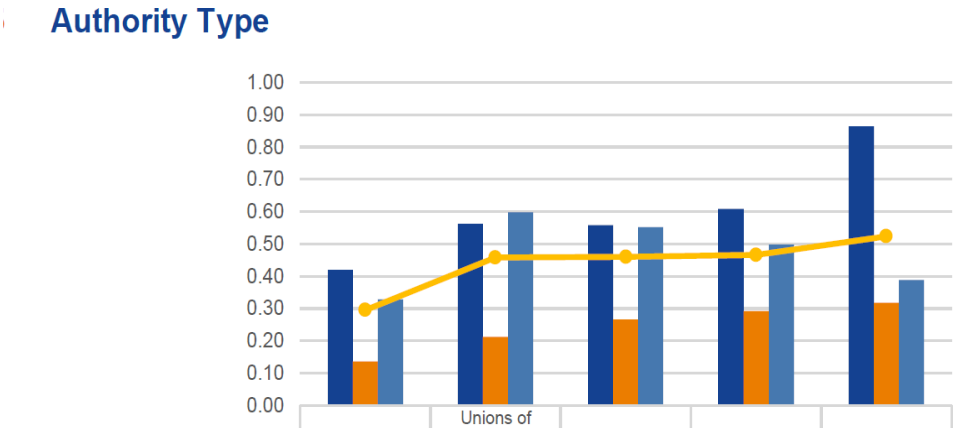
European Public Sector's Digital Maturity

Larger public authorities, particularly those with populations exceeding 500,000, demonstrate stronger institutional capacity, with over 65% having digital innovation strategies compared to around 50% of smaller authorities (populations 50,000–100,000)[186]. They also show better

[186] https://www.espon.eu/DIGISER

service integration and data management, especially in cities with populations over 250,000[187]. Wealthier cities generally perform better in data management, though proficiency declines sharply in cities with GDP per capita below €10,000[188]. Western Europe leads in digital maturity, while Eastern Europe lags. Most cities have digitized or are transforming processes, but the adoption of innovative technologies like AI and blockchain remains limited, scoring lower than other aspects of digital maturity. This gap highlights the importance of institutional capability as a driver for innovation in the EU.

In 2024, AI adoption in public administrations is still in the experimental phase. According to the updated PSTW Database, there are 1,295 documented AI-based cases across Europe. The highest numbers are found in Germany (167 cases), the Netherlands (154), Italy (138), and the United Kingdom (81), followed by Belgium, Spain, and Estonia, each with more than 70 cases. Notably, AI applications impacting government-to-citizen (G2C) interactions are more commonly piloted or implemented at the local level (41% of cases) compared to the national level (31%), while government-to-government (G2G) solutions tend to be more prominent at the national level (54% compared to 37% locally)[189].



	District/Parish/ Ward	Unions of municipalities/ Mountain communities	Metropolitan Area	Municipality (city/town)	County/Province
I1.1.1 - Digitization	0.42	0.56	0.56	0.61	0.86
I1.1.2 - Innovative technologies	0.14	0.21	0.27	0.29	0.32
I1.1.3 - Advanced methods and principles	0.33	0.60	0.55	0.50	0.39
I1.1 - Digital maturity	0.29	0.46	0.46	0.47	0.52

Private Sector

In figures

The European private sector plays a pivotal role in the region's AI market, marked by a growing ecosystem of AI-focused firms, startups, and investments. While analysts often differ in figures and market definitions, their insights provide valuable indicators of the European AI market's

[187] https://www.espon.eu/DIGISER
[188] https://www.espon.eu/DIGISER
[189] https://interoperable-europe.ec.europa.eu/sites/default/files/document/2024-11/PSTW%20-%20AI%20and%20blockchain%20in%20the%20European%20Public%20Sector%202024.pdf

transformative growth, driven by both private sector advancements and supportive frameworks for innovation. Valued at USD 33.65 billion in 2022, it is expected to grow at a CAGR of 25.7%, reaching USD 325.29 billion by 2032[190]. Europe is considered as the fastest-growing region, supported by a dynamic ecosystem of AI-focused firms, startups, and investments. According to the AI Watch Index 2021[191], the EU28 is home to 5,776 AI-related entities, spanning research institutions, firms, and government bodies. These firms fall into three categories: those focusing on AI without patenting, those filing AI-related patent applications, and those with core AI businesses that also file patents[192]. Notably, only 43 companies (0.7%) fit the last category. Meanwhile, broader data identifies 950 AI-focused SMEs in the EU27, while robotics startups, growing at an annual rate of 10%, are also making significant contributions, although they are particularly outside the public sector[193]. However, initiatives like CitCom.ai bridge AI and robotics for public services, supporting smart cities and aligning with the TEF mandate.

Europe accounted for 25% of the global AI market in 2022, with global AI revenues projected to hit $712.61 billion by 2032[194]. Venture capital investments in European AI totaled $51 billion between 2012 and 2023, with €15.9 billion invested in 2020 alone[195], €10.7 billion of which came from the private sector. Sectors like mobility, energy, and digital Infrastructure attracted 10-15% of this funding[196]. By 2028, investments in European AI are expected to reach $133 billion, driven by a CAGR of 30.3% from 2024 onward. Generative AI is a particularly fast-growing segment, with an annual growth rate of 55%, outpacing more traditional AI technologies[197]. While the public sector's AI adoption is harder to quantify, it increasingly underpins government services. Meanwhile, initiatives like CitCom.ai TEF foster EU-compliant, ethical, and human-centred AI innovation by supporting technology providers in testing AI solutions, particularly at TRL 6, within a structured regulatory framework.

Across Europe

The European private sector's AI landscape is supported by TEF sites strategically deployed across what we refer to as North, Central, and South nodes, tailored to the size, trends, and specific needs of local markets. According to JRC's TES Analysis of the AI Worldwide Ecosystem (2009–2018)[198], Germany and France (Central node) dominate in the number of AI-related actors, followed by Spain and Italy in the South Node, and the Netherlands and Sweden in the North/Central Node. Specific countries, such as Germany, Sweden, and Belgium, also show high activity in Connected Automated Vehicles (CAVs)[199], particularly relevant to domains like energy, transport, and connectivity. In 2020, Paris and Berlin were the EU27's largest hubs for AI and blockchain, while Amsterdam, Barcelona, and Madrid also host over 40

[190] https://www.sphericalinsights.com/reports/artificial-intelligence-ai-market
[191] https://publications.jrc.ec.europa.eu/repository/handle/JRC129174
[192] https://publications.jrc.ec.europa.eu/repository/handle/JRC128744
[193] https://www.eib.org/attachments/thematic/artificial_intelligence_blockchain_and_the_future_of_europe_report_en.pdf
[194] https://www.precedenceresearch.com/artificial-intelligence-market
[195] https://publications.jrc.ec.europa.eu/repository/handle/JRC129174
[196] https://oecd.ai/en/data?selectedArea=investments-in-ai-and-data&selectedVisualization=vc-investments-in-ai-by-country-and-industry
[197] https://www.idc.com/getdoc.jsp?containerId=prEUR252670624#:~:text=MILANO%2C%20October%2024%2C%202024%20%E2%80%94,CAGR)%20of%2030.3%25%20over%20the
[198] https://publications.jrc.ec.europa.eu/repository/handle/JRC120106
[199] https://www.eib.org/attachments/thematic/artificial_intelligence_blockchain_and_the_future_of_europe_report_en.pdf

AI and blockchain SMEs each. Although SMEs are present in smaller AI centres, capitals generally concentrate the majority of a country's AI SMEs, serving as key drivers of innovation and growth within the European AI market[200].
More recently, Estonia has emerged as the sixth-best global hub for AI startups, surpassing major European AI powerhouses like France and Germany. Germany itself has risen to the 7th position globally in the AI startup ecosystem, driven by a remarkable 244% increase in AI funding during 2023, which far outpaced global trends. The country now hosts 463 AI startups, overtaking France in the rankings. Other European nations, such as Sweden (ranked 17th) and Ireland (20th), have shown marked improvement, climbing five and four spots respectively in 2023. Romania, ranked 11th, has also outpaced countries like Norway, the Netherlands, and Finland in nurturing AI startups, further highlighting the dynamic growth of the European AI ecosystem[201].

