

AI and standardisation of sustainable and smart cities



Feb 11th 2025 Workshop

Synthesis of the presentations

Abstract of the workshop

Like human intelligence, artificial intelligence is rooted in a body of knowledge, experience and feedback.

With a view to strengthening sustainable development in the face of today's challenges, what new information, bibliographical resources, observatories, data sets and models should be provided to AI for the cities and regions of tomorrow?

How can AI be integrated into standardisation processes and efforts pooled on a global scale, to guarantee its ethical use for the benefit of citizens?







To answer these questions, Cerema and AFNOR organised a working seminar on 11 February 2025 at the French Ministry of Ecology, as part of the AI Action Summit and the 'AI Frugale' day, bringing together fifteen experts of different nationalities (Germany, Brazil, China, United Kingdom, France, etc.), representatives of international organisations (United Nations University, OECD, European Commission, etc.) and local authorities such as Paris and ICLEI 'local governments for sustainability'.

Through the issues and feedback shared in a variety of fields (carbon emissions, mitigation of heat islands, quality of life, mobility, buildings, biodiversity, etc.), a fundamental question emerged: how can we organise the sharing of experience, pool skills, consolidate facilitating approaches and go to scale, for the benefit of all cities?

The forthcoming European and international deadlines for the creation of voluntary standards for sustainable cities, based also on 'smart solutions', could be based on the recommendations arising from these discussions: definition of trajectories for the sustainability of territories, taking into account of data relating to actions carried out by local players, monitoring of biodiversity in the urban environment, taking into account the human and ethical dimensions of development.

So the aim of this workshop was to identify what initiatives must be taken to insure the building of an AI as useful as possible for sustainability, by taking into account convenient informations to set up decisions and actions aligned with SDGs (the question of building a frugal AI being treated within an other side of the AI Summit).

Agenda

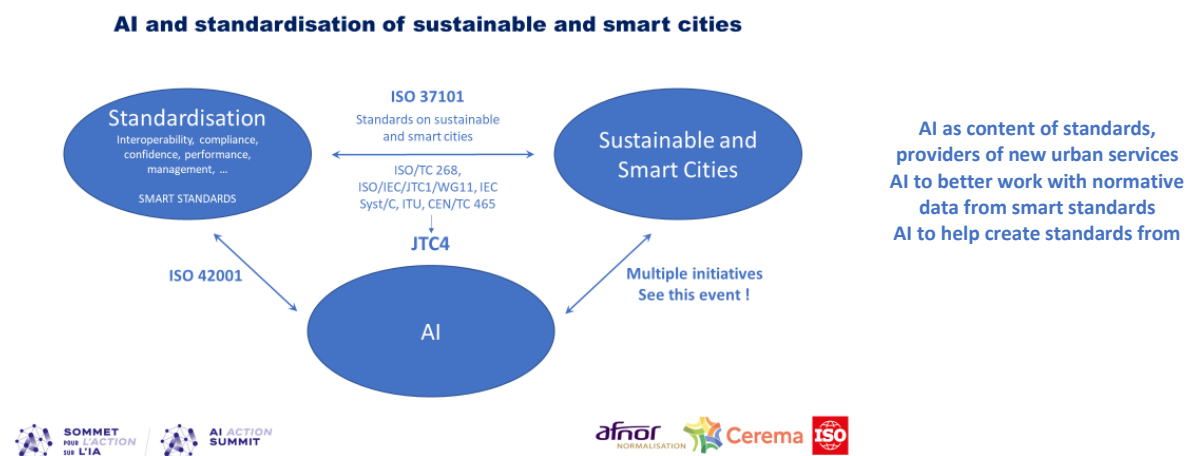
     			
Follow on line https://afnor.zoom.us/j/91705532106?pwd=LmB9EqQvO3LT0hEWptbY0xa6biUjLL1			
AI ACTION SUMMIT	AI and standardisation of sustainable and smart cities workshop, Feb 11th		
Theme	UTC H	Speaker	Organisation
Presentations AI issues and indicators for a "SDG" AI ?	12:45	Jean-Michel REMY	Head of the Construction and Water Cycle Department, AFNOR
		Christian BRODHAG	Cochair CEN TC 465 Sustainable Cities and Communities, Emeitis Pr.
		Marcos DIAZ RAMIREZ	Economist, OECD Centre for Entrepreneurship, SMEs, Regions & Cities
		Carlos MORENO	Associate Professor, Paris 1 University and IAE. Urbanist of the "15 mn city"
		Ilias IAKOVIDIS, PhD	Adviser, Digital aspects of Green Transition, DG CONNECT, EC
		Dr Soumaya BEN DHAOU	Research Specialist, United Nations University
		Wolfgang TEUBNER	Regional Director Europe, ICLEI Local Governments for sustainability
		François HISSEL	Monitoring, assessment and data Director, French Biodiversity Office
		Margot De Caminel	Data Project manager, Grand Paris Metropole
	14:05	PAUSE	
Discussion : short summaries of recent works conducted by ISO groups, then Q/A moment to the speakers under the common interrogation : "Which AI at the service of sustainable and smart cities, on what informations and data basis?"	14:10	Shanfeng DONG	ISO-TC268 WG3 City anatomy and sustainability terms, SAC, China
		Michael MULQUIN	Open Agile Smart Cities, Chair Smart Cities IEC-ITU Committee, BSI, Royaume Uni
		Jose ABREU	ISO-TC268 TG3 Strategic positioning of ISOTC268, ABNT, Brésil
		Luc Jonveaux	Mutt McDonald
Closing	15:10	Sophie HOUZET	CEREMA, Fabrice O program manager

Jean-Michel Remy, AFNOR, Head of Engineering, Construction, Water Cycle and Materials Department

AFNOR Normalisation – AFNOR Standardization, welcome participants and underline the linkage function of AI between standardisation and sustainability of cities and communities, particularly in the context of :

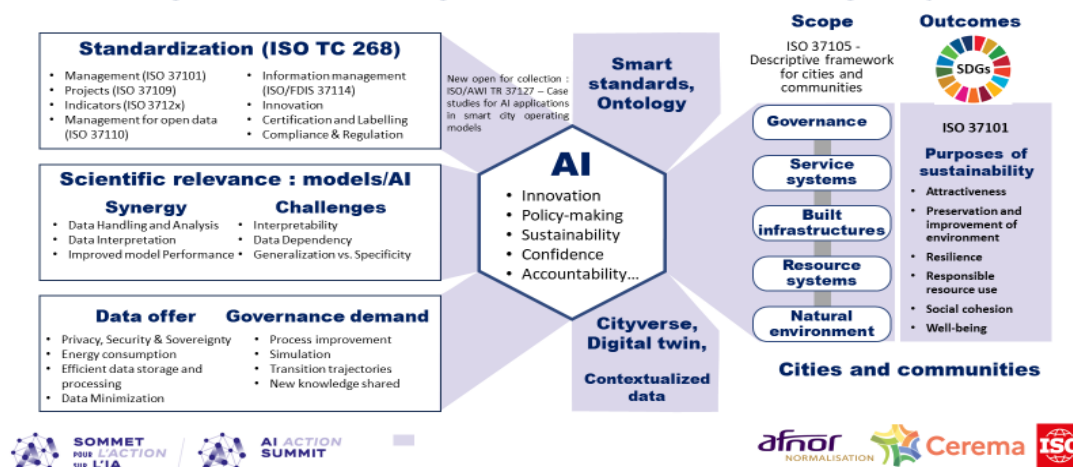
- The recent opening of the revision of the master standard ISO37101 ;
- An enlargement of the scope to smart cities through a new IEC-ISO Joint Technical Committee (JTC4) being launched before the end of 2025.

Smart standards will help to collect trusted normative data sets for new urban services and organisations and to reach sustainability goals. Standardization will address the various dimensions of the AI and smart topics, including governance, management, risk, assessment, ethical and privacy issues, sustainability, performance, evaluation, compliance, evaluation which are in the scope of the standardisation activity.



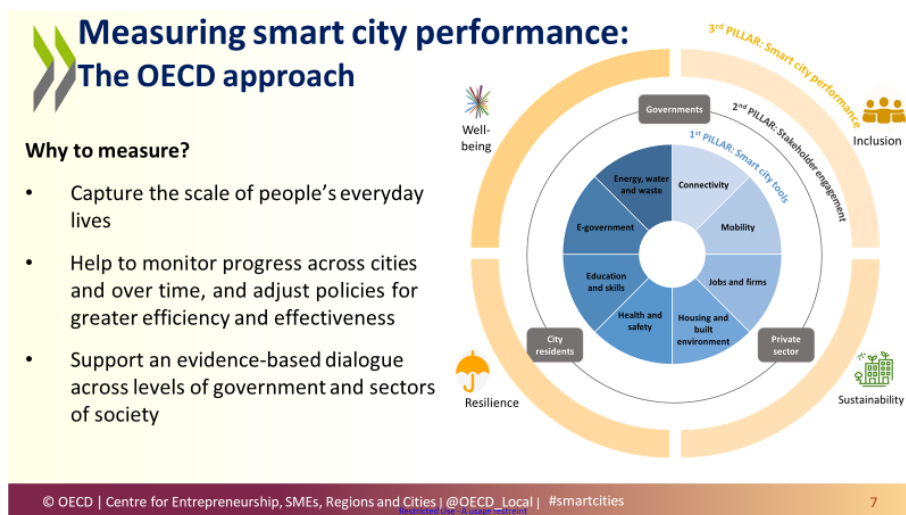
Christian Brodhag, CENTC465 Vice-President, present how AI is going to enable territories to pursue SDGs through massive territorial data sets implemented in local digital twins. These new resources will enable responsables to modelize territorial evolutions through scientific models, for optimized sustainability choices, which can be adressed at the different levels : services system, built infrastructure, resources, system and organization, nature and environment, in an integrated governance.

Challenges of AI integration into knowledge systems

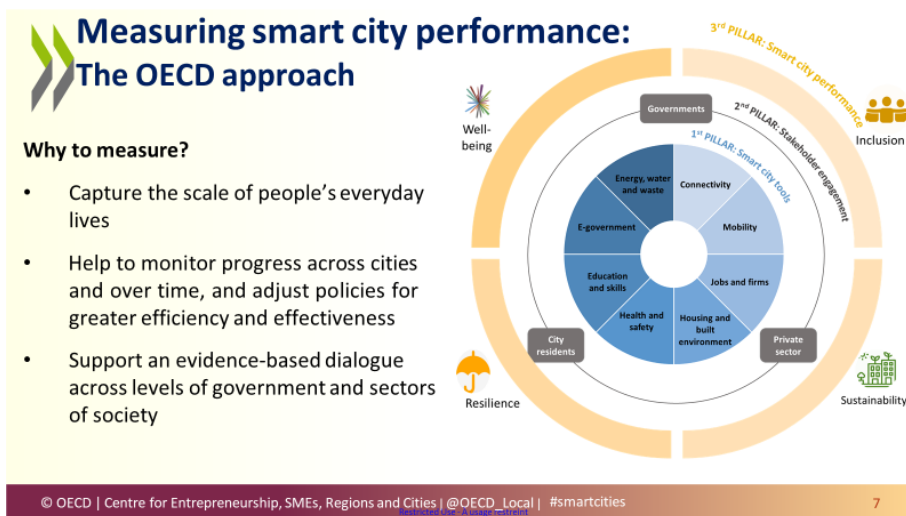


Referencing to this systemic comprehension of AI would be helpful to produce an outcome aiming SDGs and the different purposes of sustainability already defined by ISO 37101 : : developed in the ISO 37101 Standard : attractiveness, preservation and improvement of environment, resilience, responsible resource use, social cohesion and well-being.

Marcos Díaz Ramirez, economist at OECD, replaces digital divide in the context of inequal abilities to mobilize powerful tools : a « happy digitalisation », for people and for territories, may raise important results under the assumption that awereness and readiness have been raised at a sufficient level. Smart housing, mobility, infrastructure and urban planning, must be implemented regarding the social, economic, and environmental risks associated.



In order to prevent difficulties, OECD has launched in 2019 the program on smart cities and inclusive growth, with measurement of how smart cities perform in delivering better well-being, sustainability, resilience, and inclusiveness, particularly through sharing of best practices and increasing access to high broadband in rural areas. Smart city tools, engagement of stakeholders and SDGs are the three pillars of a dynamic including AI as a new step, giving to smart cities the opportunity of a better comprehension and management of public policies.



Carlos Moreno, Associated Professor, Paris 1 Sorbonne University, #15mn Cities focuses on the way AI is a resource for the shortest distances in cities, a concept for reconciling sustainability and quality of life. AI, software, computing and geodatabase analysis enable us for exploring our cities and territories, identifying our different resources services and uses available. On the other hand, AI open to discuss with citizens for having important local and citizen empowerment with an important social acceptability.

This model is a basis to define in what kind of city we want to live in, today around the world, instead of continuing to live with the unacceptable climate change, traffic jams, massive and crowded transportation and declining urban health.

Proximity to essential services through an organic density, a polycentric organization are accessible through an AI designed towards improving the quality of life, measured through 6 principal services : housing, retail, public services, education, greenspaces and sustainable mobility, over the 8 issues mentioned beside.



Based on Nobel Prize Paul Krugman works, and the 0 carbon and 0 poverty approach, our model combines the mesoanalysis of districts and the microanalysis of streets and individual homes. This approach opens lots of possibilities for exploring, and gives capability for generating new indicators in order to offer to the different inhabitants, with different profiles the best resources in proximity for avoiding long commute for working in a decentralized activity and for developing a hybrid model, opened to different kind of cities.

Same vision, methodology, different implementations

15-Minute Neighbourhood

Zurich, future «ville à 15 minutes»

Les habitants de la plus grande ville de Suisse ont accepté ce dimanche un nouveau plan d'aménagement du territoire. Qualifié de vote le plus important de la décennie, il devrait transformer l'agglomération.

Phasing Out Cars Key To Paris Mayor's Plans For 15-Minute City

21 janvier 2020 par Carbon 84d

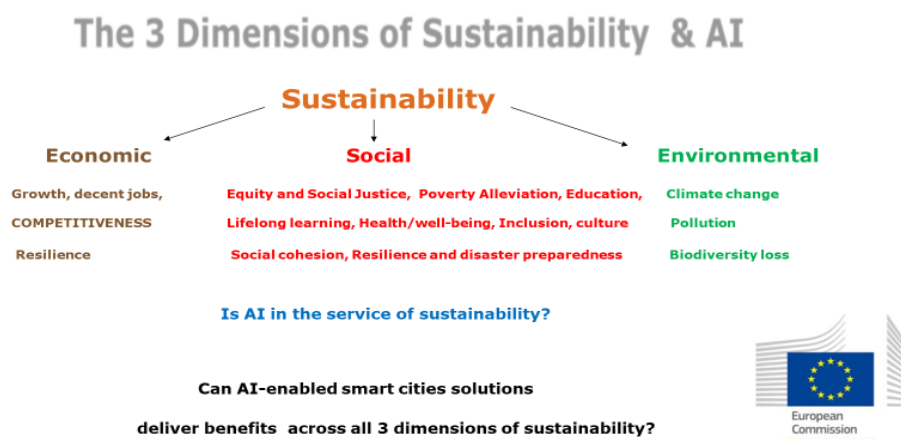
Busan - 부산시, 「15분 도시 부산 비전 선포식」 개최

We have developed a methodology adapted to a strong alliance between mathematics and computer science based on artificial intelligence, software, computing geodatabase analysis for exploring our cities and territories, for identifying our different resources, services and uses available, and, on the other hand, to discuss with citizens to generate local empowerment and citizenship involvement.

Ilias Iliakis (Advisor, DG CNCT, European Commission) evokes the European frame of AI Act, complementing Data Act, Digital Markets Act, Digital Services Act, European Data Protection Regulation.

The AI impact on sustainability must be better known. Digital agenda never cared about environment in the past and we need more indicators to qualify AI frugality and environmental benefits, a suitable standardization process on this topic should be efficient, especially in a context where a majority of heads of environmental agencies of member states think AI has a negative impact on environment higher than a positive impact.

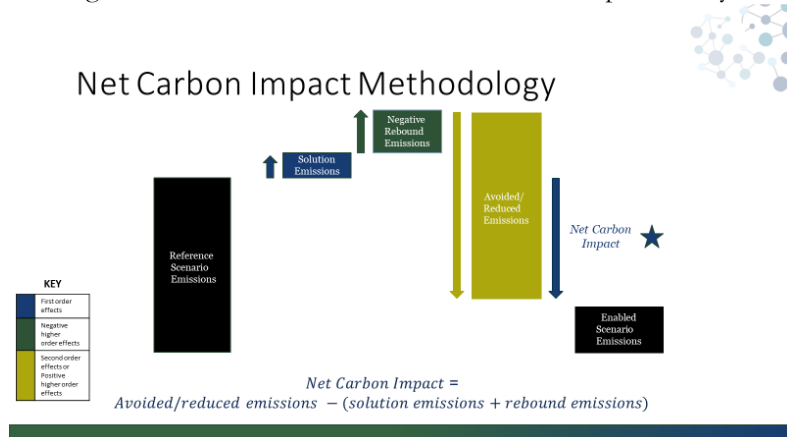
Minimizing digital resources because they have a negative impact on environment is a necessary effort, but it is also important to take into account all the positive results obtained by digital investment and specially AI, which lead to economic growth and social value but also to important savings in transport, energy, buildings, waste manufacturing, printing, publishing...



In the actual context « climate finance » represent quite half of the total amount, and the financial system is more involved and look for some criteria to appreciate targets of projects in terms of sustainability.