Examples of key European AI companies[202][203][204]:

- Aleph Alpha (Germany): Specializes in large language and multimodal models, providing transformative AI solutions for businesses and governments.
- Contentsquare - France: Provides AI-driven analytics for user experiences.
- Dataiku - France: Offers data science and machine learning platforms.
- DeepL (Germany): Provides deep learning-based language translation services, renowned for its accuracy and efficiency in translating multiple languages.
- Helsing (Germany): A defense AI firm offering advanced AI solutions for security and defense applications, solidifying its status as a leading defence tech startup in Europe.
- KONUX (Germany): Combines AI and the Internet of Things (IoT) to transform railway operations with smart sensors and AI-based analytics, delivering real-time insights for infrastructure monitoring
- Mistral AI (France): A generative AI startup that has rapidly gained prominence, focusing on open-source AI software models tailored for secure industries like banking and healthcare.
- Owkin (France): Utilizes AI for drug discovery and development, combining machine learning and biology to identify novel drug candidates.
- SAP SE - Germany: A leading European enterprise software provider
- Shift Technology (France): Provides AI-enabled solutions to efficiently detect and prevent insurance fraud, serving the global insurance industry.

[200] https://www.eib.org/attachments/thematic/artificial_intelligence_blockchain_and_the_future_of_europe_report_en.pdf
[201] https://www.startupblink.com/ (2024 Report)
[202] https://tech.eu/2023/12/27/the-top-10-european-ai-companies-of-2023
[203] https://www.sphericalinsights.com/reports/artificial-intelligence-ai-market
[204] https://www.reuters.com/technology/artificial-intelligence/italian-startup-igenius-nvidia-build-major-ai-system-2024-12-05/

European AI Market Analysis

The following section relies on the input of expert interviews combined with existing research on the topic. First it lists the needs and challenges of both the public and the private sector in Europe. These elements outline the current and future trends of the European AI market, therefore a separate analysis was done to clearly articulate them. While there is a variety of items described in this section, it was commonly underlined by experts that there is no 'one size fits all' given Europe's cultural diversity and different sectors nuanced dynamics.

"It is difficult to establish common trends in Europe. As a matter of fact, we have 12 sector specific Task Forces in BDVA, and based on what I observe from them, each domain has its own needs, trends, challenges…"
Daniel Alonso, BDVA

Needs & Challenges

Public Sector

Needs

While the public sector recognizes AI as a powerful tool to enhance efficiency and decision-making, it also raises a variety of needs for its successful adoption. These include a framework to evaluate the return on investment for AI applications to justify resource allocation, and establishing a strong foundational ecosystem — covering data governance, technical infrastructure, and collaboration networks.

'*we need tools like AI to increase productivity in the public sector to bring it closer to the citizens to increase public value. (...) people expect more empathetic, proactive, and predictive approaches. The public sector has enough data about us to also know and predict our needs and propose different support, services and solutions to us without us having to book appointments or comb through websites to find these*.'
Martin Gauk, ESPON

Capacity Building	
Awareness and Engagement	Educating citizens on the benefits, safety, and rationale behind adopting AI solutions to build trust and acceptance.
Regulatory Knowledge	Enhancing understanding of compliance and regulatory frameworks, clarifying oversight responsibilities to reduce uncertainty.
Skills and Training	Developing technical and operational skills among public servants, with a focus on fostering positive attitudes towards AI adoption.
Specialist Roles	Employing dedicated AI specialists to lead and guide

	implementation.

Collaboration	
Cross-Sector Integration	Bridging data and processes across public and private sectors for cohesive, cross-departmental solutions.
Ecosystem Development	Establishing long-term foundations with guidelines, roles, and initiatives to encourage innovation and adoption across the public sector.
Public-Private Partnerships	Strengthening collaboration with companies to harness innovation, gain trust through certification, and share expertise.
Share Infrastructure and expertise	Coordination across regional, national, and municipal levels to share infrastructure and expertise, fostering innovation hotspots.

Public Services	
Empathetic Services	Meeting citizen expectations for more personalised, proactive, and hassle-free public services.
Fraud and Risk Mitigation	Deploying AI for detecting irregularities and fraud, ensuring the integrity of public administration processes.
Optimising Operations	Leveraging AI to streamline administrative processes, such as data and email management, compliance checks, and resource allocation.
Proactive and Predictive Services	Predicting citizen needs and providing tailored services using AI-driven insights.
Service Quality	Using AI to enhance the delivery of public services, ensuring they are timely, efficient, and user-centric.

Resources	
Reusable Resources	Ready-made solutions, building blocks, and technical specifications to avoid redundant efforts and promote scalable deployment.
Technical Tools	Access to state-of-the-art tools like language models, image generators, and programming frameworks integrated into workflows. Establishment of testing facilities, akin to NIST in the US, to certify technologies and ensure their reliability.

Value Creation

Cost Management	Ensuring sufficient resources to fund AI projects while balancing costs with the benefits of security, transparency, and efficiency.
Digital Divide (Inclusivity)	Ensuring that advancements in AI and digital services are accessible to all citizens, including those with limited technological access.
Environmental and Social Responsibility	Promoting AI applications that align with sustainability goals and address societal challenges.
Return on Investment (ROI)	Identifying and articulating the value AI brings to the public sector, from increased tax revenues to long-term productivity gains.
Transparency & Accountability	Building trust by leveraging AI to improve transparency in governance and decision-making processes.

Challenges[205][206][207]

[208]The main challenges limiting digital maturity in public authorities include data silos, limited technical expertise, lack of coordination, and unequal digital capacities across departments. AI adoption faces obstacles like insufficient expertise, leadership hesitation, and complex budget planning, especially in smaller public authorities (and SMEs). Meanwhile, transparency measures and data-sharing initiatives remain underutilized[209], and many administrative processes are still non-digitized. While public procurement processes are used to help, they have a tendency to prioritise larger firms over SMEs due to the former's structured innovation and because of the latter's resource constraints - even if SMEs demonstrate an aptitude for flexibility and cooperation[210][211][212].

In Europe, smaller municipalities and those with fewer resources struggle more with digital maturity, while larger, wealthier authorities perform better[213]. Scant evidence suggests, that AI impacts economic performance unevenly across regions[214], highlighting the need for better collaboration, harmonized EU procurement rules, and mechanisms to ensure ethical AI use.

Technical Infrastructure/Resources

The lack of high-quality, accessible, and interoperable datasets limits the ability to train and deploy AI systems effectively. This is closely linked to insufficient data-sharing mechanisms between organizations and the difficulties in sharing private-sector data with public entities due to legal, technical, and organizational constraints. From a technical perspective, ensuring data

[205] https://publications.jrc.ec.europa.eu/repository/handle/JRC129100
[206] https://interoperable-europe.ec.europa.eu/sites/default/files/inline-files/JRC129301_01-1.pdf
[207] https://www.bruegel.org/sites/default/files/private/2023-03/WP%2003.pdf
[208] https://www.mdpi.com/2624-6511/7/3/57
[209] https://www.espon.eu/DIGISER
[210] https://doi.org/10.1080/10630732.2022.2035886
[211] https://doi.org/10.1111/j.1540-627X.2009.00286.x
[212] https://www.jstor.org/stable/40239907
[213] https://living-in.eu/
[214] https://doi.org/10.1016/j.techfore.2021.121164

privacy and security poses significant challenges, especially when handling sensitive information in compliance with regulatory requirements. Existing IT infrastructure also complicates adoption, as legacy systems often lack the flexibility and scalability to integrate advanced AI technologies. The rapid evolution of AI itself adds to the complexity, requiring constant updates and adaptation to new tools and methods. Poor data governance structures further hinder progress, leading to inefficiencies in the management, processing, and utilization of data for AI applications. These challenges underscore the need for robust technical frameworks and strategies to overcome the barriers to AI adoption in the public sector.

Skills

Adopting AI in the public sector faces several challenges related to expertise and skills. Many public administrations lack the necessary knowledge and experience to work effectively with AI, including understanding its technical, legal, ethical, and governance aspects. This problem is worsened by limited training and educational programs tailored for civil servants, leaving them unprepared to manage AI technologies. Navigating procurement laws for AI is another difficulty, as these regulations can be complex and unfamiliar to public officials. Additionally, the public sector struggles to compete with private companies for AI talent, which often offer better salaries, career opportunities, and access to cutting-edge technology.

Organisational

Studies show that many civil servants are hesitant about AI, often due to concerns over job security, lack of understanding, or mistrust of the technology. This reluctance is worsened by rigid organizational structures and limited collaboration between departments, slowing progress. Fragmented regulations across regions and sectors add to the difficulty, creating inconsistencies that complicate AI integration. Addressing these issues requires building trust in AI, encouraging teamwork, and harmonizing regulations to support adoption.

Trust

Concerns about discriminatory biases in AI systems and the lack of transparency in decision-making create scepticism among stakeholders. The opacity of AI processes makes it difficult to explain or justify outcomes, eroding trust. Fears of privacy violations and mass surveillance further deepen mistrust, as citizens worry about how their data is used or potentially misused/abused. Accountability is another challenge, as it's often unclear who is responsible if AI systems fail. Public sector workers fear AI might replace their jobs, increasing resistance to adoption. There's also concern about AI being misused to spread divisive content, potentially causing societal polarization. Building trust will require clear safeguards, transparent processes, and accountability measures to reassure both citizens and employees.

"There is also a lack of understanding of what AI can actually do. Then if you move up the hierarchy, maybe it has to do with liability because (...) there is space for random behaviours. And so the question is who is then liable for this random behaviours? The lack of total control, a lack of determinism of these type of tools also can create some reluctance to fully rely on them. The consequences could be severe for people that are legally responsible for what it is doing."
Enrico Ferro, Links Foundation

Financial

Limited budgets constrain the ability of public organizations to invest in AI innovation, including both the development and implementation of these technologies. The high costs associated with building, deploying, and maintaining AI systems make it difficult for many organizations to initiate or sustain AI projects. Additionally, funding for experimental AI initiatives and scaling successful pilot projects remains scarce, stifling innovation. A lack of robust return-on-investment (ROI) models further complicates decision-making, as public sector entities struggle to justify the upfront expenses without clear evidence of long-term value (not limited to fiscal value). Addressing these financial hurdles requires targeted funding strategies, better cost-benefit analyses, and supportive policies to encourage investment in scalable AI solutions.

Interoperability[215]

Interoperability in the European public sector faces several challenges that hinder the seamless integration of public services across Member States. Fragmentation, along with diverse legal and technical frameworks, complicates cross-border collaboration and consistency. Additionally, the varying levels of digital maturity among EU Member States amplify these challenges, making it difficult to achieve a uniform progress[216]. While research often highlights technical and resource-related obstacles, Europe's cultural and organizational diversity must also be considered, as it can impact the adoption of interoperable solutions[217]. The Interoperable Europe Act, which comes into force in July 2024, aims to address some of these issues by requiring interoperability assessments (IOPAs) starting in January 2025[218]. These assessments will help identify and mitigate barriers early in the design phase of policies and public services. Improved interoperability is not just a technical goal but an economic opportunity, with the potential to increase the EU's GDP by 0.4%, saving €543 million annually for citizens and €568 billion for businesses[219].

Private Sector

The European AI market, especially in sustainable solutions, faces significant challenges that hinder its full potential[220][221]. One overarching issue is that power and influence are concentrated in a few companies or countries, limiting broader participation and innovation across the region.[222]

Infrastructure

Access to comprehensive, accurate, and real-time data is critical for training AI models, yet both the AI market and sustainable monitoring systems suffer from fragmented, incomplete, and poorly integrated datasets.

---

[215] https://publications.jrc.ec.europa.eu/repository/handle/JRC137063
[216] https://academic.oup.com/book/58128/chapter/479901657?utm_source=chatgpt.com&login=false
[217] https://publications.jrc.ec.europa.eu/repository/handle/JRC137063
[218] https://joint-research-centre.ec.europa.eu/jrc-news-and-updates/assessing-interoperability-digital-public-services-eu-sooner-better-2024-05-24_en
[219] https://publications.jrc.ec.europa.eu/repository/handle/JRC127330
[220] https://dataconomy.com/2023/07/06/challenges-in-artificial-intelligence/
[221] https://www.eib.org/attachments/thematic/artificial_intelligence_blockchain_and_the_future_of_europe_report_en.pdf
[222] https://www.oecd.org/content/dam/oecd/en/publications/reports/2024/11/assessing-potential-future-artificial-intelligence-risks-benefits-and-policy-imperatives_8a491447/3f4e3dfb-en.pdf

Investments

Limited venture capital and specialization in AI investments within Europe further constrain the development and scaling of AI solutions, which require significant computational resources and infrastructure investments to handle the demands of deep learning and real-time processing. Experts explained that this is especially challenging for SMEs, because it remains difficult to demonstrate the benefits and return on investment of AI to stakeholders.

Regulatory Environment

The fragmented regulatory environment and evolving policies in the EU complicate scaling efforts and add uncertainties, while ensuring data privacy and security, particularly for sensitive sustainability-related data, remains a priority.

"The digital regulatory ecosystem is expanding, with frameworks like the GDPR, the AI Act, and the DSA setting important standards. Navigating these regulations may be challenging, particularly for small and medium-sized stakeholders. This is where the TEFs play a key role, providing essential testing facilities to support SMEs in their journey to compliance and market readiness."

Isabelle Hupont Torres, JRC

Trust

Building trust among stakeholders by ensuring model interpretability and transparency is vital, especially in sustainable applications where explainable predictions are essential.

Innovation Ecosystem (skills)

Addressing these challenges also requires fostering a cohesive innovation ecosystem, bridging skill gaps in AI expertise, and engaging local communities, sustainability organizations, and regulatory bodies to secure the support and acceptance necessary for successful AI implementation.

Commercialization and Sustainability

Europe leads in AI research but lags in commercializing these innovations. Most AI investment in Europe comes from public funding, while the return on investment often benefits regions like the US. Startups face challenges in maintaining long-term sustainability as many solutions are designed for narrowly defined problems, leading to limited scalability and innovation potential.

"In the AI Start-up world, many start-ups partner with big tech from the USA, which each have their own exclusive start-up programs. Here, the startups join to get access to computing which is extremely important in the AI sphere: To train your model, you need a lot of computing power, which is very expensive, and also quite scarce in our continent. [the larger enterprise] They have sufficient computing power but they also have technological expertise, so the startups also get support from the staff. But it is not pro-bono, there is sometimes a lock-in effect on their technology and naturally, big tech also gains deeper insights into the startups. Eventually, the startups are often bought by the company. This also implies that European start-ups eventually become US companies, so the value eventually goes to the US."

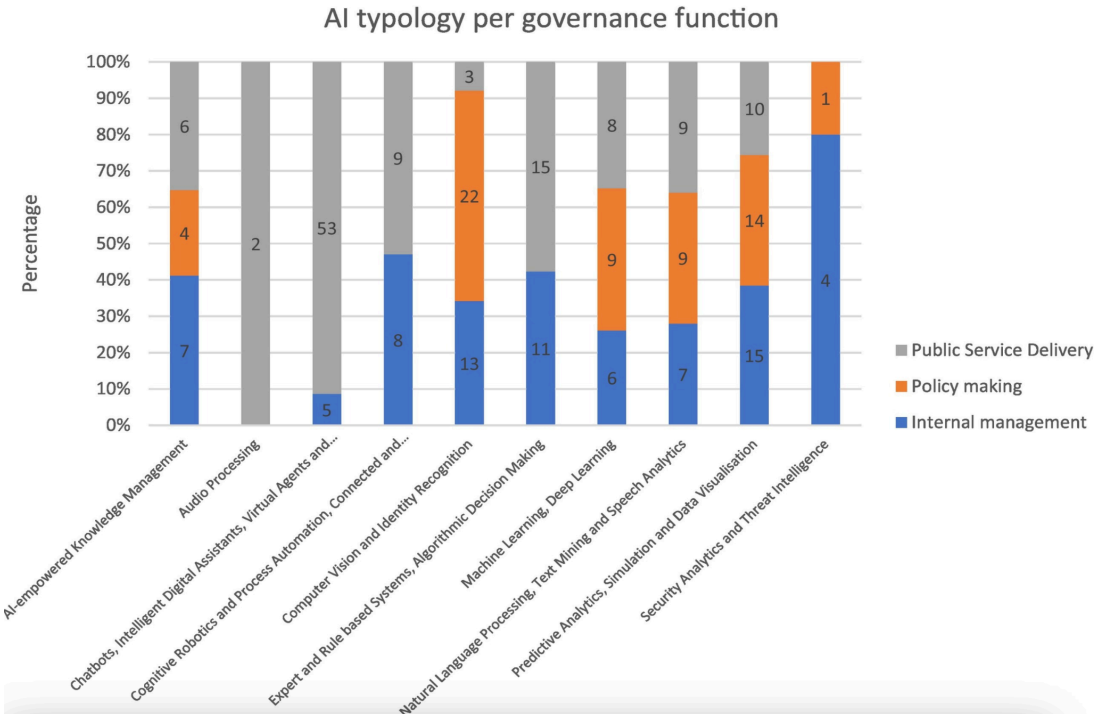
Dr. Philip Hutchinson, European AI Startup Landscape