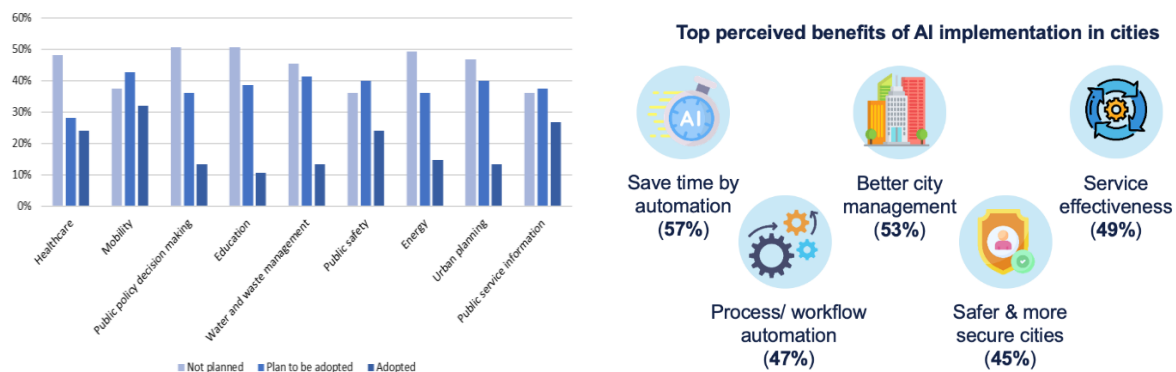
An appropriate approach has been set up by many digital large companies through a « net carbon impact method », with the help of ITU which is involved on the sustainability topic by the side of ISO and CEN.

The [Europe Green Digital Coalition program](#) gives details on applying the method presented above, which needs an increasing amount of data to show the Net Carbon Impact of any new digital investment.



A new expert group will be tasked by European Commission to calculate 50 cases, with a priority for Smart cities, with the expectation of mobilizing private investors and banks to finance smart city solutions. The development of AI should be a good support to follow these orientations, much more documented.

Dr Soumaya Ben Dhaou Research coordinator at United Nations University, Operating Unit on Policy Driven Electronic Governance, present the results of a study conducted in 2020, a global assessment of the opportunities and constraints about the design, implementation, adoption and use of a « responsible AI » from a worldwide perspective (even though global North and Global South raise different situations). The process aims inclusive and sustainable urban environment, aligned with human rights, fairness, privacy, and accountability, and at the same time takes into account the cultural, economical, infrastructural differences between cities. Lots of cities use AI (Generative AI, AI enabled-metaverse, Digital twins and IoT, Smartcity GPT) on different issues of urban environments, so a better knowledge of its effects is to be known. The following figure shows the principal purposes treated and benefits identified.



A large part of cities have the intention to implement AI to face urban challenges in the SDG's perspective, with a better citizenship involvement and taking into account the increasing occurrence of different risks.



Most of the surveyed cities look for the management of transport-related pollution and traffic, and a majority, especially in the global south, look for AI's potential to bolster their bussiness ecosystem, and emphasize education as a vital dimension.

A lot of actors present a request of standards and guidelines on responsible, ethical, and sustainable AI for cities in the SDG perspective, including ethical aspects and aligning AI implementation with smart city tenets of human-centricity, public-private-people partnership, and data-driven governance.

On this basis, three categories of key recommendations for a responsible AI have been proposed.

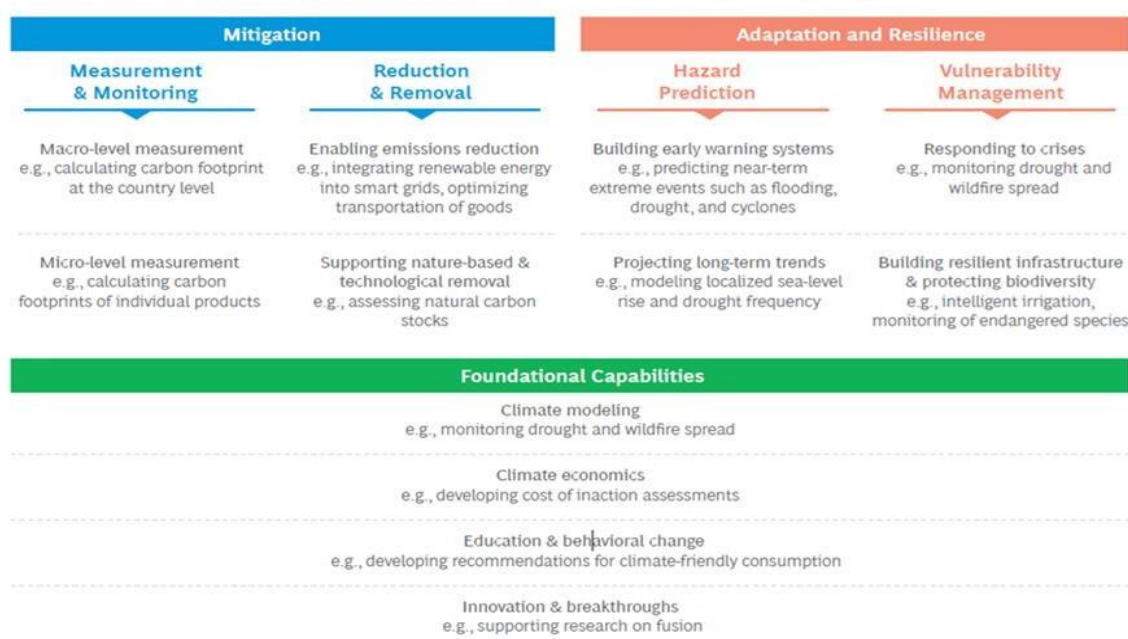


Tanya BAYCHEVA-MERGER Expert Green and Digital Transformation, represents ICLEI (Local governments for sustainability), a worldwide 2500 local and regional governments organisation, committed towards sustainable urban development.

AI and other digital solutions hold enormous potential for the cities to accelerate progress towards sustainability and particularly climate neutrality goals. The ICLEI AI for Cities return of experience is based on ten european cases (in Germany, Greece, Italy, Netherlands, Scotland, Spain, Sweden), within which six particularly use AI technologies with the particular goal of engaging citizens in urban climate action. The method conduct to provide data-driven insights, to urban planners and decision makers and to automate and enhance urban monitoring services.



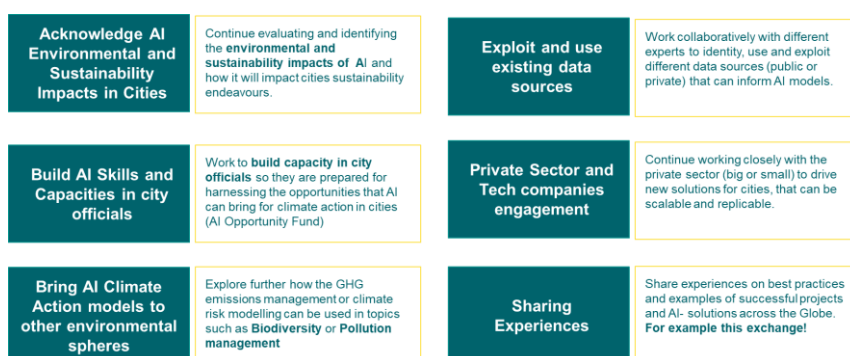
Exhibit 3 - Key AI applications to accelerate climate progress



Local climate vulnerability (Barcelona), Fire detection and propagation (Athens) and AI Energy advisor (Stockholm) are the main returns of experiences. Stockholm is developing a digital platform for citizens, for the city and for researchers, to access climate data, enable climate actions and fulfill the city's climate plan on the basis of an « AI driven energy advisor ». One result is a Chatbot for smart energy investments, climate models for local planning, to develop sustainability impact assessment and plans.