Trends & Future Trends

Public Sector

Trends

A review of 250 cases across the EU in 2022[223], summarized in the figure below, reveals that AI is primarily used to improve public service delivery. Its secondary use is to enhance internal management, while only a limited number of cases demonstrate its direct or indirect role in policy decision-making. The findings suggest that different types of AI technologies and applications serve distinct governance functions, highlighting the need for deeper investigation to better understand their role and impact within the framework of governance "of, with, and by AI."



The expert interviews added that AI is increasingly being applied in areas such as early warning systems, urban planning, and energy management, though these applications remain relatively underexplored. Currently, the most common use of AI is in improving public service delivery, followed by enhancing internal operations. In contrast, its role in policy decision-making, whether direct or indirect, is much less prevalent highlighting the growing but uneven adoption of AI across different governance functions. The analysis of expert interviews granted the following categories as AI trends in the public sector:

AI for Law Enforcement and Public Safety

AI is widely used in law enforcement to enhance efficiency and safety. Applications include crime prediction, surveillance, and traffic management, such as using AI-equipped cameras to

[223] https://www.sciencedirect.com/science/article/pii/S0740624X22000478?via%3Dihub#f0030

monitor flow and detect unusual activities. However, public acceptance remains a challenge, underscoring the need for transparent and ethical implementations.

AI for Social Good

AI holds significant potential in areas like education, social services, and improving access to public resources. Applications such as waste management, smart meters, and personalized public services demonstrate its transformative possibilities. Yet, these opportunities remain underutilized, particularly in Europe, where small and medium enterprises (SMEs) face challenges in bringing AI-for-good solutions to market.

Generative AI and Innovation

Generative AI is gaining traction in entertainment, video games, and public administration. The European Commission is developing strategies to encourage its adoption in public services, where it is being piloted to improve efficiency and service delivery. Efforts are also focused on making generative AI more accessible and cost-effective by using simpler models that deliver strong results.

Chatbots and Virtual Assistants

Chatbots and virtual assistants represent some of the earliest AI solutions adopted in public services. These tools are evolving to offer citizens personalized and proactive support, helping them navigate services and access critical information. They are now foundational to improving public interactions and service delivery.

Interoperability and Reusable AI Solutions

AI is being used to enhance interoperability across public sector systems, focusing on structuring data, optimizing APIs, and creating reusable AI models. Sharing algorithms and solutions across administrations promotes efficiency and collaboration while reducing redundancy.

Digitally Readable Laws and Automation

AI is being explored to digitize legislation, aiding in compliance and reducing administrative burdens. Automation in public administration is also gaining momentum, integrating services and streamlining processes to create more efficient workflows.

Inclusive Governance and Organizational Transformation

AI is reshaping organizational structures through inclusive governance models that prioritize citizen participation. By leveraging AI, governments aim to build transparent systems that actively involve citizens in decision-making processes, ensuring equitable and effective governance.

Blockchain for Security

Blockchain technology, often paired with AI, is used for secure applications like issuing diplomas and certificates, ensuring authenticity and reliability in processes that require high levels of trust.

AI in Research and Training

Universities and public institutions are advancing AI through research in areas such as neurosymbolic AI, physically grounded models, and machine learning. Simultaneously, public administrations are investing in AI education and training to build knowledge and skills, enabling staff to identify and implement AI opportunities effectively.

Towards a Long-Term AI Strategy

There is a growing recognition of the need for coherent, long-term strategies for AI integration in public services. Moving beyond pilot projects, organizations are focusing on sustainable

adoption and embedding AI into core processes. This requires upskilling staff, fostering innovation, and addressing ethical considerations to ensure the responsible deployment of AI.

Future Trends

The trends, challenges and needs foreshadow the approaches that guide AI development in the near future. As European regulation promotes the development of interoperable solutions to enable scalability, and replicability, experts agreed that future regulations will aim to strike a balance between fostering innovation and addressing ethical and societal concerns. This in turn will also translate into building a foundation for ecosystem growth by setting up long-term frameworks to encourage collaboration across governments, academia, and industry. The rapid pace of technological advancements will increasingly require policymakers to develop clear guidelines and frameworks for the use of AI in the public sector including when to use it. At the same time, efforts will also focus on demonstrating the tangible benefits of AI, such as cost savings, enhanced service delivery, and improved public decision-making, to showcase its value and encourage broader implementation. Accordingly, incentives to adopt AI are also diverse, as it can be for increasing trust but also to increase tax revenues. Concretely, future trends are likely to be in the direction of data-driven decision making, predictive policing, smart infrastructure, citizen engagement, automated public services, urban planning and design, and cybersecurity.[224]

Regulatory Evolution and Ethical Standards

The rapid development of AI has outpaced regulatory frameworks, but efforts to close this gap are underway. New regulations are expected to shape the market, ensuring AI solutions align with societal and ethical expectations. Common European ethical standards are being developed to guide AI adoption, particularly in the public sector, facilitating the sharing and reuse of AI solutions across administrations. Additionally, criteria for AI use, including impact assessments to evaluate public value and benefits, are becoming a priority.

Innovative and Inclusive AI

There is a growing emphasis on creating AI systems that are inclusive and accessible, addressing the digital divide to ensure no one is left behind. AI's sustainability, both societal and environmental, is also a critical focus. Innovations in business models, particularly those leveraging interoperability, are needed to maximize AI's potential. AI's role in enhancing semantic interoperability, such as structuring data and optimizing APIs, is gaining traction as organizations strive for more effective data management and collaboration.

Generative AI and Next-Generation Systems

Generative AI continues to be a focal point, with dedicated strategies and funding to expand its use in public sector applications. There is also increasing interest in next-generation AI systems capable of interacting with the physical world, further broadening the scope of AI’s potential. These advancements aim to make AI systems more effective and adaptable across various domains.

Reusable AI Solutions and Interoperability

[224] https://www.mdpi.com/2624-6511/7/3/57

A trend towards reusable AI algorithms and models is emerging, enabling administrations to improve efficiency and collaboration by sharing solutions. AI is also being used to enhance interoperability across systems, particularly through semantic alignment, ensuring that data models and APIs work seamlessly together.

"In the Interoperable Europe Act, we really promote the idea of share and reuse; that you as an administration could contact another administration and say, 'I would like to reuse that solution unless it's under certain IP rights or other conditions'. This exchange can also be done by publishing the relevant content on the Interoperable Europe portal or on a portal, catalogue or repository connected to the Interoperable Europe portal."
Andrea Halmos, DIGIT

Public Acceptance and Trust
For AI to succeed in the public sector, increasing public trust and acceptance is crucial, particularly for applications in essential services. Comprehensive testing facilities are needed to evaluate AI systems not only for technical performance but also for societal, ethical, and environmental impacts.

"he adoption of AI can also increase a certain level of transparency and trust in the society. It can also help to ensure that certain laws are enforced equally (...) One of the examples is an AI solution adopted in France that uses image recognition technologies to analyse which households have a private pool. Outside pools are taxed in France, but some homeowners have not declared building one. The French tax authority discovered over twenty thousand non-registered pools using this AI powered tool upon its pilot launch in 2022, generating over 10 million in fines and back taxes to the public administrations."
Martin Gauk, ESPON

Integration into Long-Term Strategies
AI is transitioning from experimental projects to an integral part of organizational strategies, much like the adoption of computers in previous decades. Organizations are embedding AI into their long-term plans to ensure its sustained and effective use.
Growing Knowledge and Skills
The number of people with knowledge and skills to handle AI is expected to grow significantly. This shift will enable organizations to better identify opportunities and leverage AI effectively. Public administrations are expanding training programs to equip staff with a broad understanding of AI, fostering widespread adoption and integration across functions.
Sustainability and Societal Impact
AI's role in supporting sustainable practices is becoming more prominent. This includes addressing societal challenges and ensuring that AI solutions contribute to environmental sustainability. By balancing innovation with ethical considerations, public sector AI aims to deliver long-lasting benefits.

Private Sector

Trends

This section identifies key trends in AI innovation. Generative AI has emerged as a dominant topic in discussions on artificial intelligence, significantly enhancing productivity for developers and knowledge workers through systems like ChatGPT. According to Precedence Research, deep learning (DL) accounted for the largest market share in 2022. Its revenue is projected to grow from USD 166 billion in 2022 to an impressive USD 948 billion by 2032. The report notes that "rising technological advancements in the field of DL are expected to overcome challenges associated with processing high volumes of data.". DL is followed by machine learning (ML) in market share. ML applications, including hypothesis generation, clustering, tagging, filtering, visualization, and navigation, drive the development of cognitive solutions. Additional trends include natural language processing (NLP) and machine vision, which are advancing rapidly across various domains.

The experts interviewed reflected on the growing influence of generative AI, sector-specific applications, and decentralized approaches while highlighting challenges in commercialization, sustainability, and ethical development. The discussion offers a comprehensive view of how private enterprises are leveraging AI to drive innovation and address key industry challenges.

Generative AI and Large Language Models (LLMs)

Generative AI is at the forefront of AI innovation, transitioning from predictive capabilities to content creation and becoming mainstream across various domains. The value created by foundation models and LLMs is substantial, though the development and commercialization of these technologies are more advanced in the US and China compared to Europe. European initiatives are focusing on making generative AI more efficient and cost-effective, often leveraging simpler, smaller models tailored to specific tasks.

AI for Specific Industries and Sectors

There is a growing emphasis on vertical AI models designed for niche industries, such as healthcare, energy, manufacturing, and logistics. These models are trained on industry-specific data unavailable to large tech companies, offering unique solutions for sector-specific challenges. Mobility solutions, including autonomous vehicles, and industrial AI for supply chain optimization and predictive maintenance are notable areas of focus.

Edge AI and Decentralized Approaches

Edge AI, which processes data locally on small devices, is emerging as a game-changer. It offers lower latency, faster processing, and improved privacy compared to centralized AI systems. Alongside this, there is a shift towards decentralized and modular AI systems that foster collaboration among smaller companies, helping them compete with larger monopolies and promoting ecosystem innovation.

Ethical and Transparent AI

Ethical development is a core focus in Europe, driven by frameworks emphasizing transparency, accountability, and fairness. The European AI Act underscores this trend, advocating for controlled, verifiable, and trustworthy AI systems. Organizations are aligning their strategies to ensure AI solutions do not perpetuate biases and remain socially responsible.

AI in Public Services and Society

AI applications in public services are expanding, with significant use in law enforcement, though public trust remains a concern. In education and social domains, AI has untapped potential to enhance accessibility and equality. European SMEs are pioneering ethical and social applications of AI, although financial barriers often hinder market adoption. Proactive initiatives like AI-driven personalized services and chatbots are helping bridge the gap in public service delivery.

Convergence of Technologies

The intersection of AI with other technologies, such as blockchain, IoT, and synthetic data generation, is gaining momentum. This convergence opens new opportunities for enhanced functionality and cross-domain applications, enabling transformative solutions for challenges like resource optimization and secure data management.

"We are moving away from purely data-driven machine learning approaches towards more combinations of learning and reasoning and the area of neurosymbolic AI. This is very relevant for Europe because we are driving much of that research. We also see an increasing interest in how we build physically grounded models. For example, for robotics - because robotics is a strong area for Europe - we can build AI models/ solutions that are adapted for more physical systems. That would greatly help us."

Fredrik Heintz, EURAI

Strategic Data Management and Cost Reduction

Data ownership and effective management are increasingly recognized as foundational to AI development. The cost of training AI models is decreasing, levelling the playing field for smaller companies and enabling broader adoption of AI technologies. Initiatives like the European Data Space aim to enhance data access and usability, linking applications to centralized data repositories.

AI for Sustainability

AI is playing a growing role in addressing environmental challenges, with applications in waste management, energy efficiency, and resource optimization. The development of energy-efficient AI models is a priority, reflecting a broader commitment to sustainability.

Future Trends

In desirable AI futures, the benefits of AI would be widely distributed, empowering individuals, civil society organizations, and social partners while respecting human rights, including privacy, and intellectual property rights. Robust technical, procedural, and educational tools would ensure AI systems are transparent, explainable, and aligned with human values. Systems and ecosystems would be resilient across physical, digital, and societal domains, with effective mechanisms in place to enhance AI security and prevent misuse by bad actors. Policies and governance measures would focus on preventing excessive power concentration and managing risks associated with high-stakes AI systems during training, deployment, and use. International and multi-stakeholder collaboration would further enable safe, trustworthy, and equitable AI

development.[225]While the aforementioned notions are taken from the OECD publication, the blow analysis is based on insights gathered from expert interviews exploring the future of AI in the private sector. It highlights emerging trends, challenges, and opportunities as businesses increasingly adopt AI technologies, focusing on innovation, regulation, and sustainable development.

Technological Disruption

The future of AI will continue to be marked by disruptive advancements, as seen with the unexpected emergence of tools like ChatGPT. Generative AI will remain a transformative force, but discriminative AI also holds immense potential, particularly in addressing complex challenges such as over-tourism and predictive modelling. Advances in deep-tech AI, including AI chip technology, will further enhance AI capabilities, enabling more specialized and efficient solutions.

Generative AI and Business Innovation

Generative AI will dominate the landscape, with increased investment and development initiatives driving its integration into diverse sectors. Businesses are also exploring new models of interoperability and collaboration to optimize AI deployment. Startups, particularly in Europe, have opportunities to develop niche solutions tailored to local needs, leveraging generative AI's adaptability for both consumer and industrial applications.

Sector-Specific Growth

The health sector will continue to lead AI adoption due to extensive data availability and the demand for innovative solutions in diagnostics, treatment, and operations. Mobility, energy, and industrial AI will also experience significant growth, with AI being used for autonomous vehicles, resource optimization, and predictive maintenance.

Regulation, Ethics, and Trust

With the deployment of the EU AI Act, compliance will be a key focus. Simplified regulatory frameworks and standardized approaches to implementation will be critical to avoid excessive complexity that hinders interoperability. Ethical AI aligned with European values will emphasize transparency, fairness, and accountability, helping to build public trust. Tools and services that assist SMEs in adhering to these regulations will become increasingly important.

Human-AI Collaboration

A shift toward human-AI collaboration will define the next wave of AI innovation. Companies will prioritize AI systems that enhance human decision-making, improve productivity, and integrate seamlessly into workflows. The industrial sector, in particular, will benefit from these collaborative approaches, fostering greater efficiency and safety.

Strategic Data Management and Cost Reductions

Data ownership and privacy will become even more critical as companies recognize data as a core asset for AI training. Concurrently, the cost of training AI models will continue to decline, making AI development more accessible to startups and smaller companies. This trend will help level the playing field in the AI market and promote innovation. Smaller, task-specific AI models will gain prominence, emphasizing efficiency and reduced power consumption. Innovations like

---

225 https://www.oecd.org/content/dam/oecd/en/publications/reports/2024/11/assessing-potential-future-artificial-intelligence-risks-benefits-and-policy-imperatives_8a491447/3f4e3dfb-en.pdf

decentralized AI ecosystems and federated learning will address privacy concerns and democratize AI development, reducing reliance on monopolistic players.