What is next on AI for urban climate action

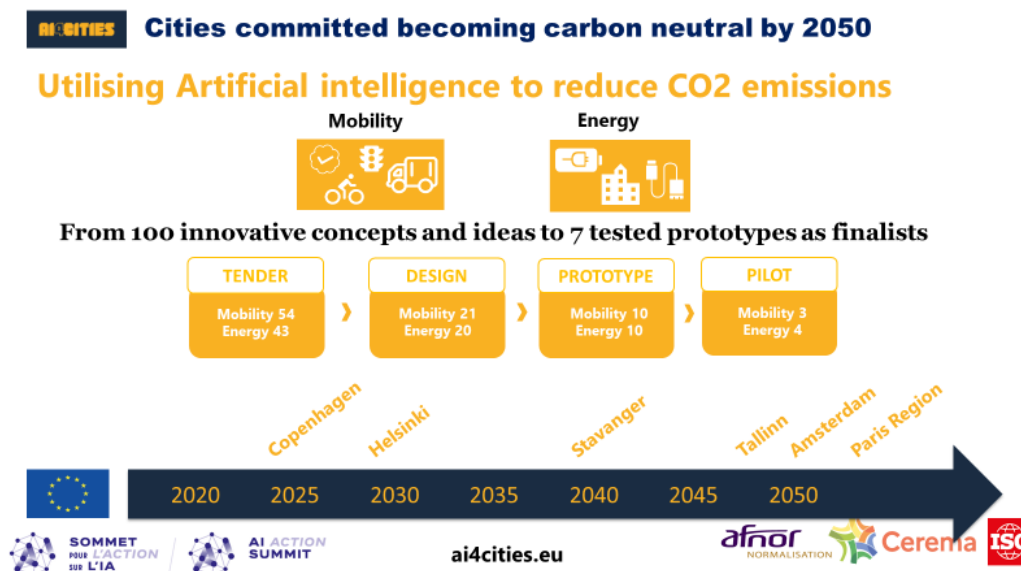


Data is a key point because of the need to mobilize lots of private and public data sources to train an AI model, if necessary through a particular pilot collecting appropriate data sources involving new partners at different levels, with very strict compliance to data, privacy, and security regulations to ensure ethical and responsible use of AI

Margot DE CAMINEL, Data Project Manager, Grand Paris Metropolis, present the AI4cities project, financed by the European Commission and gathering the cities of Tallin, Helsingi, Stavanger, Copenhagen, Amsterdam, a bueyrs group and ICLEI, in association with the french cluster and expert partner Cap Digital, in order to use AI for reducing CO2 emissions, principally in the thematics of mobility and energy, which represent nearly 80% of CO2 emissions, and are quite easy to tackle with AI.

To do so a tender has been launched in order to organize the public procurement.

A hundred of innovative concepts were presented, among which 7 pilots were tested in real life environment.



The solution presented here is a traffic flow management, based on machine vision and optimisation of traffic controllers. The city of Meudon welcomed a 6 months process basically easy to assess, based on the avoiding stop of the car at the red light, an interesting solution to cut CO2 emissions, avoid traffic noise and get a smoother traffic.

Results and lessons

After measuring footfall, noise levels, CO2 emissions and special events such as emergency vehicles passing through, an artificial intelligence algorithm was installed to regulate the traffic under these new objectives, and conducted to produce the following results:

- 2 to 3% reduction in CO2 emissions
- Stops avoided outside rush hours
- Waiting time 4 seconds shorter
- A real feeling of time saved

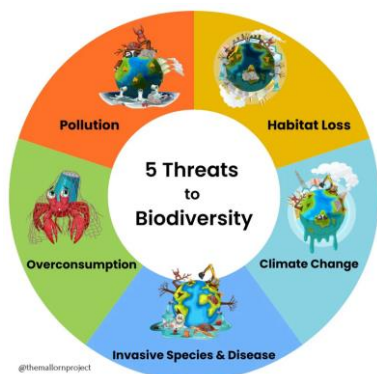
The project conducted to realize that there was no method for the use of data-driven CO2 emission assesment. So different solutions were tested in different cities, to create comparable indicators between the cities involved, in order to reach the goal of replicability and scalability.

This situation conduct to express the need of a method giving milestones about data availability, patterns of understanding as well as and mobilization of city agents.

It also appeared convenient to incorporate parameters concerning safety and security of users that had not been taken into account upstream.

François HISSEL Director of Surveillance, Evaluation and Data, French Biodiversity Office, present a support for cities to take into account biodiversity within urban territories.

Cities play a major role in the biodiversity crisis, as ecosystem services which are essential to our way of life are at risk. Cities generate 70 % of worldwide carbon emissions, fragment ecosystems, generate loss of natural habitats, destruction of food resources, overexploitation and pollution, increasing of temperature, change of climate, risks, and facilitate the arrival of invasive species.



Disconnection between human and nature is a key element :

60% of present-days extinctions are related to invasive species (sometimes introduced by poorly-designed planning strategies).

70% of the global CO2 emissions comes from cities.

59% of drinking waters systems in the US have been affected by eutrophication and harmful algal blooms.

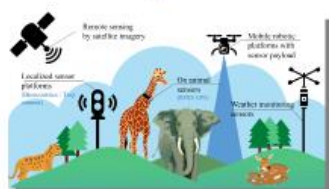
So cities must create spaces that foster this lost connection while integrating biodiversity into planning.

Artificial intelligence offers valuable tools to build answers :

- by giving capacity to analyze large data sets from acoustic, video and remote sensing sources ;
- by mapping habitats and predict evolution under different planning scenarios ;
- AI driven models can also improve the design of nature-based solutions and enhance communications between planners, scientists, policymakers and citizens.

The GBIF (Global Biodiversity Information Facility), created by OECD in 2001, plays a key role in data worldwide sharing, and compiles over 3 billion records of species occurrence, even it must be improved for local scale uses. The figure below shows different uses that can be proposed on this basis.

What is AI good for?



Monitor biodiversity through connected sensors, remote sensing, drones: help to detect species through acoustic records, images or videos



Map and model ecosystems (habitats, wetlands,...), model the tendencies of change. Predict the impacts of urban planning strategies



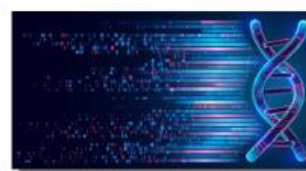
Optimize processes :
• green roofs design in Vancouver
• parks and gardens in Paris
• water leak detection in distribution systems in Bangkok



Supplement citizens in participative programs and help to raise awareness : capacity building, assess the quality of observations



Make decisions in real time to manage biodiversity



Enable breakthrough approaches to better assess biodiversity (DNA profiling)



It remains necessary to harmonize methodology : beyond the « red list index », assessment methods like the Global Biodiversity Score, which attempts to quantify biodiversity impacts from human activities, must be shared at a larger level, bridging disparities between regions and increase citizen participation in science programs.

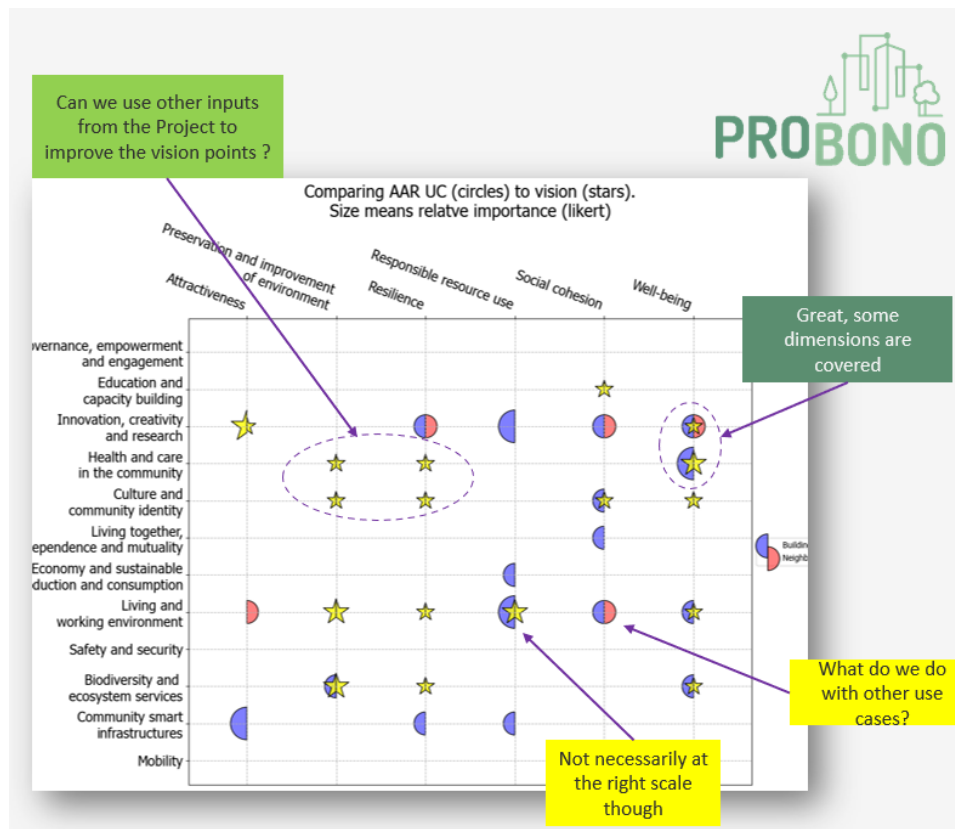
Luc Jonveaux, Mott McDonald, conduct a evaluative work on the ProBono projects on « green building neighbourhoods » funded by Horizon European programme, and on this basis presents how to enrich LLM-based city tools with the ISO37101 perspective.

PROBONO is a 47-strong Horizon 2020 funded project. We have used the ISO37101 series to shape a common understanding of sustainable cities and communities initiatives.

Qualify what are « green building neighbourhoods » conducted to standards and obviously reached the ISO37101, particularly interesting in regard of its 6 purposes and 12 issues matrix.

Then we used AI to build a mapping system, aiming at capturing information at scale (cities, regions, EU, Horizon activities) and **create a Cities sustainability initiatives catalogue**. We started with ~400 activities within the project, added another pilot, but won't stop there.

The following picture shows the alignment or lack of alignment between ambitions of the cities and their actions. This method is not dedicated to evaluation, rating or audits, it is a support to get a discussion for continuous improvement in driving the projects and the programme by sharing suitable information between candidates, stakeholders, local actors...



It captures what makes cities initiatives important, and adds several layers of metadata (geographical, time, budget, financing, number of initiatives, ... as well as when available KPIs, possibly from ISO37120), eg information that can be exploited by urban practionners.

This system can provide a reference to quantitatively gauge number of initiatives in different settings – and an automated watch over projects or initiatives, globally, independently of the context, size, language, territory, or country, as well as a dataset usable in any decision support system, to feed in relevant context for AI queries, than raise new indicators and data useful to add within sustainability policies, see the example of Resilience x Living.

One thing really interesting is we're not only assessing what we are doing as a project, but we're also assessing what our demonstrators want to do.

Shanfeng Dong, Chair, Shanghai Pudong Pearl International Standardization Institute (PSI) China, UTOPATH Group President, Convenor of ISO-TC268 WG3 (City anatomy and sustainability terms) and different WG, representing SAC, present his analysis of a global perspective : building AI + standards for 8 billion people and not only for 8 billionaires.

The use of AI applications, potentials and concerns is related to the standardization work in cities and communities, which has been examined through different standards. In the ISO 37127, AI application in smart cities operating models provides global cases on **policies, technologies, and management methods** for cities and communities to achieve zero-carbon goals.

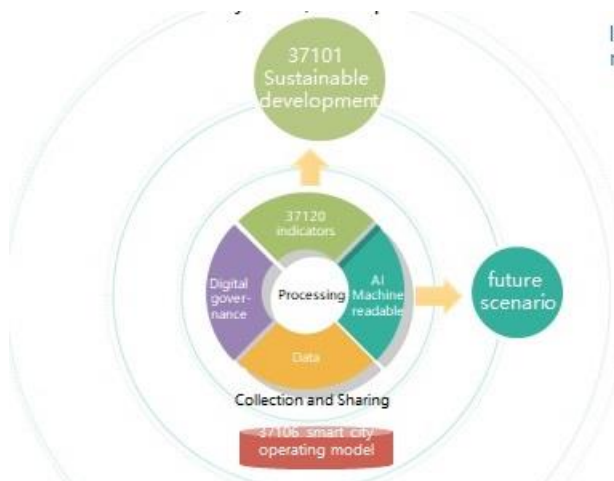


The difficulties identified (see figure besides) should be solved by using the ISO 37127 to share case studies and then elaborate recommendations and proposal for standards. This framework is to be developed with contributions from this workshop and others to come.

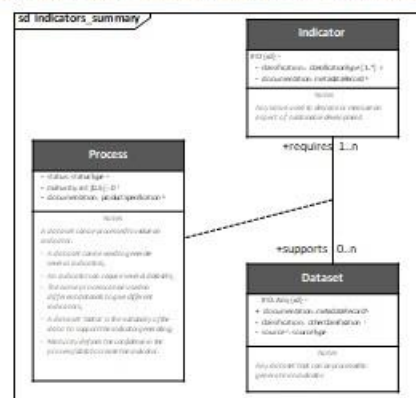
The ISO37115 concerning Net Zero Cities Pathways is also an issue and can use AI for lots of use cases in the industry, sustainable production, consumption, renewable energies and storage of energy, smart grids, construction, transportation, and a few others.

The 37111 standard is also useful as a guidance document for urban settlements undertaken in a step by step and progressive approach.

Then ISO37114 gives guidance to implement a method enabling cities to introduce AI in cities management around sustainability objectives, Datas filling the stastical model before launching an assessment....



ISO 37114 — Appraisal framework for datasets and data processing methods that create urban management information



5

Concluding this presentation, three questions are raised :

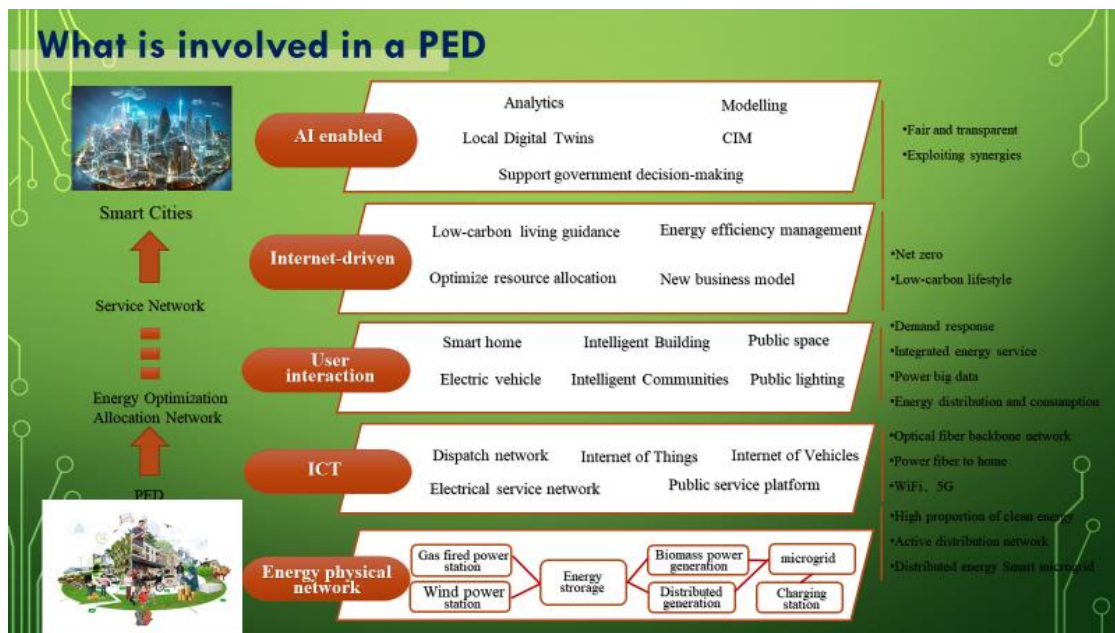
1. Will the widespread application of AI technology exacerbate social inequality? How to ensure the fair use of AI technology, also considering jobs and employment issues in SDGs ?
2. Would Human Intelligence survive out of Artificial Intelligence? What can be done?
3. How can the global challenges posed by AI technology mitigated through international cooperation?

Michael Mulquin, MIMs Ambassador for Open Agile Smart Cities, Chair IEC systems committee on smart cities, look at issues from a system perspective and insist on the huge diversity of situations, which is a challenge considering the amount of data we can use to tackle many different topics.

Here are the essential questions :

- How can we get the right data?
- How can we train the AI models effectively?
- How can we choose AI models that will provide us with the sort of answers we need?
- How can we aim many different SDGs that can seem to be in conflict with each other?
- How can we be careful enough in order not to let AI guide us?

The example of positive energy districts shows the need to look at a whole range of different issues at different levels.



On the basis of this scheme we need to scope out what are all the issues that need to be solved in order to develop a positive energy district, and how can those issues be implemented in a holistic way to make sure that all the different actions that are taken work together and not against each other. And of course, as we said, part of that is about developing requirements for AI, so that it will provide the fair, accurate, and effective guidance on how to manage the many key interlocking issues involved.

Open, Smart and Agile Smart Cities hold three proposals: use interactive approaches to develop policy guidance for cities and communities, develop a Minimal Interoperability Mechanism on interoperability between AI models, work with ITU to develop a Technical Report on how Large Language Models can facilitate semantic interoperability.

It is useful to see all the many different diverse things that cities are doing using AI. But to be efficient we must collect many case studies of how different sorts of cities, in different parts of the world are working, and then come up with appropriate shared good practice.

How can we address common use cases and gain information of how those use cases work across the great range of cities ? How can we collect information about how many different cities are addressing common use cases? How may we gain many cities to use the developing standards and provide the feedback needed to ensure that the standards we develop are effective across the range of cities ?