Decentralized and Modular AI Ecosystems

Decentralized AI ecosystems, where multiple stakeholders collaborate to create federated AI, will gain traction. This model allows data to remain local while enabling shared insights, fostering inclusivity and reducing dependence on large tech monopolies. Modular AI solutions will enable businesses to adapt and scale systems efficiently across different contexts.

Convergence of Technologies

The integration of AI with other emerging technologies like blockchain, IoT, and quantum computing will unlock new applications and capabilities. This convergence will enhance data management, security, and operational efficiency, offering businesses innovative ways to solve complex challenges.

Sustainability and Inclusivity

Sustainable AI development will be a priority, emphasizing reduced energy and water consumption while addressing societal and environmental challenges. Efforts will focus on ensuring AI solutions are inclusive, bridging the digital divide, and making AI accessible to all. The idea of AI as a universal right, akin to internet access, will gain momentum, raising critical questions about governance and equitable access.

Standardization and Long-Term Integration

AI is transitioning from experimental adoption to a standard component of business strategies. Companies are investing in AI knowledge and skills, equipping their workforce to identify and leverage AI opportunities effectively. Standardized methodologies for integrating AI into operations will emerge, mirroring the historical adoption of computers as essential business tools.

Experts were hesitant about the notion of ‘cross-country collaboration’ and ‘internationalisation’ given the required resources and the growing trend of local SMEs.

> *“SMEs don't like to travel beyond their immediate geography;. (...) They have to see an immediate return of investment to do so. So you have to embed internationalism and scaling right from the very beginning of their journey in order to create opportunities for them to reach out to, access and create different market opportunities”*
>
> *Philip Piatkiewicz, ADRA*

European AI Market Testing

One of the core recommendations from the JRC report on 'AI for the Public Sector'[226] is to "experiment first, scale-up later." This principle underpins the widely endorsed "test before invest" strategy, championed by initiatives like the European Digital Innovation Hubs (EDIHs). By prioritising testing, organisations can foster mutual learning and confidently scale up solutions with proven potential. Testing helps navigate the complexities of public sector applications and regulatory environments. Simulation tools, experimentation spaces, and collaborative trials involving diverse industrial actors—including SMEs—highlight its value. These methodologies provide the safe and controlled settings necessary to refine and validate solutions before broader implementation. Key enablers of innovation, such as living labs and sandboxes, create ecosystems for experimentation. Combined with standardised practices, these approaches ensure consistency, interoperability, and scalability across projects. In digital government and smart city initiatives, testing in close collaboration with users has proven instrumental in enhancing user experience, improving efficiency, fostering trust, and maintaining relevance.

"If you're going to build a testing facility, it's not only about testing the technology. It's also about testing societal aspects and sustainability aspects. (…)Our technology can be mature in technological terms, but perhaps it's not mature in terms of our readiness to use it. (…)It is clear that the answer is 'transdisciplinarity' (…) and diversity in the sense of considering the views of many people, people from different ethnicities, ages, people from different educational backgrounds…"

Isabelle Hupont Torres, JRC

Willingness to pay

The willingness to pay for AI testing services varies significantly depending on factors such as the regulation, complexity of the solution, technology readiness level (TRL), and the business sector involved. For industries like healthcare, where precision and safety are critical, a higher budget allocation for testing is expected. Generally, experts suggest that testing should constitute 10-30% of the overall budget, with some advocating for as much as 40-50% in cases where thorough testing under diverse conditions is crucial, particularly for mature technologies.

Budget constraints often lead to testing receiving a marginal allocation, despite its importance in ensuring quality assurance, mitigating risks, and meeting regulatory requirements. Public administrations are encouraged to make testing a contractual obligation within procurement processes, with at least 30% of the budget earmarked for this purpose. For SMEs, affordability remains a challenge, and pricing for testing services should be proportional to company size to ensure accessibility.

In R&D, an average of 10% of cash and 24% of in-kind resources is typically allocated to demonstration and validation. While some solution providers are expected to cover testing costs, many acknowledge the importance of allocating 10-15% of the technology development

[226] https://publications.jrc.ec.europa.eu/repository/handle/JRC133826

budget to testing, with flexibility based on the specific needs of each project. Ultimately, testing is recognized as a key element of the development process, essential for delivering reliable, compliant, and high-quality AI solutions.
SMEs will be subsidised by CitCom.ai and all other customers will be expected to pay full price for a TEF service.

Expectations

The interviews reveal that testing is highly valued in Europe for its role in mitigating risks, ensuring compliance, and building trust in AI solutions. The emphasis on testing reflects a strategic approach to developing robust, reliable, and ethical AI systems, particularly in contexts where public trust, compliance with regulations, and societal impact are critical. Below is an analysis of the attitudes and added value of testing in Europe:

Risk Mitigation
Testing is expected to reduce uncertainty and prevent unintended consequences such as ethical violations, cybersecurity vulnerabilities, operational failures, and user frustration. It ensures systems perform as intended in real-world scenarios, particularly in high-stakes domains like health, safety, and public policy.

"It has an important value because it minimises risks, so you can identify issues early and that helps avoid expensive changes that you need to make to the product and then you have issues with your reputation. This is extremely valuable."
Anonymous Interview Subject

Compliance with Regulations
Testing must verify that AI systems adhere to the AI Act, privacy laws, and other regulatory frameworks. Ensuring compliance early in development prevents costly legal issues and supports smoother market entry. Certification through standardized testing enhances public trust and acceptance.
Building Trust and Ethical Assurance
Thorough testing demonstrates that AI systems are ethical, free from biases, and trustworthy. This is essential for gaining public trust and avoiding reputational damage, especially for applications with significant societal impact, such as decision-making tools or health-related AI.
Market Fit and Refinement
Testing ensures that AI solutions align with user needs and market demands, preventing misalignment that could lead to product failure. By refining solutions based on feedback, testing helps deliver products that resonate with customers and perform effectively.
Operational Validation
Real-world testing validates the performance of AI solutions under diverse conditions, including stress testing for high-demand scenarios, scalability assessments, and adaptation to different operational environments. This ensures systems remain robust and reliable outside controlled lab settings.
Economic and Strategic Value

Testing helps demonstrate the return on investment (ROI) by reducing the likelihood of costly failures and ensuring long-term scalability. It serves as a strategy to embed AI solutions into processes over time, creating sustainable and efficient systems.

Environmental and Social Impact

Testing is expected to assess the environmental footprint of AI solutions, ensuring energy efficiency and alignment with sustainability goals. Socially, testing supports the development of acceptable and inclusive AI solutions that respect ethical principles and contribute positively to society.

Improving Scalability and Interoperability

Testing ensures AI solutions can scale effectively across larger contexts or geographies and integrate seamlessly with existing systems. This is particularly important for cross-country testing within the EU, where interoperability between diverse regulatory environments is critical.

Validation for New Use Cases

Testing provides a platform to evaluate innovative AI applications in emerging fields such as autonomous systems, predictive decision-making, and crowd management. This helps verify the feasibility and effectiveness of AI in novel scenarios.

Certification and Branding

Certification through testing creates a quality label that builds credibility and trust among customers and stakeholders. This is particularly valuable for SMEs, providing a competitive advantage and facilitating market entry by demonstrating reliability and compliance.

Domains of Testing

A variety of testing methods were described but it was also noted that testing needs vary across domains and potentially cultures.

> *"Testing requirements vary significantly by domain. For example, I wouldn't want anything in digital health to be insufficiently tested, nor would I want something implemented in urban systems that might compromise public safety."*
>
> *Federico Menna, EIT Digital*

Agrifood and Sustainability
AI for monitoring and improving agricultural processes and food supply chains.

Climate and Environmental Applications
Early warning systems for natural disasters, such as floods, integrating meteorological data and sensors.
AI for monitoring air pollution and adapting to climate change impacts.
Energy efficiency and carbon footprint reduction in cities and buildings.

Energy consumption monitoring and optimization
Simulation modules for photovoltaic panel installations.
Smart energy grids, water management, and waste management solutions.
Smart environmental monitoring for real-time data insights.

Crowd and Event Management
AI solutions for crowd management in public spaces like stadiums to ensure safety and efficiency.
AI-driven simulations for city planning and tourism strategies, incorporating public sentiment analysis.
Violence prediction and prevention, addressing privacy concerns.
AI for enhancing citizen security and safety in smart communities.

Customer Service and Support
AI to improve customer service and replace call centers.
AI for social support, such as companions for elderly individuals.

Cybersecurity and Regulatory Compliance
Ensuring AI systems are robust against cyber threats.
Testing for compliance with the AI Act and other regulatory frameworks.

Education and Learning
AI for personalized learning, language education, and accessibility improvements.
Virtual environments and avatars to enhance educational experiences.

Entertainment and Generative AI
Generative AI applications for creating content in video games and other media.

Healthcare
AI for decision-making and patient care in hospitals and health authorities.

Computer-assisted analysis and second opinions for diagnostics
AI companions to reduce loneliness in elderly populations.

Mobility and Transportation
Testing autonomous vehicles for safety and regulatory compliance.
AI for traffic flow optimization, congestion reduction, and parking management.
Drone technology for urban applications and environmental monitoring.
Simulation modules for transport planning and policy decision-making.

Public Services and Administration
AI for improving access to public services and enhancing governance models.
Virtual assistants to streamline administrative processes and citizen interactions.
Fraud detection in tax systems and other public sector applications.
Testing virtual environments and avatars to enhance public interaction and service accessibility.

Types of Tests

While experts described a variety of test types, the need for a comprehensive testing framework was a commonly mentioned theme to ensure that AI solutions are functional, ethical, secure, and aligned with public trust and regulatory standards.

Functional and Operational Testing
Testing must ensure AI systems operate reliably across all intended functionalities and in real-world environments
• Functional Testing: Ensures the system performs as expected in all scenarios.
• Operational Testing: Simulates diverse environments, such as varying weather conditions or crowded spaces, to confirm reliability.
• Stress Testing: Assesses how AI handles high-demand scenarios, such as processing multiple video streams in real-time.

Security and Interoperability Testing

Ensuring robust integration with existing systems while safeguarding against vulnerabilities is crucial:
• Security Testing: Evaluates resilience against cybersecurity threats and data breaches.
• Interoperability Testing: Confirms seamless integration with other platforms and adherence to data standards, enabling scalability and collaboration.

Compliance and Certification Testing
AI solutions must meet regulatory requirements and gain formal validation:
• Compliance Testing: Verifies adherence to the AI Act, data protection laws, and other regulations
• Certification Testing: Provides formal validation to ensure trustworthiness, reliability, and adherence to ethical and legal standards.
• AI Sandboxes: Enables safe testing under realistic conditions to address compliance and build trust.

Explorative and Extended Testing
A balanced approach combining structured and adaptive testing is essential for comprehensive evaluation
• Standardized Testing: Ensures solutions meet established norms, providing consistency and reliability.
• Exploratory Testing: Examines broader implications and potential for innovation, uncovering unforeseen challenges or opportunities.
• Extended Period Testing: Evaluates performance and reliability over time, typically over six months or more.

User and Usability Testing
AI systems must align with user expectations and accessibility standards:
• User Testing/User Acceptance Testing: Involves end-users to validate practical applicability and satisfaction.

- Usability Testing: Focuses on ease of use and accessibility, ensuring inclusivity across diverse user bases.

Specific Use Case Testing
Tailored testing ensures AI is fit for purpose in high-stakes or specialised applications:
• Autonomous Systems: Testing for vehicles or drones under various conditions for safety and reliability.
• Health Applications: Rigorous evaluations to meet healthcare regulations and ethical standards.
• Crowd Management and Decision-Making Tools: Ensures safety, effectiveness, and fairness in critical public use cases.

Ethical and Public Value Assessments
Testing for social responsibility and impact is critical for public trust:
• Ethical Testing: Verifies alignment with ethical principles, including bias reduction, privacy, and fairness.
• Public Value Assessment: Measures economic benefits, cost reduction, time savings, and overall value to citizens.
• Fraud Detection Testing: Ensures reliability in systems designed to detect fraud, such as in taxation or financial applications.
• Cost-Effectiveness Testing: Evaluates economic viability to ensure solutions remain accessible and practical for widespread adoption.

Environmental and Sustainability Testing
Addressing the environmental impact of AI technologies is essential for long-term viability:
• Environmental Impact Testing: Assesses energy consumption, carbon footprint, and overall sustainability of AI solutions.

Scalability Testing
Ensures solutions can adapt across geographies and scales effectively:

• Cross-Country Testing: Validates scalability and compliance with diverse regulatory frameworks within the EU.
• Scalability Testing: Confirms the adaptability of AI solutions to larger contexts or higher demands.

Services

The expectations towards a TEF and testing requirements outlined the desired services of the TEF. These services collectively address the needs for validation, compliance, scalability, collaboration, and innovation.

Testing and Certification Services	
Exploratory Testing for Emerging AI	Provide platforms to test reasoning, learning, and adaptability in cutting-edge technologies like large language models (LLMs) and multimodal AI.
Operational Environment Testing	Simulate diverse real-world conditions to validate AI performance in various scenarios (e.g., city operations, weather conditions).
Real-World Scenario Testing	Evaluate solutions in environments that closely mimic real-life settings, ensuring practical applicability and reliability
Regulatory Sandboxes	Create safe environments for companies to test AI solutions while navigating complex regulations, especially compliance with the AI Act and local standards.
Validation and Certification	Provide services to test and certify AI solutions, ensuring compliance with legal, technical, and ethical standards. Certification from reputable institutions will increase trust and facilitate participation in public procurements.
Collaboration and Ecosystem Building	
Ecosystem Creation	Build networks of relevant actors, including startups, SMEs, and public bodies, to promote collaboration and knowledge sharing.
Knowledge Sharing and Best Practices	Disseminate successful test cases, methodologies, and practical examples to avoid duplication of efforts and accelerate AI adoption across cities.
Increase TEF Awareness	Promote the TEF's services among SMEs, public administrations, and citizens to increase participation and demand for tested solutions.
Hackathons and Challenges	Organize hackathons to address city-specific challenges, fostering innovation and new ideas.

Public Branding and Quality Labels	Provide certified quality labels to tested solutions, building trust and encouraging wider adoption.
Public-Private Collaboration	Partner with public administrations to align testing outcomes with local needs, fostering digital transformation in cities and regions.
Standardization Support	Help companies comply with EU-wide and local standards to ensure scalability and interoperability.
Support Startups and SMEs	Encourage local startups through partnerships (e.g., EIT Digital) and pipelines to support early-stage testing and market entry.
Deployment Support	
Access to Compute and Data	Provide access to high-performance computing resources and diverse datasets, including real-world data from city environments and other sources.
Data Providers Network	Establish partnerships with data providers to ensure solutions are validated against real-world data.
Full Life Cycle Impact Assessment	Evaluate the sustainability of AI solutions by considering economic, social, and environmental impacts.
Risk Mitigation Strategies	Ensure solutions are tested to prevent unintended consequences, such as ethical lapses or system failures, and include post-market monitoring.
Business Support Services	
Customized Business Solutions	Fill gaps by providing tailored AI solutions for specific use cases where "AI as a Service" models do not yet exist.
Funding for Demonstrations	Provide funding for concrete use cases to showcase the value and scalability of AI solutions, ensuring alignment with public sector priorities.
Market Alignment	Help SMEs and startups align their AI solutions with the practical needs of city councils and other public entities, as seen in the example of Birmingham City Council.
Servitization Models	Explore leasing or renting AI solutions to encourage adoption among resource-constrained public entities.
Subsidized Testing Services	Offer financial support for SMEs to access TEF facilities, particularly for real-world testing and certification.
Tendering Support	Facilitate access to tendering opportunities by disseminating information and assisting with certification processes required for public procurement.
User-Engagement	

Citizen and Customer Validation	Include end-users in testing phases to ensure usability, accessibility, and societal acceptance of AI solutions
User Journey Creation	Develop detailed user journeys for tested solutions, linking their outcomes to actionable steps for public and private sector implementation.

Conclusive remarks

The European AI Market report is based on the knowledge of the network that fosters the CitCom.ai TEF. This provided an overview of pertinent legislations and funding mechanisms, and outlined the needs, challenges, trends and future trends of the market while reflecting on how to operationalise AI testing. While this report is launched to inform all European stakeholders, it is also positioned as a source for strategic guidance of the TEF's activities.