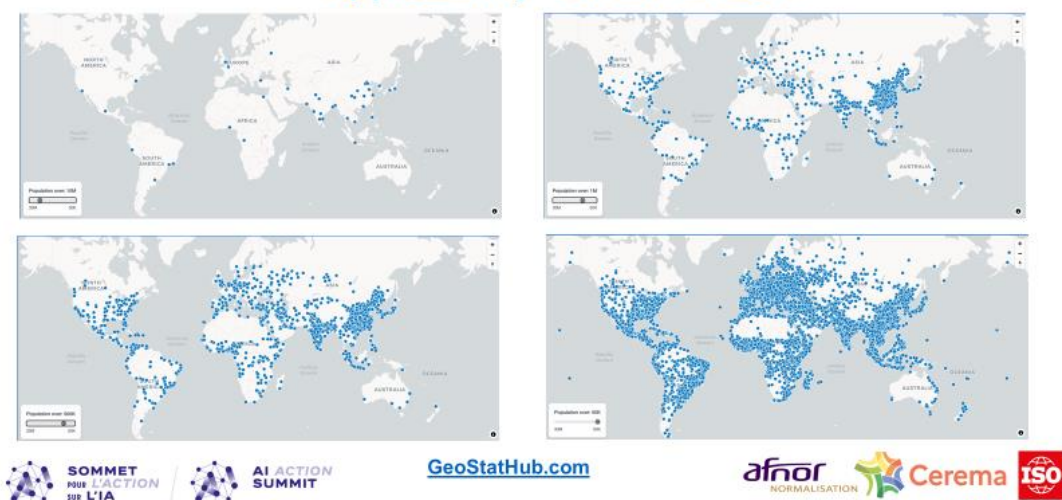
José Augusto Abreu, Chair of the Brazilian mirror committee for ISO/TC 268 – Innovation management, also participates, both at national and international levels, at ISO/TC 309 – Governance, ISO/TC 262 Risk management and ISO/TC 228 – Tourism, and plays an active role in PC 277 Sustainable procurement.

How can we link all these presentations, how can we use them and embed them in the ISO37101, taking into account that ISOTC268 is going to be part of the IEC/ISO Joint Technical Committee 4 dedicated to sustainable and smart cities ?

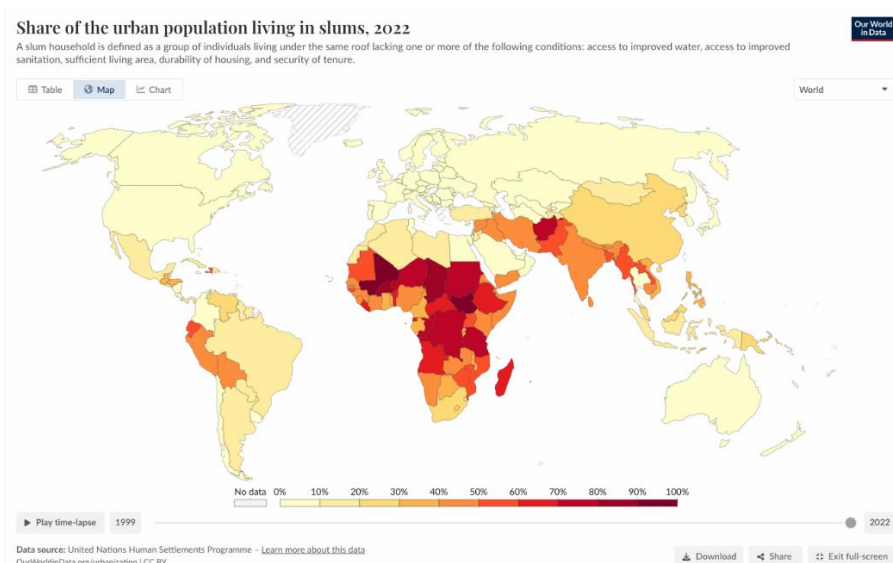
Among a lot of interrogations, a technical one is raising. The sustainable development system for cities and communities is to be applicable to cities and communities of all sizes. The two figure below shows how important is this challenge. That means that the standards should be as flexible as possible, as simple as possible, in order to address all the needs and challenges of all these kind of cities.

What are we looking for?

"Applicability" of ISO 37101



Looking at the economic situation of cities enhance this question of the ISO 37101 adaptability.



A complementary question has been asked on the chat by Pasquale Capezzuto : AI applications in some contexts as mobility, health, energy etc..., should be certified by specific standards to ensure security and safety for people. This topic implies specific skills in technical committees. What to do about that?

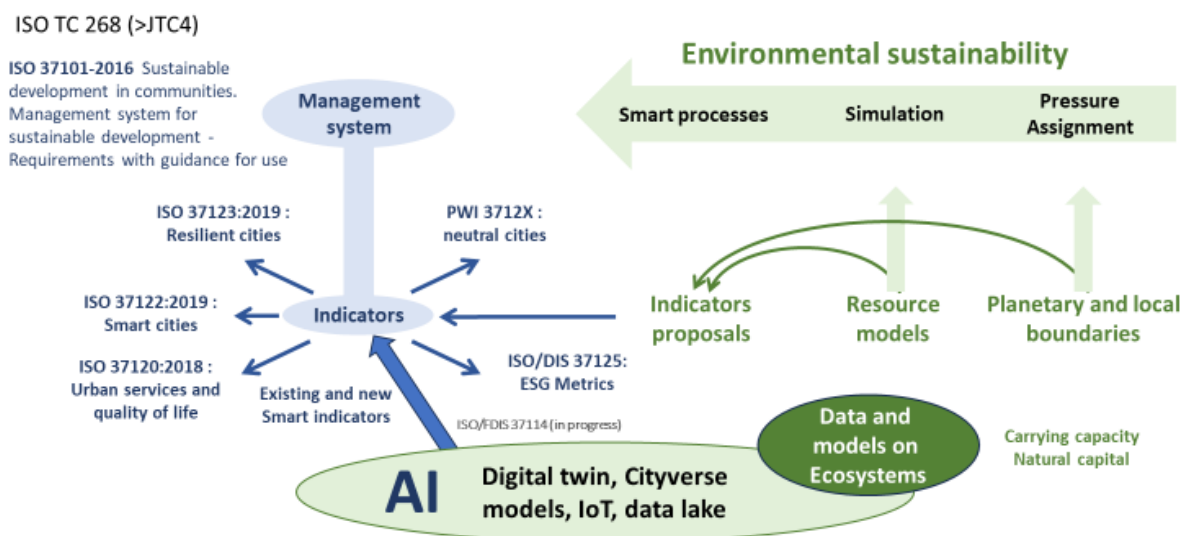
Sophie Houzet, manager of the Fabric'O Programme at CEREMA, closes the workshop by proposing to open coopération on the field of implementing examples, analysis, models, and data sets within a suitable perspective.

It appears from these presentations that AI can be a powerful lever for developing sustainable, resilient and inclusive cities, but it requires :

- Ethical governance: AI aligned with human rights and the Sustainable Development Goals (SDGs);
- Combine individual and collective strengths and put circularity in the heart of urban development;
- Developing citizen science to avoid the risk of disconnect between humans and nature, and use AI to facilitate analysis of the data collected;
- Developing the AI skills of leaders, and literacy;
- Developing simulation tools to help local authorities measure the impact of their projects on their carbon trajectory and adapt their policies;
- Go beyond pilot projects, integrate AI in urban climate plans, scale solutions in a responsible way;
- Deploy appropriate infrastructures, security, interoperability and cybersecurity.

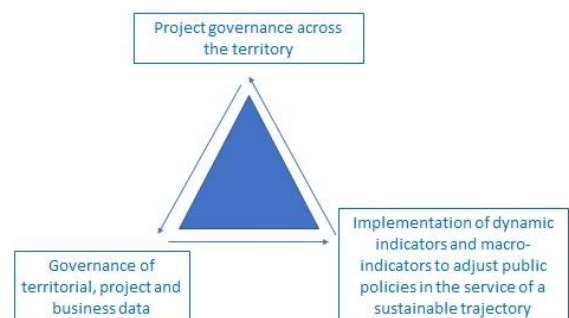
The integration of AI in standardisation will use shared infrastructures of Local Digital Twins, holding data sets implemented according to the rules given by the management system standard and the SDGs, which should integrate the questions of appropriate modeling and technical infrastructures.

INTEGRATION OF AI IN STANDARDIZATION



So this workshop opens an important opportunity to feed the revision process of the ISO 37101 as well as the shaping of the JTC4, to be built by ISO/IEC-JTC1 and ISO-TC 268 through a share of our values, methodologies and comparable indicators, semantic data model and innovative tools.

This dynamic could be much easily adopted in an open way, mobilizing citizens on the basis of a shared data governance using dynamic indicators and macro-indicators deserving sustainable local trajectories.





**SOMMET
POUR L'ACTION
SUR L'IA**



**AI ACTION
SUMMIT**

AI and standardisation of sustainable and smart cities workshop, Feb 11th

Synthesis of presentations and references

Jean-Michel Remy, AFNOR, Head of Engineering, Construction, Water Cycle and Materials Department
AFNOR Normalisation – AFNOR Standardization,

Christian Brodhag : Introduction to the workshop

Emeritus Professor School of Mines Saint-Etienne,
Cochair CEN TC 465 Sustainable Cities and Communities

Abstract :

How to mobilise AI in urban systems to promote the sustainability of cities and territories. Integrating the natural environment, infrastructures and populations via geospatial data and knowledge systems should promote the physical and human processes that shape urban space via a systemic and collaborative approach, where the information system makes it possible to better manage real activities in line with governance, thus facilitating the participation of all players, from institutions to citizens.

Two integration frameworks are proposed: the 'Local Digital Twin', which supports decision-making, simulation, optimisation of resources and assessment of environmental sustainability, and the 'Citiverse', an advanced communication tool promoting governance, social interaction and resource creation. At the heart of these systems, AI raises specific issues, in particular the adequacy of the supply of data to community needs and the challenges associated with confidentiality, security, sovereignty, energy consumption and data processing.

The relationship between AI and validated scientific models offers synergies in terms of analysis and interpretation, while posing challenges of interpretability and data dependency. In addition, integration into normative systems (with ISO standards such as 37101, 3712x, 37109, 37110, 37114) aims to guarantee data interoperability and consistency. The information system must cover all levels of the city - governance, services, infrastructure, resources and environment - to support ecological planning and the digital transition, with a view to sustainable territorial development based on the SDGs and the six pillars of ISO 37101: attractiveness, environmental preservation, resilience, responsible resource management, social cohesion and well-being.

Marcos Diaz-Ramirez

Economist, OECD Centre for Entrepreneurship, SMEs, Regions & Cities

Title: Sustainable urban development in the digital era

Abstract

Digitalisation and AI are transforming urban landscapes, creating new opportunities to enhance quality of life and drive sustainability. However, digital technologies also bring challenges that need to be managed, including digital divides, security risks, and governance complexities. This presentation – led by the OECD's Centre for Entrepreneurship, SMEs, Regions, and Cities – will explore the critical role of AI-powered smart city solutions in

fostering sustainable urban development. It will highlight the OECD's approach to measuring smart city performance, linking smart city tools to well-being, inclusiveness, resilience, and sustainability outcomes. Additionally, it will discuss how this framework leverages digital and AI tools to monitor progress towards the Sustainable Development Goals (SDGs) in regions and cities.

References:

The OECD Programme on Smart Cities and Inclusive Growth: <https://www.oecd.org/cfe/cities/smart-cities.htm>

“Measuring smart city performance in COVID-19 times: Lessons from Korea and OECD countries: Proceedings from the 2nd OECD Roundtable on Smart Cities and Inclusive Growth”, OECD Regional Development Papers, No. 19, OECD Publishing, Paris, <https://doi.org/10.1787/72a4e7db-en>.

Leveraging Digital Technology and Data for Human-Centric Smart Cities: the case of smart mobility: <https://www.itf-oecd.org/sites/default/files/docs/data-human-centric-cities-mobility-g20.pdf>

A Territorial Approach to the Sustainable Development Goals: Synthesis report , <https://doi.org/10.1787/e86fa715-en>.

Smart City Data Governance: Challenges and the Way Forward: <https://doi.org/10.1787/e57ce301-en>.

Carlos Moreno : A Franco-Colombian Academic and Urban Planner

Carlos Moreno, a Franco-Colombian academic and urban planner, has focused his work on transforming cities, mainly through the concept of the *"15-Minute City"*. A professor at the IAE Paris, University of Paris 1 Panthéon-Sorbonne, he also serves as the Scientific Director of the ETI Chair (Entrepreneurship, Territories, Innovation), where he develops insights on innovative and sustainable cities.

Synthesis of presentation : AI as a resource for 15mn cities

Artificial Intelligence (AI) is a key enabler of the 15-Minute City, enhancing urban proximity, sustainability, and livability. AI-driven data analytics optimize resource allocation, improve mobility, and foster citizen-centric planning.

AI enhances chrono-urbanism, ensuring essential services—work, education, healthcare, and leisure—are equitably distributed within short distances. Predictive algorithms improve public transport efficiency, reduce congestion, and promote soft mobility solutions like cycling and walking.

Geographic Information Systems (GIS) and AI-powered mapping play a crucial role in identifying and optimizing local resources. Dynamic cartographies provide real-time insights into service accessibility, guiding urban policies and fostering local economic resilience.

Open data and collaborative governance foster transparency and empower communities.

AI also personalizes urban experiences, from smart grids to dynamic public spaces. However, ethical deployment is essential to ensure inclusivity, privacy, and equity.

By integrating AI, GIS, and local cartographies, the 15-Minute City evolves into a Living City, where technology strengthens proximity, sustainability, and collective intelligence to rehumanize urban life.

Biography and Background

Initially a specialist in complexity sciences, technology, and urban innovation and an expert in complex systems and urban services, Carlos Moreno has oriented his approach toward sustainable urbanism, technological innovation, and new methods of planning smart cities.

The *"15-Minute City"* concept (2016) is based on restructuring cities around proximity to enhance urban dwellers' quality of life while reducing their environmental impact.

Digital Approach and Standardization of Sustainable Cities

Digital technologies are central to achieving sustainability goals, mainly through:

- **Massive big data** collection to understand urban dynamics.

- **Algorithms** dedicated to optimizing urban services.
- **Open data and collaborative governance**, ensuring transparency and local stakeholders' engagement in sustainable practices.
- **"Chrono-urbanism,"** which integrates proximity, service temporality, and urban life rhythms.
- **The impact of AI on urban management**, focusing on predictive analysis, infrastructure optimization, soft mobility management, and carbon footprint reduction.

Main References on the topic

- Moreno C., Allam Z., Chabaud, D., In 'Learning from COVID-19 for Climate-Ready Urban Transformation', *Case Study 1.4 "Implementing the "15-Minute City": a case study of Paris'* Cambridge University Press, February 2025
- Fondation Jean-Jaurès, Œuvre collective – «J'éprouve donc je suis. Des politiques du sensible pour réhumaniser notre quotidien » – January 2025. Chapitre : *"De la ville insensible à la ville vivante : la révolution de la proximité, une démarche du sensible"*.
Collective work, *"I Feel, Therefore I Am: Sensory Policies to Rehumanize Our Daily Lives": Chapter: 'From the insensitive city to the living city: The proximity revolution, a sensitive approach'*
- Nijkamp, P., Kourtit K., Krugman, P., Moreno, C. *"Old wisdom and the New Economic Geography: Managing uncertainty in 21st century regional and urban development"* – in Regional Science Policy & Practice, Elsevier, Science Direct, October 2024
- Moreno, C., *"The 15 minutes city: a solution to saving our time and our planet"*, Mai 2024, Wiley book.
- Moreno, C., Gall, C., Chabaud D, Garnier, M., *"The 15-minute City model: An innovative approach to measuring the quality of life in urban settings 30-minute territory model in low-density areas"* WHITE PAPER N° 3, IAE Paris Sorbonne, 2023
- Allam Z., Nieuwenhuijsen, M., Chabaud, D., Moreno, C. *"The 15-minute city offers a new framework for sustainability, liveability, and health"*, The Lancet Planetary Health 6 (3), 2022.
- Moreno, C., Allam, Z., Chabaud, D., Gall, C., Pratlong, F. *'Introducing the "15-Minute City": Sustainability, resilience and place identity in future post-pandemic cities'*, Smart cities, 2021

Ilias IAKOVIDIS

Adviser, Digital aspects of Green Transition, DG CONNECT, European Commission

Title :Quantifying the climate impact of the digital and AI based smart city solutions

Abstract

After more than 2 years of work the [European Green Digital Coalition](#) (EGDC) published in April 2024 the a science-based method to estimate the net environmental impact of digital solutions in major sectors of economy such as energy, transport, construction, agriculture, smart cities, and manufacturing. This work was done by the [EGDC Pilot Project](#) that supported relevant [organisations](#) and [experts](#) to work with the [EGDC members](#) to develop the [Net Carbon Impact Assessment Methodology for ICT Solutions](#). For the first time there is a detailed and agreed

methodology to calculate both the negative and positive carbon impact of digital solutions such as those used in smart cities context. If the net impact is positive that provides the necessary evidence to policy makers and financial actors to support the scale up of such solutions. By end of February 2025 the new EGDC Pilot 2 will start that will calculate 50 case studies from different sectors including smart cities setting and bring financial institutions to develop eligibility criteria for climate (green) financing of the deployment of proven green digital (AI) solutions. The new consortium will look for companies and cities deploying digital solutions that have and can share relevant data.

References

[Net Carbon Impact Assessment Methodology for ICT Solutions](#)

[Case Studies - European Green Digital Coalition](#)

[IT4Green : évaluation environnementale des effets directs et indirects du numérique pour des cas d'usage - La librairie ADEME](#)

Dr Soumaya Ben Dhaou

Soumaya Ben Dhaou is currently the research coordinator at the United Nations University Operating Unit on Policy-driven Electronic Government. She is leading the research line on "Digital transformation, Innovation and Emerging Technologies", investigating the potentials of emerging technologies such as Artificial Intelligence, Blockchain, IoT and Data Analytics and their impact on transforming urban centres and settlements and Government and public service. She led in collaboration UN-HABITAT and IDRC the “Global assessment on responsible AI in cities”. Soumaya is also lead contact for UNU-EGOV collaboration with the International Telecommunications Union (ITU) where she was responsible for a number of working groups under the U4SSC (United 4 Smart Sustainable Cities Communities) such as Blockchain for cities, simple ways to be smart and currently leading the working group on “Guidelines for inclusive, responsible and sustainable AI for cities”.

Research coordinator, United Nations University, Operating Unit on Policy Driven Electronic Governance

Title : AI for Sustainable Urban Futures: Insights from the Global Assessment of Responsible AI

Abstract

This presentation examines Responsible AI for sustainable smart cities, drawing insights from a global assessment. It underscores AI's potential for economic, social, *and* environmental good, aligning with human rights, SDGs, and ethical standards. Cities are increasingly adopting AI for urban challenges, but responsible implementation is vital. The presentation will cover how AI can transform areas such as mobility, *waste management*, and public safety, *promoting environmental sustainability through efficient resource use and reduced energy consumption*. It also highlights challenges like skill shortages, privacy, and regulation gaps, stressing the need for proper governance and context-specific solutions. It also emphasizes the potential of technologies like AI-enabled metaverse, Digital twins and IoT. The need for collaboration and the careful addressing of ethical considerations are also key points. Ultimately, it will showcase how tailored AI solutions can lead to resilient and *environmentally sound* urban futures.

References

Ben Dhaou, S., Isagah, T., Distor, C., & Ruas, I. (2024). [Global Assessment of Responsible Artificial Intelligence in Cities: Research and recommendations to leverage AI for people-centred smart cities](#). United Nations Human Settlements Programme.

Ben Dhaou, S. I. & Isagah, T., & (2024, October). Artificial Intelligence Readiness in Africa: Status Quo and Future Research, proceedings 17th International Conference on Theory and Practice of Electronic Governance (pp. 430-437).

Ben Dhaou, Soumaya Isagah, Tupokigwe (2024). [Responsible and Inclusive Urban AI: Opportunities and Challenges for Advancing Sustainable Development Goals](#). Science-Policy Brief for the Multistakeholder Forum on Science, Technology and Innovation for the SDGs, May 2024

Distor, C.B., Ruas, I.C., & Ben Dhaou, S. (2024). [Responsible Artificial Intelligence for Sustainable Development: Evidence from Asia-Pacific Cities](#). UN ESCAP Asia-Pacific Tech Monitor.

Ben Dhaou, S., Isagah, T., & Magalhães, L. (2024). [Exploring urban innovation: Insights from Artificial Intelligence adoption in Brazilian cities. Technologies for public services](#), XVI, No2 CETIC.br

Dr. Tanya Baycheva-Merger, ICLEI Europe

Title : Building Sustainable Cities with AI

Dr. Tanya Baycheva-Merger is an Expert in Green and Digital Transformation at ICLEI Europe, actively involved in key AI-focused projects such as the ICLEI Action Fund 2.0 and other smart city projects in Europe. Before joining ICLEI, she worked as a postdoctoral researcher at the Chair of Forest and Environmental Policy at the University of Freiburg, where she explored the intersection of environmental policy and digitalization, with a particular focus on the adoption and use of IoT by local governments.

Abstract

This presentation focuses on how AI can support the development of sustainable and smart cities. It provides an overview of the European policy landscape driving the green and digital transformation processes on a local and regional level, including the EU Green Deal, the AI Act, and the Competitiveness Compass. It delves into AI's role in sustainable urban planning, highlighting key application areas such as climate adaptation, mitigation, and resilience, as well as sustainable mobility, energy efficiency, waste and water management, and green infrastructure development. The presentation also examines the sustainability impacts of AI that cities need to consider and explores strategies to address them. It showcases ICLEI's work on AI by presenting key projects and highlighting innovative applications that contribute to the green and digital transition in cities.

References:

ICLEI Action Fund. <https://iclei-europe.org/funding-opportunities/action-fund/>

AI4Cities Project: <https://iclei-europe.org/projects/?c=search&uid=iF56bg0p>

Matrycs Project: https://iclei-europe.org/projects/?MATRYCS_&projectID=EDoiGTqQ&type=project

François HISSEL

Monitoring, assessment and data Director, French Biodiversity Office

"The IPBES Global Assessment on Biodiversity, published in 2019, highlights the urgent need for transformative global changes across society to achieve sustainability in our use of ecosystem resources. Cities play a crucial role in addressing this challenge: (i) they are at the heart of many driving forces behind biodiversity loss ; (ii) their scale of action is well-suited for implementing measures to protect and restore biodiversity at the local level ; (iii) as the first public authority in direct contact with citizens, they can foster public engagement in biodiversity-related actions and projects.

AI has already proven to be a valuable tool in several cities, supporting urban planning and decision-making. For example, it has been used to predict the impacts of green spaces and green roofs on biodiversity and to manage invasive species. AI is also widely employed to analyze vast amounts of satellite and sensor data, improving our understanding of ecosystems. However, its broader application is hindered by a lack of standardized data on species, habitats, and environmental pressures at the city level. Additionally, the indicators currently used to assess the impact of human activities on biodiversity for voluntary and mandatory reporting frameworks (e.g., CSRD, TNFD) fail to fully address all aspects of ecosystem conservation.

Many of these challenges could be addressed through AI-assisted citizen science programs. Citizen science is the largest source of biodiversity data worldwide and serves as a powerful tool to raise public awareness of biodiversity and ecosystem services. It also enhances civil society participation in decision-making processes. With its ability to process vast amounts of data, AI could reduce the burden on experts responsible for validating crowdsourced information, making these programs more accessible to citizens regardless of their expertise."

Margot de Caminel

Data Project manager, Métropole du Grand Paris

Title : Greater Paris Metropolis lessons learned from the AI4Cities european project

Abstract

“AI4Cities was a 3-year EU-funded project aimed at accelerating carbon neutrality in European cities through AI solutions. The project involved Helsinki, Amsterdam, Copenhagen, Greater Paris Metropolis, Stavanger, and Tallinn, focusing on mobility and energy challenges to reduce CO2 emissions and meet climate commitments by 2050.

AI4Cities was based on a Pre-Commercial Procurement (PCP) process, which challenges industry from the demand side to develop innovative solutions for public sector needs. PCP allows public procurers to compare alternative solution approaches and filter out the best possible solutions to address key challenges. This is how the project received 100 innovative concepts, worked on 20 prototypes and narrow down to 7 tested prototypes in a real-life environment.

MARHSALLAI, one of the pilot in the Mobility lot, was conducted in parallel in Greater Paris Metropolis, in the city of Meudon and in the city of Helsinki. MARSHALLAI used machine vision and deep learning for traffic management. The pilot aimed to reduce traffic noise, smooth traffic flow, and cut CO2 emissions.

Despite technical difficulties like tuning during experimentation, bugs, and unsuitable WiFi architecture, results showed a 2-3% reduction in CO2 emissions, 22% fewer stops, and shorter waiting times.

The piloting phase showed that technical improvements still have to be made as developing a technical validation model, certifying AI algorithms, and enhancing connection architecture.

In the end, the project highlighted several key lessons, including the challenges of creating comparable indicators, accurately estimating emission reductions, ensuring data access and reliability, maintaining data security, mobilizing city agents, managing pilot preparation times, and scaling solutions effectively.”

Shanfeng DONG

Chair, Shanghai Pudong Pearl International Standardization Institute (PSI), China

President, UTOPATH Group

Since 2013, Shanfeng DONG has actively participated ISO works, with rich experience in leading the development of several ISO standards and operation of multiple TC & WGs

ISO/TC 268 (Sustainable cities and communities), WG3 Convenor, registered expert in WG1 & WG4, former convenor of TG1

ISO/TC 321 (Transaction assurance in E-commerce), Committee Manager

ISO/TC 83 (Sports and other recreational facilities and equipment), WG10 Convenor, WG13 Convenor

Luc Jonveaux

MuttMcDonald

Title : Enriching LLM-based city tools with the ISO37101 perspective

Abstract

The EU-funded PROBONO project spans six neighbourhood demonstrators with 47 partners, managing approximately 400 activities. It uses the ISO37101 12x6 framework centred on sustainability and services..

To handle this scale efficiently, the project developed an LLM-based automation system for mapping urban sustainability initiatives on this framework, while maintaining human oversight. The methodology begins with stakeholder workshops and evolves into an automated system, maintaining human expertise in the loop while scaling efficiently across multiple demonstrators and hundreds of activities.

This methodology was tested on both PROBONO's activities and several hundred projects from Paris' Participatory Budget, creating a comprehensive knowledge base.

A result is the interactive catalogue, that identifies undervalued positive externalities in urban projects, helps communities evaluate and challenge their sustainability visions, and facilitates cross-project engagement through a shared language.

The system demonstrates practical applications in urban planning - when cities and communities can help strengthen their alignment, the tool suggesting relevant initiatives from its corpus. This approach enables systematic project mapping while breaking down traditional urban planning silos, supporting holistic sustainability strategies across different urban contexts and data sources, and provides a reference dataset for a holistic, qualitative cities review.

References

Using Large Language Models for a standard assessment mapping for sustainable communities - <https://arxiv.org/html/2411.00208v2>