CitCom.ai was launched to shape Europe's digital future, and as such it is well positioned to address challenges and needs described in this report. Beyond those is a list of items that this report does not detail but would like to draw the reader's attention to. These include the use of a common terminology across Europe, an in-depth evaluation of European testing facilities, and an agreement of the required scope of AI testing (beyond what is suggested in the AI Act). The report emphasises that CitCom.ai is part of the European ecosystem and hence, it is important to raise awareness and clearly define the roles and responsibilities of the TEF and other initiatives for advancing Europe's digital competence. Finally, while the need for testing is substantiated by this report, further work should be undertaken to operationalise the process testing of AI-driven solutions; ideas included certification or a 'seal of excellence'.

Annex

Interview Guide: Public Sector Experts

Interview Guide

Thank you for your time to participate in an interview that will be used for the updated CitCom.ai market report[1]. Please note that ahead of this interview you should have received a consent form to allow us to record and use your anonymised input.

CitCom.ai is one of the four European testing and experimentation facilities (TEFs). TEFs are specialised large-scale reference sites to test state-of-the art AI and robotics solutions. They are open to all European technology providers wanting to test both software and hardware AI products and services in real-world environments. In this context, the project also offers a market report as a publicly available resource. This report provides an overview of current AI trends, including needs, and challenges and stakeholders. As part of this work, we are conducting a series of expert interviews to enrich our findings.

Name	Country	Region	Sector
			• Public Sector • Private Sector
Expertise in:	• Finance • Strategy/Innovation • Investment • Procurement • Legislations/law pertaining to technology • IT services for governments and/or communities • Other		

Context
1. Please elaborate on your professional activities in your sector.
Market
2. What encourages/discourages AI uptake in the public sector? a. What are your needs regarding AI solutions and services in your profession? b. What are the challenges for incorporating AI solutions in your profession?
3. What are the current trends in the European AI market in your view?

[1] https://citcom.ai/assets/uploads/Resources/CitCom.ai_-Integrated-Market-report_1_february2024.pdf

4. How do you see these trends evolve in the future?
5. How do you see the likelihood of implementing AI solutions developed in other countries?
6. How do you see the likelihood of implementing AI solutions tested in other countries?
7. Could you name some examples of useful AI use cases for smart communities?
8. How do you see the role of political public administration in supporting the development of technologies for smart communities?
Testing and Experimenting AI solutions for the public sector
9. Which types of testing are must-have versus good-to-have (standardized, certification, explorative) before going to market with a solution?
10. Which use cases/ themes/solutions intended for smart communities would you want tested?
11. What percentage of your IT budget would you allocate to testing a technology?
12. What is the value of testing for you (economic, social, environmental, political)?
13. If testing would ensure more efficient and effective solutions, would you be willing to request this as a contractual requirement? What would be the conditions to do so?
14. What are your expectations towards CitCom.ai?

Interview Guide: Private Sector Experts

Interview Guide

Thank you for your time to participate in an interview that will be used for the updated CitCom.ai market report[1]. Please note that ahead of this interview you should have received a consent form to allow us to record and use your anonymised input.

CitCom.ai is one of the four European testing and experimentation facilities (TEFs). TEFs are specialised large-scale reference sites to test state-of-the art AI and robotics solutions. They are open to all European technology providers wanting to test both software and hardware AI products and services in real-world environments. In this context, the project also offers a market report as a publicly available resource. This report provides an overview of current AI trends, including needs, and challenges and stakeholders. As part of this work, we are conducting a series of expert interviews to enrich our findings.

Name	Country	Region	Sector
			☐ Public Sector ☐ Private Sector
Expertise in:	☐ Funding ☐ Investment ☐ Procurement ☐ Legislations/law pertaining to technology ☐ IT services for governments and/or communities ☐ Other		

Context
1. Please elaborate on your professional activities in your sector.
Market
2. What are common go-to-market strategies for SMEs?
3. What are the current trends in the European AI market in your view?
4. How do you see these trends change in the future?

[1] https://citcom.ai/assets/uploads/Resources/CitCom.ai_-Integrated-Market-report_1_february2024.pdf

5. What are the needs for developing AI solutions in your profession?
6. What are the challenges for developing AI solutions in your profession?
7. How do you see the role of political administration in the development of technologies for smart communities?
Testing and Experimenting AI solutions for the public sector
8. Which types of testing are must-have versus good-to-have (standardized, certification, explorative) before going to market with a solution?
9. Which use cases/solutions intended for smart communities would you want tested?
10. How do you feel about testing your solutions in different countries of the EU?
11. What percentage would you allocate of an overall technology development budget to testing?
12. What is the value of testing for you in terms of economic benefits?
13. How do you see testing as a contractual requirement?
14. What are your expectations towards the CitCom.ai?

Consent From

CitCom.AI

Consent Form

Expert Interviews: European AI Market Report

As part of CitCom.ai[1] Task 5.1 European AI Market Report, we are conducting semi-structured expert interviews with experts that are knowledgeable about the legal, organizational and technical aspects of smart communities either from the private or the public sector. Within this research task, the partner IMEC is responsible for coordinating the interviews, collecting and analysing data, while the interview outcomes will be shared with the other project partners. Should you have any questions about the study or the use of your data, you can directly contact: Sophie Meszaros; sophie.meszaros@imec.be

Privacy and anonymity

The personal information that is shared in this project will be treated confidentially. All personal data gathered during the research will be processed only by IMEC. All participants will be coded (for example by using pseudonyms) in the processing and public reporting of the research findings. This means your name will not be directly linked to the collected information. You can choose to be publicly identifiable, in which case you will be recognized as a contributor to Deliverable 5.1. Your name and affiliation will appear on the document. With your consent, an audio recording of this interview will be made for comprehensive processing and analysis. This recording will not be made public.

The collection and processing of data is in accordance with the legal principles imposed by the new European General Data Protection Regulation 2016/679 (GDPR or AVG), which has been in force since 25 May 2018.

A. The personal data we collect from/about you are the following: name, contact details, affiliation, electronic address, and your opinion and answers in the context of the above mentioned topics.
B. IMEC acts as the controller of your data.
C. The data are collected and processed for the purpose of the aforementioned project.
D. We may only use your personal data for scientific purposes. The processing is based on informed consent.
E. You have the right to access and correct your data. You also have the right to erase your data, to limit their processing, to object to their processing and to transfer your data to third parties.

[1] https://citcom.ai/

F. You have the right to withdraw your consent to the processing of your data at any time. The withdrawal of consent does not affect the lawfulness of the processing of the data obtained prior to the withdrawal of consent.
G. Your data may only be accessed by those conducting the interviews which includes representatives of the following project partners: IMEC (BE), Valencia Innovation Capital - Las Naves (ES), Politecnico di Milano (IT), Universitat Politècnica de Valencia (ES), SystemX (FR), Digitaal Vlaanderen (BE), FIWARE (GE), Luxembourg Institute of Science and Technology (LU), Ajuntament de València (ES) and will not be shared with other project partners. Only the pseudoanonymized interview summaries will be shared with the other project partners.
H. Your data will be stored and secured in accordance with the guidelines of IMEC.
I. If you wish to exercise your rights or if you have any further questions regarding your rights and the processing of your personal data, you can always contact sophie.meszaros@imec.be.
J. We take as many measures as possible to ensure the security and confidentiality of your data, including:
    - The pseudonymization of your data, generating a non-identified data set with references or tokens. We will create and keep a "translation key" on a separate storage facility.
    - Your data will only be stored on the cloud storage provided by CitCom.ai coordinators. In the event of a coordination change, this environment may change, and IMEC carries the responsibility to notify you of such changes.
    - The pseudoanonymized interview summaries will be stored on the cloud of IMEC, the coordinator of the project. Your data is therefore never stored on unprotected personal computers, handhelds or other end-user devices and is never forwarded by e-mail.

Consent

I, _____, agree with the content of this document and agree to participate in this research project.

I, _____, wish / do not wish to be publicly identified as a contributor to Deliverable 5.1.

Signature & Date:

_____

Name:
E-mail address: