

# Digital Transformation Webinar Series

Outcome Document 2023

Episodes 21-39



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Additional information and material related to this report are available at the [Digital Transformation Webinar Series Webpage](#).

If you would like additional information, please contact [digitaltransformation@itu.int](mailto:digitaltransformation@itu.int)

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# Digital Agriculture: Driving Digital Transformation for Food Security

Episode 21: 17 February 2023

## Overview

With the advent of the fourth industrial revolution, emerging technologies such as Artificial Intelligence (AI), the Internet of Things (IoT), and unmanned aerial vehicles (UAVs) are being embraced across sectors to enhance operations. Within the agricultural domain, there is further exploration of the potential of these technologies to drive digital transformation for ensuring food security and improving the overall agricultural production process to boost yield and distribution across the value chain.

This webinar explored the concept of food security in the context of digital agriculture and the role of AI and IoT in delivering interventions for the optimization of agricultural production processes.

## Opening Remarks

In his opening remarks **Seizo Onoe** welcomed participants of the webinar and thanked the organizers for their efforts in raising awareness of the important role of digital agriculture. He stated that one of the priorities of ITU is to ensure that the benefits of technological advancements are available to all people. He stressed the importance of inclusive initiatives and building bridges between different specialist technical areas to ensure that together we can develop comprehensive standardization solutions for the benefit of all.

**Dejan Jakovljevic** introduced the focus of the webinar, to explore the potential of digital tools and processes for addressing world hunger and achieving food security. He explained that digital technologies can help increase sustainable productivity, affordable access to digital technologies and digital public goods to foster food security, especially for rural and vulnerable communities. He highlighted the role of ITU in promoting the use and adoption of digital technologies and in advising and promoting the policy agenda to share the benefits of digital agriculture. He stated that AI can have a tremendous positive impact on agriculture by optimizing agri-food systems and alleviating hunger. Dejan Jakovljevic informed the participants that FAO is already using AI applications to improve forest management and pest control.

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Food and Agriculture  
Organization of the  
United Nations



**Seizo Onoe**,  
Director,  
Telecommunication  
Standardization Bureau,  
ITU



**Dejan Jakovljevic**  
CIO and Director,  
Digitalization and  
Informatics Division, Food  
and Agriculture  
Organization (FAO)



## Session 1: Digital Transformation in Agriculture

**Sebastian Bosse** opened the webinar session by introducing himself and his role as Co-Chair of the Focus Group on "Artificial Intelligence (AI) and Internet of Things (IoT) for Digital Agriculture" (FG-AI4A).

**Abhay Pareek** shared his policy insights on how to create stakeholder collaboration between public and private partnerships to scale digital agriculture technologies. He explained how India's agriculture sector is pressured to produce for 1.3 billion people with various challenges such as climate change. He explained how his team is working to create a more efficient, sustainable, and data-driven agriculture system. His areas of focus include inclusivity, sustainability, and efficiency, which allows to create a model that can be replicated across other countries who are facing similar challenges.

He discussed the three pillars of the PPP framework. The first pillar focuses on building an ecosystem where farmers can have access to digital services. The second pillar is about creating awareness and informing farmers of these services. The third pillar is establishing a sandbox, which provides a safe environment for every advisory to be tested and improvised, with a focus on safeguarding farmers by encouraging innovation. As an example, this model was implemented in Telangana whereby partnering with the government of Telangana it was possible to deliver services to around 7,000 farmers, as well as documenting the impact of the services on their farming practices. Abhay Pareek is working with state and provincial governments in India to generate these lessons and guidance which can then be shared with the agriculture industry of India. He discussed the importance of standardization of data sets, citing soil data as an example. He believes standardization is important for the government to understand how it should create, collect data and share data with the private sector. A big gap that he sees is that the governments have been collecting data, but they still do not understand how the private sector can benefit from it.

**R. Andres Ferreyra** shared his thoughts on agriculture, which involves collecting vast amounts of data variables in different forms so that they can be used as inputs to decision making. He believes that one of the things that is important is to standardize data type definitions in general, such as air temperature or yield in mass per unit area and make machine-readable data like definitions available publicly. He noted that data is only as good as the maintenance of the equipment and the attention being paid by the collector of the data. Therefore, we need to think creatively about the incentive structure for farm operators and producers to



**Sebastian Bosse**  
Head of Interactive &  
Cognitive Systems Group,  
Fraunhofer HHI



**Abhay Pareek**  
Lead, Fourth Industrial  
Revolution for Agriculture,  
World Economic Forum



**R. Andres Ferreyra**  
Data Asset Manager,  
Global Digital  
Agriculture, Syngenta



ensure they understand the value of good quality data and make it easy for them to use it.

**Claudia Rosner** explained that digital transformation is urgently needed in agriculture due to climatic, political, and economic changes. She discussed how the promise of data and advanced analytics can make more timely, precise, and granular decisions on farms. She stressed the importance of high-quality data in advanced analytics, including the right quantity and granularity of data, and the need to understand what is happening on farms. She also shared that the most important technology in agriculture depends on the farm's location and needs, but IoT has a real value in constant understanding when a potential risk comes up in the field.

She discussed the importance of labeling data, highlighting three key items when it comes to labeling. First, the important role of reference datasets to be able to understand, translate, and compare data, much like a dictionary, to help with labeling. Second, the use of synthetic data to have a more structured way to train data and label data in a lab setting. Lastly, use other datasets to detect errors and labeling to better understand where things need to be corrected manually. All three different techniques can significantly help with data collection and quality.

**Sebastian Bosse** closed the session and expressed his gratitude towards the speakers for their insights and participation in the discussion. He also thanked the audience for their interest and the ITU team for their support. He mentioned that he would like to continue the discussion in the future and invited the audience to participate in the Focus Group on AI and IoT for Digital Agriculture that will be held at the end of May 2023.

### Closing Remarks

**Ramy Ahmed Fathy** thanked the panelists and participants for joining the webinar, which is part of the ongoing ITU Digital Webinar Series. He also thanked the International Organization for Standards (ISO) and the Food and Agriculture Organization of the United Nations (FAO) for co-organizing the event. He outlined that the global food production would need to be accelerated to meet the demands of the growing global population, expected to reach 9.7 billion by 2050. He mentioned that technologies such as AI, Internet of Things, UAV soil sensors, and others could play a vital role in enhancing agricultural production and processing. These technologies would need to align with the Sustainable Development Goals (SDGs).



**Claudia Rosler**  
Director, Microsoft Cloud



**Sebastian Bosse**  
Head of Interactive &  
Cognitive Systems Group,  
Fraunhofer HHI



**Ramy Ahmed Fathy,**  
Vice Chairman of ITU-T  
SG20, ITU



**Bilel Jamoussi** thanked FAO and ISO for co-organizing the webinar on digital agriculture and food security. He cited an FAO report stating that nearly 828 million people were impacted by hunger in 2021, and by 2050, the world would need 50% more food to feed 10 billion people. He highlighted the adoption of digital technologies in agriculture for improving yield, reducing waste, and aligning with Sustainable Development Goals 3 and 12. Technologies like blockchain, RFID tags, unmanned aerial vehicles, and AI played pivotal roles in revolutionizing food production, tracking information, and enabling predictive analysis. ITU and FAO had established a Focus Group on AI and IoT for digital agriculture as a global platform for discussion. Jamoussi thanked the panelists and co-chairs for their insights and invited all stakeholders to join the discussion on international standards.



**Bilel Jamoussi**  
Chief of Study Groups, TSB,  
ITU



## Digital water in smart sustainable cities

Episode 22: 14 March 2023

### Overview

With the 68% of the world population anticipated to live in urban areas by 2050, the urban water demand is expected to increase by 80%. This rise in demand holds the potential to diminish resources and lead to overexploitation of water resources.

Cities embarking on a journey to become smart and sustainable, must therefore aim to pursue circular water strategies, supported by emerging technologies to ensure long-term water security and update the aging urban infrastructures associated with water distribution and management in cities.

### Opening Remarks

**Seizo Onoe** spoke about the importance of cities becoming smart and sustainable in how they use their resources, especially water, which is critical for human survival. He mentioned that the ITU Focus Group on Smart Water Management delivered a set of key performance indicators to assess the impact of smart technologies when applied to water management. He also highlighted the importance of privacy systems in smart water management.

**Juerg Luterbacher** emphasized the importance of water as a critical resource for human survival, especially in smart cities. He talked about the need to explore how emerging technologies such as AI and IoT can be leveraged for water resource management in smart cities. He discussed the role of effective water sensing and early warning systems in supporting water monitoring, facilitating decision-making, risk analysis, and predicting the location and intensity of water-related disasters, including floods. He also spoke about the work of the Focus Group on AI for Natural Disaster Management, which looks at how AI is used for data collection and handling, improving modelling, and providing effective communication in the advent of a natural disaster.

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**Seizo Onoe,**  
Director,  
Telecommunication  
Standardization Bureau,  
ITU



**Juerg Luterbacher**  
Chief Scientist, Director  
Science and Innovation,  
WMO





## Session 1: Digital Transformation in Agriculture

**Ramy Ahmed Fathy** discussed the increasing need for smart and sustainable cities as urban populations grow. By 2050, 68% of the world population is expected to live in urban areas, leading to an estimated 80% increase in urban water demand. City administrators need to monitor water supply and consumption, and emerging technologies like IoT and AI can help manage water infrastructure. Additionally, natural water-related disasters cause significant damage and losses, so it is essential to develop systems that can predict disasters and disseminate timely warning messages.

**Sebastian Bosse** provided an overview of smart water management which aims to guide the utilization of water in an efficient, sufficient, and sustainable manner. Contemporary management approaches involve innovative technologies such as sensors, smart water metering, information systems, data acquisition, and decision support systems. Sebastian highlighted that two-thirds of the global population may have limited access to freshwater resources by 2050 due to climate change, which is leading to frequent weather-related catastrophes. He stressed the importance of smart water management systems in achieving water security. He also discussed the challenges in agriculture, where traditional approaches are aimed at controlling water rather than managing it. Agricultural water management seeks to enhance productivity and conserve natural resources for the benefit of downstream users and ecosystem services. Sebastian explained that the Focus Group is driven by use cases to establish a catalog of best practices, identify relations between different use cases, and analyze technological challenges, proposed solutions, and obstacles. The Focus Group also identifies standardization gaps. He distinguished between two aspects of smart water management: the sensor level and the AI level, where IoT and novel technologies are used at the sensor level to find the digital representation of the physical world, and abstract models are used at the AI level to control these things, enabling the use of AI models for temporal prediction.

**Remko Uijlenhoet** spoke about the new opportunities in hydro-meteorology, particularly in hydro-meteorological sensing and monitoring. He highlighted the data revolution that has taken place in recent years and how it is related to developments in remote sensing, opportunistic sensing, and citizen science. As a hydrologist, he mainly studies the terrestrial part of the hydrological cycle and talked about how precipitation is the main driver of terrestrial hydrological processes. He also discussed how monitoring hydrological processes has been



**Ramy Ahmed Fathy,**  
Vice Chairman of ITU-T  
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**Sebastian Bosse**  
Head of Interactive &  
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**Remko Uijlenhoet**  
Professor, Water  
Resources Section, Faculty  
of Civil Engineering and  
Geosciences, Department  
of Water Management, TU  
Delft



revolutionized by different types of sensors, ranging from in-situ monitoring to ground-based remote sensing. However, he acknowledged the challenges associated with accurately estimating precipitation from satellites and weather radars.

To complement dedicated information from weather radars, rain gauges, and citizen science networks, Mr. Uijlenhoet suggested using cellular communication networks as an opportunistic source of precipitation information. He and his team are collaborating with the GSM Association and mobile network operators in various countries to use microwave links in existing cellular communication networks as rainfall monitors. He highlighted the importance of leveraging new technologies and data sources to better understand and manage hydro-meteorological processes, especially given the increasing risks of extreme weather events and climate change. By exploring new opportunities in hydro-meteorological sensing and monitoring, such as using existing cellular communication networks as rainfall monitors, researchers and practitioners can improve early warning systems and enhance preparedness and response efforts to mitigate the impacts of such events on communities and the environment.

**Monica Garcia Quesada** spoke about the International Water Resources Association (IWA) Smart Water Cities Project which she coordinates. The project examines the concept of smart cities and the use of smart border technologies in urban contexts. The main purpose of the project is to develop an index for smart cities, with the objective of measuring and comparing the provision of urban water services and management around the world. Before developing the index, she first wanted to understand the functions that water fulfills in a city, and in the first stage of the project, examined the different roles that water fulfills within a city and how technology can intervene at each stage. She found that digital technologies work alongside non-digital technologies in smart cities. Ms. Monica emphasized that the project's index would help identify the key elements of a smart city and compare one case to another. She explained that the index is designed to enable cities to self-assess themselves in terms of sustainable practices and to compare themselves to other cities in order to develop a ranking. She added that the key strategic objective behind developing the index is to encourage cities to adopt sustainable water management practices and to support them in their efforts. The index was developed through a rigorous and consultative process that included input from a wide range of stakeholders, including municipalities, water utilities, and civil society organizations.



**Monica Garcia Quesada**  
Project Officer, IWRA



## Building the pathway to sustainable digital transformation

Episode 23: 2 May 2023

### Overview

ITU, together with the Rwanda Utilities Regulatory Authority, have jointly organized the STI Forum 2023 “Side Event – Building the pathway to sustainable digital transformation”.

Over the past few years, science, technology, and innovation have become a necessary reality. However, digitization and sustainability are often viewed as mutually exclusive. As the global climate crisis persists, sustainability and digital transformation are well-positioned to be seen as complementary growth drivers.

Sustainable digital transformation has many foundational elements, such as circular economy, greening digital networks and efficiency of information and communication technologies (ICTs), that drive change. Having all of these pieces together can accelerate the progress toward the Sustainable Development Goals (SDGs), reduce greenhouse gas emissions and ultimately achieve global agreements and commitments.

### Opening Remarks

In his welcoming remarks, **Seizo Onoe** highlighted the importance of addressing the challenges posed by climate change and achieving the UN Sustainable Development Goals (SDGs). He stressed that the need for global action is urgent and emphasized the importance of taking tangible steps to combat climate change. His remarks highlighted the importance of using sustainable energy solutions and international standards to achieve sustainability on a global scale. This includes considering the role of digital technology in promoting sustainability and the need for careful consideration of the environment and social impact in supply chain management.

The collaborative nature of technical standardization, involving experts from around the world who build consensus on the necessary options to ensure that technologies and business practices are safe was emphasized. As well as the role of standards in addressing all aspects of the value chain and helping industry and

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**Seizo Onoe,**  
Director,  
Telecommunication  
Standardization Bureau,  
ITU



government to consider sustainability at all levels, from procurement to disposal.

Seizo Onoe concluded his remarks by stressing the need for urgent and sustained action to address climate change and achieve the SDGs. He emphasized the importance of using sustainable energy solutions and international standards to promote sustainability on a global scale and encouraged collaboration and innovation to achieve these goals.

In his welcoming remarks, **Charles Gahungu** emphasized the need for affordable and clean energy (SDG 7) to meet the growing demand for energy and the effect of fossil fuel on climate change. He discussed the impact of COVID-19 on the world and the need to accelerate recovery from the pandemic while implementing the SDGs. Noting that science, technology, and innovation are necessary components of development and growth, but they are often viewed as mutually exclusive with sustainability.

Speaking about sustainable digital transformation, he outlined its potential to be a complementary growth driver with foundational elements such as circular economy, greening digital networks, and efficient information and communication technologies. He concluded his remarks by outlining the objectives of the webinar to highlight development in science, technology, and innovation to accelerate progress towards the SDGs. He urged participants to continue exploring how the ICT sector can help in sustainable digital transformation at all levels and reach net zero emissions.

### **Keynote Speech: International standards paving the way towards a Sustainable Digital Transformation**

Delivering the keynote address, **Dominique Würges** spoke about the importance of international standards in achieving digital transformation and sustainability. He emphasized the role of ICTs in integrating digital technology into various sectors to enhance connectivity, efficiency, and create new opportunities. Connecting digital transformation with achieving the Sustainable Development Goals (SDGs), she described digital transformation as a critical strategy for staying competitive in the digital age, with implications for technology development, communication, and data exchange. The ICT sector was described as having a dual nature, contributing to global emissions but also offering potential for reducing them by 20% by 2030. For this reason, sustainability in the ICT sector, which includes energy efficiency, emission reductions, and waste management, was highlighted as a key consideration.



**Charles Gahungu,**  
General Manager of ICT  
Regulation, Rwanda  
Utilities Regulatory  
Authority (RURA)



**Dominique Würges**  
Chairman ITU-T Study  
Group 5



The role of international standards, particularly within the International Telecommunication Union (ITU) Study Group 5, was emphasized. These standards provide guidelines, recommendations, and technical guidance for governments, companies, and organizations to implement green energy solutions, measure progress, and improve connectivity. The ITU, as a multi-stakeholder platform, involves member states, private companies, academia, and civil society in the development of these standards.

In his keynote he further discussed the work of ITU Study Group 5 in addressing environmental and climate action issues, waste management, energy efficiency, and decarbonization. Specific recommendations and standards discussed included Recommendation ITU-T L.1023 for assessing energy efficiency and Recommendation L.1061 on circular public procurement of ICTs. Dominique Würges concluded the keynote by emphasizing the need for international standards to drive sustainable digital transformation and achieving the net-zero transition.

### **Session 1: Building the pathway to sustainable digital transformation.**

**Anita Batamuliza** opened the session by introducing herself as the Senior Officer in charge of e-waste Management at the Rwanda Utilities Regulatory Authority (RURA) and welcoming the first speaker. She then introduced the next speaker.

Discussing the relationship between sustainability and digital transformation, **David Jensen** stressed that we are at a pivotal moment in time where two of the greatest transformations in human history are taking place, digital transformation and sustainability transformation. The challenge that we face is connecting these two transformations into a twin transition where digital is sustainable, and sustainability is enabled through digital technologies. He explained that digital technologies are changing the way we live, consume, and entertain ourselves. They are also fundamentally shaping our perceptions of reality and our humanity.

In order to achieve global sustainability goals, he outlined the need to proactively harness and guide the development of digital technologies. He explained that the governance of digital technologies is one of the four priorities of the United Nations Secretary-General, and that the global Digital Compact planned for 2024 is expected to become the fundamental framework for governing these technologies.



**Anita Batamuliza,**  
Senior Officer in charge of  
e-waste Management,  
Rwanda Utilities  
Regulatory Authority  
(RURA)



**David Jensen,**  
Coordinator, Digital  
Transformation  
Programme, UN  
Environment



One of the issues highlighted was that digital transformation conversations around the world right now are systematically failing to address the issue of digital sustainability. There are two sides to the coin, the first being how to accelerate sustainable digitalization and minimize the environmental risks and impacts of digital tech. The second side of the coin is how to use digitalization to enable sustainability. David Jensen further elaborated on the core issues that need to be addressed for sustainable digitalization, such as energy, greenhouse gas emissions, and water footprint of ICTs, demand for rare earth minerals, pollution, spread of misinformation, and the creation of rebound effects. To achieve the Sustainable Development Goals, it is essential to connect the two transformations, where digital technologies are sustainable, and sustainability is enabled through digital technologies.

The sustainable digital transformation of communities through ICT technologies should be considered through the three pillars of environmental, social, and economic sustainability. This was the key message of **Leandro Navarro's** presentation, which emphasized that to achieve sustainability, we need not only energy efficiency but also material efficiency and sustainability of digital devices that are used by consumers and industry. He went on to discuss the importance of a circular economy model which prevents waste by focusing on using devices, parts, and materials in a sustainable manner, reducing the environmental impact. Saying that until we can achieve sustainable digitalization we cannot claim to have a circular economy, he pointed out that the ICT sector can have a transformative effect on society if appropriate digital infrastructure and digital tools are made available to everyone to achieve a sustainable transformation. Leandro Navarro also spoke about the role of sustainable digital transformation in helping to decouple natural resource usage from environmental impacts and economic activity. In conclusion, he invited everyone to join in defining a sustainable and just transformation, encouraging all stakeholders to be involved.

Speaking on the impact of ICTs on sustainability, **Christian Maasem** highlighted the double-edged nature of the ICT led transformation, accelerating digital transformation towards sustainability on the one hand, while leading to increased emissions and climate change impacts on the other. He emphasized the importance of green ICT and transparency which will enable the measurement of the impact of human decisions and actions on sustainability.

He introduced the idea of attainability coins, which would bring ICT and sustainability together for a better future in terms of the environment,



**Leandro Navarro,**  
Professor and Researcher,  
UPC



**Christian Maasem,**  
Partner & Head of  
Hyperconnectivity,  
Detecon Consulting



economy, and social impacts. He emphasized the importance of educating people, colleagues, and industries about sustainability while enabling them to see the impact of their actions and decisions. He discussed the benefits of attaining attainability coins for both technology providers and users, noting that this process would enable users to make a greener choice when going through a digitalization transformation process. He concluded by providing a hands-on example of the use of attainability coins to monitor carbon emissions using a carbon enablement calculator.

In her remarks, **Pernilla Bergmark** discussed the role of the ICTs in keeping the industrial, institutional and infrastructural sectors on track for achieving net-zero carbon emissions. Net-zero is the point at which an organization has reduced its emissions along its value chain following a science-based approach and neutralized any residual emissions using the same approach. She went on to outline the importance of the guidance provided by ITU-T Study Group 5 on setting net-zero targets and strategies for ICT organizations. Furthermore, she discussed the ICT industry's targets for reducing emissions by 45% from 2020 to 2030, as well as the need to work on both the positive and negative effects of ICT on the environment.

She explained three levels of effects of ICT, which include first-order effects that comprise direct environmental impacts, second-order effects that come from using ICT services and can affect other sectors, and higher-order effects that can cause more transformative changes in society, including changes in behavior. In providing an overview of the greenhouse gas emissions globally, Ms. Pernilla Bergmark highlighted that the majority of emissions are related to energy and industrial processes, and ICT's footprint is relatively small compared to other sectors. However, she noted that the indirect effects of ICT on other sectors can be substantially larger than their own footprint.

### Closing Remarks

Providing concluding remarks, **Paolo Gemma** expressed his appreciation for the positive engagement by the webinar participants and noted that the discussions during the session have been informative, interesting, and provocative. He acknowledged the challenges involved in managing digital transformation initiatives and highlighted key issues to consider such as implementing circular practices, acknowledging the role of ICTs in enabling change, and the crucial role of standardization and using international standards. He encouraged all attendees to take insights and findings from the session and apply them by



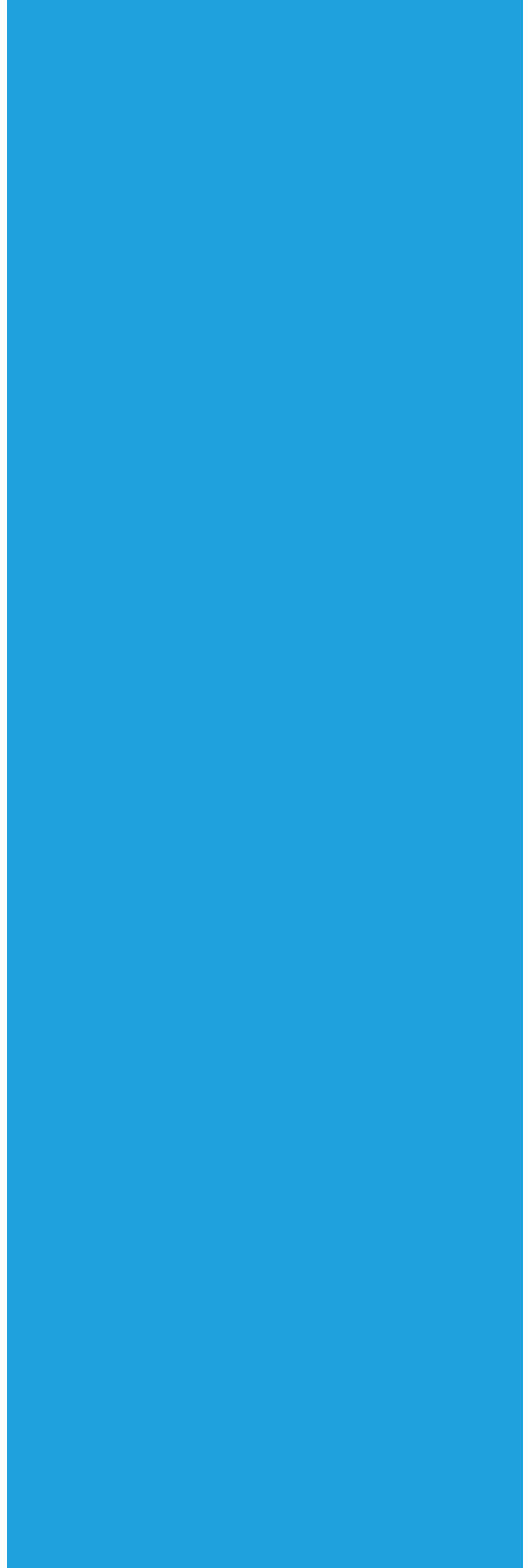
**Pernilla Bergmark,**  
Principal Researcher ICT  
Sustainability Impacts,  
Ericsson



**Paolo Gemma,**  
Chairman, Working  
Party 2 of ITU-T Study  
Group 5



working together to create a sustainable digital transformation pathway for a better future for themselves, the community, and the planet.







# Building back smarter and more sustainable cities through the United for Smart Sustainable Cities Initiative

Episode 24: 3 May 2023

## Overview

Cities around the world face rapid urbanization, economic constraints and environmental stressors. To address these challenges, city administrators are turning to digital technologies to reshape how services are offered in the urban environment. Digital innovation over the past two decades has been at the heart of smart sustainable cities to build more efficient and livable urban environments. By employing digital technologies cities can increase efficiencies, economic development, sustainability, and life quality for citizens in urban areas, demonstrating how cities are accelerating their recovery from COVID-19 and achieving the 2030 Agenda for Sustainable development at all levels.

## Opening Remarks

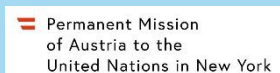
In his welcoming remarks, **Seizo Onoe** stressed the significance of establishing human-centered cities in achieving the Sustainable Development Goals, especially in the face of rapid urbanization, economic concerns, and environmental challenges. He emphasized the role of technology in shaping urban services and improving efficiency, economic development, sustainability, and quality of life for urban inhabitants. He also discussed ITU's work in developing international standards to support the efficient and sustainable functioning of cities worldwide. As an example of ITU work on smart cities he spoke about the United for Smart Cities and Communities (U4SSC) initiative which to date has supported over 150 cities on their digital transformation journey, advocating for public policy and encouraging the use of digital technologies to facilitate smart cities.

Seizo Onoe also officially launched the “U4SSC Procurement Guidelines for Smart Sustainable Cities”, which provide cities with tools to transition towards more sustainable procurement practices, and improving their supply chain performance. In addition, he announced the release of a new ITU publication, "Building a people-centered digital future for cities and communities," which aims to drive the development and standardization of smart, sustainable cities

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**Seizo Onoe,**  
Director,  
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and communities. In his concluding remarks he highlighted the importance of ITU's Digital Transformation webinars in identifying new ideas and initiatives for sustainable digital transformation.

In his welcoming remarks, **H.E. Mr. Nape Nnauye** spoke of the challenges that cities face, including increasing demands for energy, water, sanitation, healthcare, and housing. These challenges require an urgent need to rethink urban planning and the use of digital solutions. He emphasized the importance of involving all stakeholders in the development of smart cities and how the issues cut across many sectors, such as transport, water quality, energy, healthcare, education, public services, and the ICT. The smart city approach helps to overcome the limitations of traditional urban development that tends to plan and manage urban infrastructure systems in silos. He spoke about Tanzania's new capital city, Dodoma, which is currently in a period of transition due to a population increase. The Tanzanian government is developing Dodoma as a pilot smart city, which will be built upon the developed national capital master plan of 2019-2039. He stressed that smart city development is the future approach to urban planning and management for Tanzania as it can provide solutions to urban challenges such as the inefficiency of delivering urban services, environmental pollution, and traffic congestion.

In his welcoming remarks **H.E. Mr. Hans-Joachim Almoslechner** discussed the crucial role of cities in accelerating their digital transformation towards smart and sustainable development. He highlighted the challenges faced by cities worldwide due to rapid urbanization, socio-economic issues, and the negative impacts of climate change. He emphasized that technology and digital transformation can play a vital role in addressing these challenges, and encouraged the panel to discuss concrete examples of digital innovation and explore how lessons learned in one city can be a model for others. He also mentioned the importance of the ongoing consultations on the global Digital Compact, led by the permanent representatives of Rwanda and Sweden, and supported by the Secretary-General's Envoy on Technology. He informed participants that Austria has submitted written comments to this process as part of the European Union contribution and in its national capacity.

The Chairperson of the United for Smart Sustainable Cities (U4SSC) Austrian country hub, **Barbara Kolm**, spoke about the U4SSC platform and its unique role in accelerating cooperation between the public and private sectors while facilitating digital transformation in cities and communities. She highlighted the role of the ITU in bringing together UN agencies, governments, industries,



**H.E. Mr Nape Nnauye,**  
Minister, Ministry of  
Communication and  
Information Technology,  
Tanzania



**H.E. Mr Hans-Joachim  
Almoslechner,**  
Deputy Permanent  
Representative and  
Minister Plenipotentiary,  
Permanent Mission of  
Austria to the United  
Nations



**Barbara Kolm,**  
Chairman of the U4SSC  
Austrian Country Hub



academia, and civil society initiatives, such as the U4SSC, to develop the U4SSC Key Performance Indicators (KPIs) that help cities drive and measure their digital transformation progress. Over 150 cities have undergone U4SSC KPIs assessment to evaluate their level of smartness and sustainability, and many more are invited to join this initiative.

Following the COVID-19 pandemic, the positive role of digital technologies in increasing efficiency, sustainability, economic development, and life quality for city inhabitants was highlighted. She went on to discuss how digital technologies can better support cities and their inhabitants, how U4SSC KPIs can help cities make better-informed decisions, and the latest progress made by U4SSC.

### **Session 1: Empowering Digital Transformation in cities**

**Tania Marcos**, introduced her role as the Vice Chairman of the U4SSC Initiative, and moderator of the webinar on building back smarter and more sustainable cities through the United for Smart Sustainable Cities Initiative. She outlined that the webinar is part of the ITU Digital Transformation Webinar series, which explores digital transformation's role in driving innovation, sustainable growth, and inclusion. Tania Marcos, went on to explain that this session will focus on assessment and procurement's role in accelerating digital transformation for cities and communities. The panel is expected to discuss various aspects of digital transformation, KPIs, and city implementation strategies.

**Cristina Bueti** spoke about the opportunities cities have to accelerate their digital transformation to become smarter and more sustainable. She pointed out that by 2050, 70% of the global population is expected to live in cities, which means that achieving smartness and sustainability is not a point in time, but a journey. She emphasized that cities and governments must keep up with the ever-evolving ecosystem of digital innovation, including setting realistic targets and using new data, technologies, and tools for better-informed decision-making. She also mentioned that citizen engagement and public-private partnerships are essential, and that the impact of projects and initiatives on cities needs to be evaluated to take necessary action.

Moreover, Cristina Bueti highlighted the importance of innovative financial sources to accelerate the digital transformation, and building people-centric cities and communities that empower people, ensure equitable access to technology, and manage data responsibly. She stressed that building trust is a key component and developing a multi-stakeholder capacity is necessary to give



**Tania Marcos,**  
Vice-chairman, U4SSC



**Cristina Bueti**  
U4SSC Focal Point and  
Counsellor, ITU



the necessary training and information to communities to use technology efficiently.

She also spoke of the ITU commitment to connect the world and support everyone's rights to communicate. As part of this work, ITU Study Group 20 has developed a set of recommendations that provide guidance on how cities can overcome challenges and support digital transformation in both rural and urban areas, enabled by solutions like the Internet of Things, digital twins, and AI. These standards cover different areas from infrastructure and architecture to interoperability, identification, security, assessment, and measurement.

**John Smiciklas** provided an overview of the key performance indicators (KPIs) developed through the United for Smart Sustainable Cities (U4SSC) initiative. The KPIs were developed to help cities have a standardized method to collect data, measure performance, become smarter, more sustainable, and ultimately contribute to the achievement of the Sustainable Development Goals. The KPIs were created with an official collection methodology based on IT standards, and over 150 cities worldwide are using them. The KPIs are focused on three dimensions: economy, environment, and society and culture, with 55 core indicators and 36 advanced indicators further subdivided into smart, structural, and sustainable indicators. The KPIs should be comprehensive, quantitative, collectible, and easy to collect. The KPIs were created to allow cities to track their progress over time, disseminate best practices through benchmarking, and measure their progress in meeting the SDGs. The KPIs were developed to help support digital transformation in cities. In closing John Smiciklas said that the KPIs are expected to help cities measure their progress towards achieving a sustainable future.



**John Smiciklas**  
U4SSC Verifier

**Warren Smith** discussed the development of the new U4SSC Procurement Guidelines and their contribution to a new digital commercial paradigm. The guidelines aim to ensure that public procurement has positive impacts on the well-being of people and the planet, both now and in the future. He explained that the guidelines were created as a result of meetings held in 2019, and one of the key focuses of the guidelines is to provide practical guidance for each stage of the digital data and technology buying cycle. He emphasized the importance of taking a holistic approach that starts with pre-procurement planning and engages constructively with the market.



**Warren Smith**  
Thematic Group Co-  
Leader, U4SSC

To illustrate the guidance, Warren Smith shared several case studies from around the world. These case studies showcased how countries like the Dominican Republic, Mexico, Ecuador, and New Zealand are implementing



sustainable procurement practices. For example, the Dominican Republic launched initiatives to support women and businesses in public procurement, while Mexico City collaborated with a nonprofit organization to improve bike-sharing systems.

He also highlighted the case study from Indonesia, which focused on designing cities that work for women. The research conducted in this project emphasized the importance of understanding user needs and involving stakeholders to bring about change and develop empathy for users' experiences.

Warren Smith acknowledged that implementing these guidelines comes with challenges, as cities face complex issues like COVID-19, climate change, and rising inequalities. However, he stressed the importance of scaling efforts to improve smart and sustainable procurement and ensuring that sustainable development principles guide all public sector decisions.

In conclusion, he stated that the guidelines represent a new digital commercial paradigm that promotes transparency, innovation, efficiency, and collaboration in public procurement. The guidelines are applicable to anyone engaged in procurement activities for the public sector and provide a framework for implementing accessible, human-centered, and data-driven approaches in procurement. He emphasized the need for a change in mindset and culture, as well as the importance of multidisciplinary and cross-functional teams founded on honesty, transparency, collaboration, and integrity.

**Cristina Martinez Pinto** spoke about the work of her organization in Latin America, emphasizing the importance of people-centered development and user experience in policymaking. She brought together a team of young Latin American experts from different specialties, including gender and technology experts, public innovation, and public procurement, and highlighted the significance of enabling multidisciplinary teams to drive real transformation.

She gave examples of PIT Policy Lab's initiatives in Mexico, including a collaboration with the British Embassy in Mexico City to provide 30 municipal governments with seminars on digital transformation, and cyber security. The seminars touched on emerging technologies such as artificial intelligence and discussed their application to improve public services. After the seminars, PIT Policy Lab asked the participants about their key concerns, and the participants highlighted the need for more support to drive the transformation agenda.

Another initiative was aimed at empowering SMEs in Mexico in the smart tourism industry, where PIT Policy Lab collaborated with the Mexican



**Cristina Martinez Pinto**  
Founder and CEO, PIT  
Policy Lab



government to develop policies that would enable smart tourism. Ms. Cristina Martinez Pinto emphasized the need for collaboration across organizations to work with municipalities interested in continuing their digital transformation agendas. She concluded by emphasizing the need to support specific needs and assessments to reach the desired transformation goals.

**Alexandre Bosshard** spoke of his experience implementing the U4SSC KPIs in the Swiss city of Pully. The first phase of the project resulted in an excel chart with around 1,000 cells and two meters long which is difficult to be used. That's why the second phase of the project aimed to develop an intuitive and user-friendly representation of the data to make it as comprehensible as possible for all key stakeholders. For the city administration, the strength of the KPIs was in providing a global overview of the situation while having a limited number of indicators, and the ability to contribute to reaching the SDGs. The KPIs also provided an opportunity for local city officials to see the big picture and identify potential improvements in city operations.

Alexandre Bosshard discussed the city's decision to add their own specific KPIs. The city of Pully is currently adding KPIs from the Swiss national initiative "Cercle indicateurs" and interviewing heads of city departments to identify specific KPIs, such as the state of separation of the water drainage system for the environment category, annual investment to maintain infrastructure value for the economy category, and the training of employees of the city in cyber security for the society category. The project has been incorporated into the Legislative Program, which is a policy program that describes the projects to be achieved in the city in the next five years. An updated report "Pully under the microscope 2024" will be publishes.

### Closing Remarks

**Bilel Jamoussi** praised the potential of sustainable procurement practices in helping cities achieve the Sustainable Development Goals (SDGs) successfully and the important contribution of the new U4SSC Procurement Guidelines for Smart, Sustainable Cities. Additionally, he highlighted the release of a brochure on "Building a People-Centered Digital Future for Cities and Communities," which outlined activities and initiatives aimed at driving the development and standardization of smart, sustainable cities and communities.

He also spoke about the U4SSC Key Performance Indicators (KPIs) and their use in benchmarking city performance, identifying areas for improvement, and achieving SDGs. He encouraged everyone to visit the U4SSC website to access



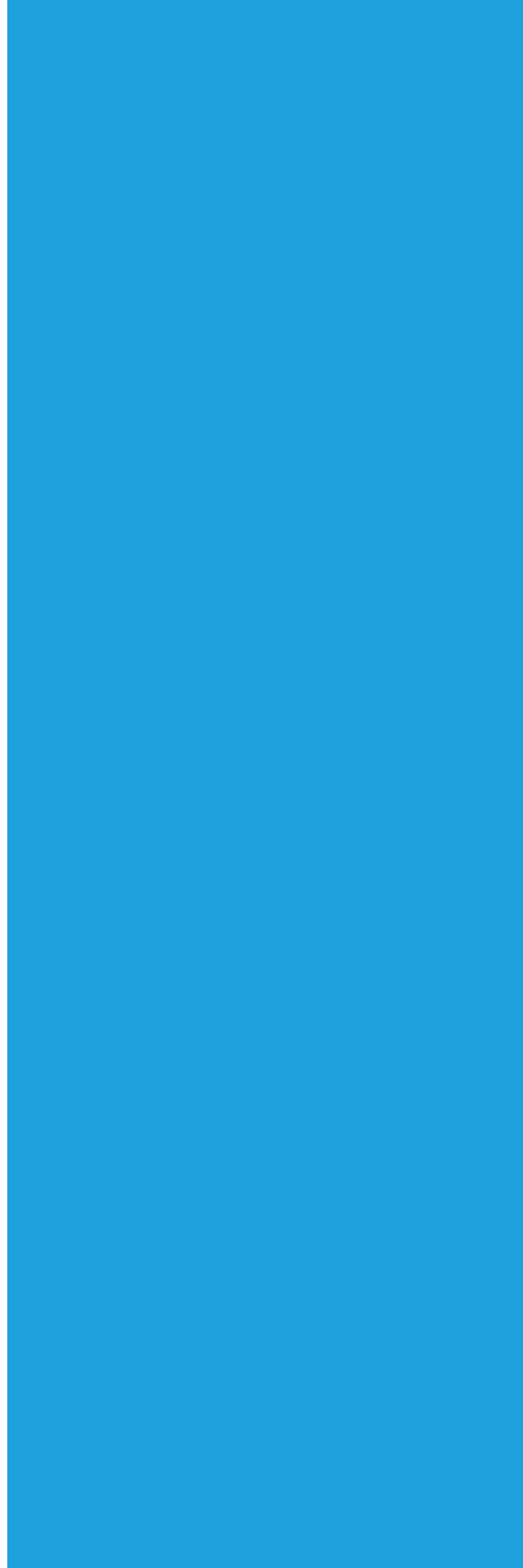
**Alexandre Bosshard**  
Coordinator and Project  
Manager, Pully,  
Switzerland



**Bilel Jamoussi**  
Chief of Study Groups, TSB,  
ITU



the new procurement guidelines and brochure, and to see how cities can benefit from the U4SSC KPIs.





## STI Forum Side event on Leveraging the metaverse in cities to achieve the SDGs

Episode 25: 4 May 2023

### Overview

The metaverse, although still in its nascency, already has immense potential to help consumers, businesses, organizations and cities advance towards achieving the Sustainable Development Goals. Early efforts have shown that the metaverse could be effectively harnessed to transform and enhance education, generate income and improve the livelihood of inhabitants, provide access to public and private services, strengthen global cooperation and community building, boost citizen engagement and enable new cooperative and collaboration models.

It is important that, as the metaverse evolves, environments for safe and meaningful innovation are established to create a positive impact on the SDGs. Public and private sectors, academia, and international organizations will need to work together to raise awareness of the role of the metaverse in achieving the SDGs and develop a solid foundation to best support the 2030 Agenda.

### Opening Remarks

In his opening remarks **Seizo Onoe** introduced the ITU Executive Briefing on the metaverse, which was developed through a collaborative effort of over 40 experts from industry, government, academia, UN agencies, and regions including Africa, Asia, the Americas, and Europe. He said that the briefing provides a concise overview of the technologies and challenges involved in the metaverse, which has the potential to enhance education, improve food security, provide access to services, generate income, and strengthen global cooperation.

He highlighted the importance of developing the metaverse in a way that benefits everyone and supports the achievement of the SDGs. He also emphasized the ITU's role in ensuring that frontier technologies like the metaverse are developed in a sustainable and inclusive manner. In December 2022, the ITU created a new focus group on metaverse that is working on identifying enabling technologies in areas ranging from multimedia to digital currencies, the Internet of Things, and environmental sustainability.

Co-organized by:



**Seizo Onoe,**  
Director,  
Telecommunication  
Standardization Bureau,  
ITU





Seizo Onoe commended the Kingdom of Saudi Arabia for their support in hosting the ITU Forum on the metaverse, which brought together over 650 experts from around the world to discuss important emerging technology issues related to the metaverse. In closing he thanked all participating experts for joining the successful webinar and encouraged interested parties to visit the ITU website to access the ITU Executive Briefing on the metaverse.

**H.E Mr. Abdulaziz bin Mohamed Al-Wasel** expressed his honor to be speaking at the event and commended the ITU for maintaining the momentum of organizing this webinar to imagine a better future for all. He then spoke of how technology, innovation, and development have been at the forefront of the Kingdom of Saudi Arabia's vision 2030, and how it has taken advantage of emerging trends in different sectors to accelerate efforts in leveraging technology and progress of innovation. He also highlighted that Saudi Arabia hosted the first ITU forum and meeting of the ITU Focus Group on the metaverse. The high level of attendance at both meetings illustrated the strong interest in the metaverse from experts around the world.

He praised the ITU for its role in serving as a collaborative platform for governments, industry, academia, and civil societies to come together and discuss pressing technological issues. He also emphasized that the Kingdom of Saudi Arabia is a strong supporter of the ITU and looks forward to continued engagement, including discussions on the important topic of metaverse standardization. In his concluding remarks he expressed his gratitude to the esteemed panelists and the audience.

### **Session 1: Building Smart Sustainable Cities in the Metaverse: Opportunities and Challenges**

**Radia Funna** opened this session with a reminder that cities are home to over half of the world's population and face complex challenges in terms of social, economic, and environmental sustainability. Challenges that the metaverse may be in a unique position to address by enabling new forms of collaboration, innovation, and participation.

**Christina Yan Zhang** spoke about the metaverse and its potential for smart city development. She said that the metaverse represents a convergence of various technologies forming the next generation of the internet, which is more immersive, interactive, and intuitive. She highlighted that the metaverse is not a new concept, as it was first coined by Neil Stevenson in 1992, and since has become a convergence of various technologies ranging from IT infrastructure



**H.E. Mr Abdulaziz bin Mohamed Al-Wasel**  
Ambassador and  
Permanent Representative  
of the Kingdom of Saudi  
Arabia to the United  
Nations in New York



**Radia Funna,**  
Futurist and creator of the  
xHuman theory



**Dr Christina Yan Zhang,**  
CEO, Metaverse Institute



such as 5G, 6G, semiconductor chips, to spatial computing, user interfaces, quantum technologies and AI.

Christina Yan Zhang provided real-world examples of metaverse applications in smart city development worldwide. The Neom project in Saudi Arabia is creating the world's first cognitive digital twin metaverse platform, integrating various technologies to demonstrate how a future city can look. The Shanghai Municipal Government is using digital twins to control traffic, while Santa Monica is using metaverse to gamify its shopping district and boost its local economy. London is using metaverse to support culture promotion worldwide, and New York City is using digital twins to provide better traffic management. Dubai and Abu Dhabi are also looking at metaverse as a holistic strategy for job creation and attracting top talents, entrepreneurs, and investors. Seoul is using metaverse to provide better public service to their citizens, including access the library and youth counselling. Lastly, Wellington is using metaverse to provide better parking slots and traffic control, while Singapore is exploring potential of the metaverse for smart city development.

Christina also highlighted some of the major future trends of the development of the metaverse. Firstly, for the metaverse to achieve its full potential, there needs to be much more computing power. With the rise of quantum technologies and especially quantum computers, this issue will be solved soon. Secondly, generative AI has increasingly become a powerful tool to make the creation of digital assets, avatars, digital environments cheaper, faster and easier. It is made possible through the fast development of Generative AI powered text to 3D objects. Thirdly, major breakthrough on nuclear fusion can provide efficient solution on the environmental impact issue of the metaverse.

**Ahmad Bhinder** highlighted the significance of digital technologies, particularly the metaverse, in achieving the SDGs for cities and communities. He emphasized that the progress on the SDGs has stagnated over the past few years due to other global challenges, but digital technologies can help accelerate the progress. The metaverse, powered by progressive technologies, has shown unprecedented growth and great potential. The digital economy, growing twice as fast as the traditional economy, aims to capture around a quarter of global GDP by 2025. He presented a preliminary framework to map and share the understanding of sustainable growth of the digital economy across the verticals of planet, society, and businesses, with examples of sustainable growth.

He also talked about the potential of the metaverse in revolutionizing urban planning, creating virtual infrastructure, and controlling carbon emissions. The



**Ahmad Bhinder,**  
Director of Policy  
Innovation, Digital  
Cooperation Organization  
(DCO)



use of metaverse enables virtual working spaces and enhances community engagement, providing new solutions to global challenges, such as social exclusion and inequality, and contributing to SDG 5 and SDG 10. Ahmad Bhinder mapped use cases in the metaverse and cities with their potential towards contributing to specific SDGs. He closed by reiterating the potential of digital technologies, such as the metaverse, in achieving the Sustainable Development Goals for cities and communities. He emphasized the importance of multilateral and multistakeholder collaboration towards a human centric and all-inclusive development of the metaverse, that is well governed, interoperable, and sustainable.

**Okan Geray** provided an economic perspective on the metaverse and highlighted its economic potential and opportunities. He explained that economic activities have traditionally been conducted physically, but with the advent of digitalization, the focus shifted to the digital economy. However, with the metaverse, a new virtual digital economy is emerging, where virtual goods, services, assets, and resources are created without physical counterparts.

He also discussed the legal and regulatory issues surrounding AI and the metaverse. Mr. Okan Geray highlighted that while AI is an important contributing technology to the metaverse, it is not the only technology or legal and regulatory issue. He believes that the regulatory side and ethical side of AI can be addressed through guidelines and ethical considerations. However, specific issues, such as those related to generative AI and intellectual property rights, may arise in the context of the metaverse. These new issues will need to be addressed by adapting regulations and being agile to make changes along the way.

He highlighted that virtual jurisdictions introduce a new layer of concern, and that new jurisdictions will come into play when the virtual economy is decoupled from the physical economy. Geray notes that existing regulations and legislation can address some of these issues, but additional regulations and legislation will need to be introduced.

He discussed how virtual jurisdictions and digital human rights will need to be defined within the metaverse. Furthermore, he emphasized that virtual inhabitants, such as avatars, will have their own rights within the metaverse and they may need to be defined differently from human rights.

Okan Geray discussed Dubai's strategy to become a global leader in the metaverse economy. The strategy aims to increase the number of metaverse



**Okan Geray,**  
Strategic Planning Advisor,  
Digital Dubai, United Arab  
Emirates



companies, create virtual jobs, and generate additional economic value for the city. He emphasized the need to foster innovation, develop the necessary infrastructure and regulations, and enhance the skills of the workforce to fully embrace the metaverse. He mentioned the challenges faced in implementing the metaverse, including interoperability, legal and regulatory issues, and the definition of new markets and competition.

He concluded by stating that capturing the economic potential of the metaverse requires an adaptive and agile approach. Innovation is needed not only in technology but also in regulations, legislation, security, and other areas. Okan Geray acknowledged the excitement surrounding the metaverse but emphasized the importance of addressing the challenges to ensure its success in the future.

**Sanni Pöntinen** spoke about the need to build a holistic metaverse that focuses on sustainability and governance, including in AI. She emphasized the importance of considering various aspects related to AI governance, going beyond threats and laws, to include issues of citizen engagement, ethics, and long-term and short-term effects. She expects these factors to also play a crucial role in shaping the metaverse and its impact on society. She went on to highlight the need to engage citizens in the revolution and listen to their perspectives, rather than solely relying on the opinions of a small group of stakeholders. Considering ethics is essential to ensure the long-term results and effects of the metaverse are positive. In conclusion, Sanni Pöntinen posed a thought-provoking question: What kind of world will we be living in and what choices will we have made when we reflect on it in a few decades? The message emphasized the responsibility to make the right decisions regarding AI governance and the metaverse.

**Cristina Martinez** spoke of how AI and similar technologies raise many unanswered questions and that the future will involve navigating a complex intersection of these technologies, increasing the need to address intersecting issues. She highlighted the European Commission's role in shaping the development and utilization of virtual worlds, particularly focusing on the three P's: planet (environmental impact), people (social impact), and prosperity (economic impact). She stressed the importance of considering the Sustainable Development Goals (SDGs) and avoiding past mistakes with similar technologies.

She introduced the concept of a "CityVerse" which is an interconnected future world representing physical counterparts, offering virtual goods and services



**Sanni Pöntinen,**  
Development Specialist,  
City of Tampere, Finland



**Cristina Martinez,**  
Deputy Head for Smart  
Technologies for  
Communities, European  
Commission



while maintaining a link to the physical environment. The concept of CityVerse will bring several technologies and concepts together such as big data, immersive experiences, avatars, and AI.

Cristina Martinez presented an illustration of the integration of the virtual world with the physical one, emphasizing the ecosystem of solutions and sectors that must be considered, including interactivity management, visualization, blockchain, physical infrastructure, computing capacity, and sensing. She also announced the launch of a new activity called "CityVerse pilots" under the Digital Europe program, which will fund projects to explore the challenges and opportunities of CityVerses. Key issues to be addressed by the project include governance models, norms and laws, the digital economy, and the management of marketplaces and stakeholders.

She concluded by providing a timeline of the planned actions, including the release of the call for city verse projects, the development of a roadmap, the preparation of a communication on virtual worlds, and continued funding for activities. The aim is to foster collaboration among existing digital twins in Europe and establish a sustainable instrument to support common digital assets.

**Cristina Bueti** spoke of the positive potential of the metaverse and its impact on cities and the Sustainable Development Goals. She emphasized the opportunities that new technologies bring, highlighting their ability to transform communication and the way we perceive reality. She also acknowledged the challenges and opportunities presented by the metaverse and how cities can leverage this technology to boost their economies.

She explained that the ITU, as a UN agency, works closely with its membership, which includes 193 member states, private sector companies, and academia, to shape the metaverse. The ITU organized the first ITU Focus Group on metaverse in Riyadh, Saudi Arabia, with over 150 participants and 30 speakers. The event resulted in an outcome document containing policy considerations and insights. She encouraged participants to join the Focus Group, which aims to establish international standards and create a collaborative platform for shaping an interoperable, sustainable, and accessible metaverse.

Cristina Bueti highlighted the collaboration between ITU and the United Nations World Tourism Organization in developing an executive briefing on the metaverse. The report provides an overview of the metaverse current state, future trends, and use cases in various sectors. The briefing also addresses



**Cristina Bueti,**  
U4SSC Focal Point and  
Counsellor, ITU



technical, social, ethical, and legal issues to ensure a safe, inclusive, and sustainable development of the metaverse.

In conclusion, Ms. Cristina Bueti called for collaboration among policymakers, regulators, and cities to build an urban and inclusive metaverse. She encouraged cities working on the metaverse to share their use cases and expressed ITU's willingness to collaborate with cities worldwide. She reiterated the need to work together to harness the vast opportunities and address the challenges of the metaverse.

**Radia Funna** closed the session with a brief Q&A and thanked the speakers and participants for a robust conversation. She also expressed gratitude to ITU and the Government of Saudi Arabia for making this important discussion possible.

### Closing Remarks

**Shin-Gak Kang** spoke of the potential of leveraging the metaverse in cities to achieve the Sustainable Development Goals (SDGs). He spoke of the metaverse having the opportunity to enable governments, consumers, business organizations, and cities in achieving the SDGs. He stressed the importance of ensuring that the metaverse is interoperable and secure to ensure its benefits for all.

Shin-Gak Kang encouraged interested experts to join the ITU Focus Group on metaverse and contribute to the development of standards that can shape the underlying technology, business ecosystem, market entry, innovation, and cost efficiency. He also invited attendees to follow the ITU metaverse website for latest updated on the progress of the Focus Group.

**Muath S. AlRumayh** highlighted the importance of co-organizing this event with the ITU, indicating the Kingdom's commitment to creating an innovative environment for introducing new technologies, products, and services. He mentioned the recent launch of the Emerging Technologies Regulatory Sandbox, which aims to facilitate the launch of innovative business models and solutions. He noted that several global and local companies are already conducting successful experiments within this framework. The metaverse is seen as an opportunity to transform various aspects of our lives, including work, communication, and lifestyle.

Muath S. AlRumayh expressed his desire to cooperate with all stakeholders to advance common goals and build a better future. He invited government, industry, academia, society, and other stakeholders to actively join in these



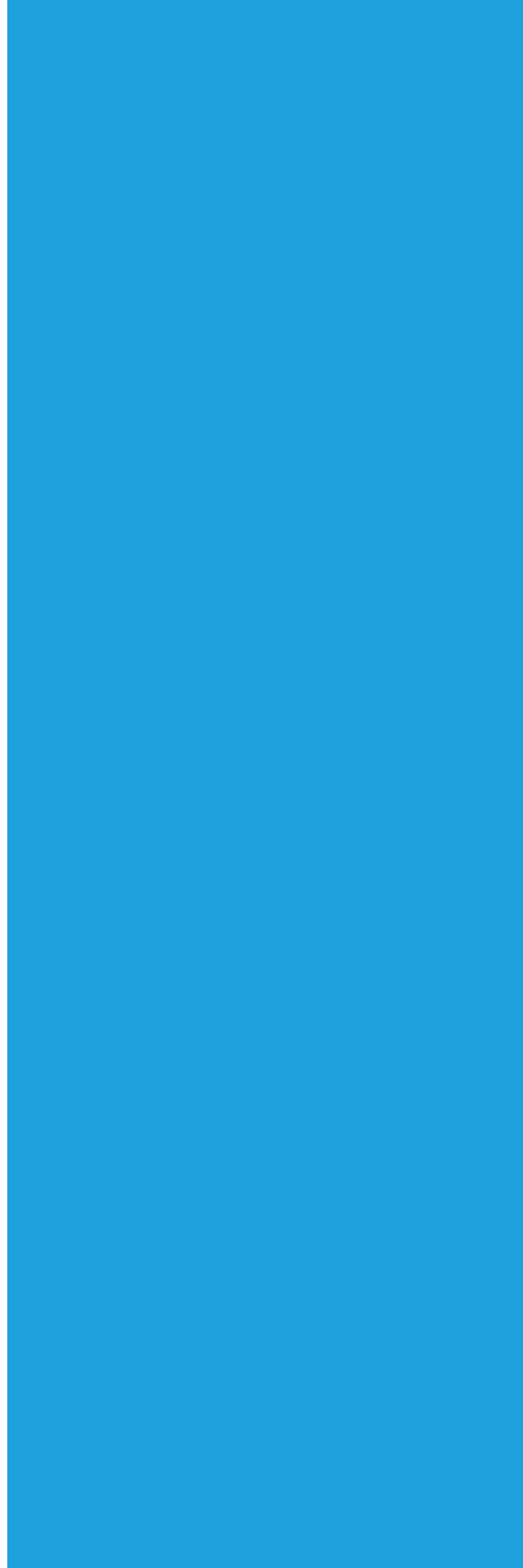
**Shin-Gak Kang**  
Chairman, ITU-T Focus  
Group on metaverse



**Muath AlRumayh**  
Director of International  
Negotiation,  
Communications, Space &  
Technology Commission  
(CST), Saudi Arabia



efforts at the ITU. In conclusion, he thanked all experts for their contributions and expressed eagerness to collaborate with them in the future.





# Digital transformation of mobility: Paving the way for road safety

Episode 26: 14 June 2023

## Overview

Digital transformation in the transport sector has laid the foundation for emerging technologies including Artificial Intelligent (AI) and Internet of Things (IoT) being employed to improve accident-related data collection and data analysis. These technologies can also be leveraged to improve road infrastructures, to enable more effective post-crash responses as envision the regulatory frameworks in the transport sector.

The aim of this webinar is to examine the existing application of modern technologies like AI, IoT, digital twin in fostering different SAE levels of autonomous driving and thereby leading a transformational change in the domain of smart mobility.

## Opening Remarks

**Seizo Onoe** welcomed everyone to the webinar and reiterated the ITU's commitment to ensure that breakthroughs in science and technology benefit everyone everywhere. He highlighted advances in AI, automation, digital twins, and connectivity, which offer opportunities for growth and safety. However, he stressed that the success of these technologies depends on building public trust.

The webinar, he noted, would focus on actions required to build this trust. Seizo Onoe also explained that the ITU is working on standards for road safety, emergency calls, and secure software updates for connected vehicles. Additionally, a new ITU standard is under development to define an automated driving safety data protocol. In closing he emphasized that through collaboration and consensus-building, ITU standards can reinforce global actions to ensure new technologies lead to safer, smarter mobility for everyone around the world.

## Session 1: Frontier technologies for Road Safety

**Bryn Balcombe** welcomed everyone to the panel and acknowledged the diverse mix of countries represented by the participants. He described the session format and introduced the first speaker.

Organized by:



**Seizo Onoe,**  
Director,  
Telecommunication  
Standardization Bureau,  
ITU



**Bryn Balcombe**  
Autonomy Systems and  
Regulatory Expert,  
Oxbotica





Discussing the importance of safety in the context of autonomous vehicles, **Paul Lam**, emphasized the need to understand the complexity and weight of the technology involved. He clarified that autonomous driving and autonomous vehicles are not the same, with the latter encompassing a broader concept that includes infrastructure, fleet management, and connectivity.

He highlighted the significance of autonomous trucking in the economy, particularly in the freight industry, and the challenges posed by the shortage of truck drivers. He argued that this shortage is not only an economic issue but also a matter of health and safety, as driving long hours without stimulation can lead to boredom and dangerous situations.

Speaking about safety, Paul Lam explained that regulations should consider different contexts and distinguish between autonomous driving and autonomous vehicle scenarios. He mentioned that the trade-offs and requirements for passenger vehicles differ from those for cargo transport, and regulations need to reflect these distinctions.

He also discussed the challenges faced by regulators, including the coexistence of autonomous and human-driven vehicles, determining what constitutes "good enough" safety, the lack of industry standards, public perceptions, limited collaboration among autonomous vehicle companies, and labor issues. He called for the harmonization of regulations and emphasized the need for frameworks and guidelines to address these challenges.

In terms of policy, Paul Lam emphasized the need for collaboration between infrastructure and industrial innovation, advocating for a circular ecosystem where autonomous, electric, and connected vehicles work together in smart cities with a digital twin as the foundation. He stressed the importance of building a common infrastructure, such as simulation platforms and maps, to ensure safety and enable progress in the field. Additionally, he highlighted the need for a new mindset and collaboration between policymakers, humans, and autonomous vehicle developers to address road design problems.

In conclusion, Paul Lam suggested that while there are technical aspects to consider in the development of autonomous vehicles, there are also opportunities to improve road infrastructure and design. He called for a holistic approach and collaboration between various stakeholders to ensure safety and progress in the autonomous vehicle industry.

With a background in electrical and mechanical engineering, **Arman Sargolzaei** highlighted his work focus on testing and verifying connected and autonomous



**Paul Lam**  
Director, Corporate  
Strategy & Development,  
TuSimple



**Arman Sargolzaei**  
Assistant Professor,  
University of South Florida



vehicles, as well as cybersecurity and network control system security. He discussed the expectations surrounding autonomous vehicles and how they are supposed to reduce crashes caused by human errors. However, he noted that the technology still faces challenges related to safety and security, which his lab is working on. He shared his personal experience of commuting between Gainesville and Lakeland, highlighting the challenges he faced on the road and the decision-making process required. This experience led him to consider how autonomous vehicles can be taught to handle various situations.

He outlined the key questions his lab is addressing in testing and verification, including generating interesting edge cases, determining equivalent scenarios, assessing coverage analysis, and learning from existing crashes. Arman also mentioned challenges related to environmental and sensor testing, the interaction of autonomous vehicles with conventional vehicles, ethical considerations, and cyber-physical attacks.

To address these challenges, his lab initially used software-in-the-loop testing but transitioned to hardware-in-the-loop simulation for greater accuracy. However, real-world testing remains limited due to the inability to replicate certain scenarios. As a solution, his lab developed a mixed reality platform that allows for the interaction of autonomous vehicles and other actors in a simulated environment. They have modified real-world vehicles, and use machine learning algorithms to generate cyber-attacks, testing the vehicles' safety and security.

Arman Sargolzaei concluded by sharing videos demonstrating their testing methodologies. One video showed how fault state injection attacks affected the automatic emergency braking system of an autonomous vehicle, while another demonstrated the performance of an adaptive cruise control algorithm under adversarial attacks.

Describing project Columbus, [Jorrit Kuipers](#), outlined its aims as to enhance public transport by reducing the cost per kilometer per person and expediting the licensing process. The main objective is to develop a free of charge, open-source autopilot, which can reduce costs and increase capacity, specifically focusing on three types of buses: mini-buses, taxi buses, and large buses.

In the Netherlands, Jorrit Kuipers has multiple projects involving driving on the road, starting with driving at Level 5 in bus depots or Level 4 in restricted areas without an operator in the vehicle. He utilizes shadow driving, where the autopilot and central system are present in the vehicle but not connected,



**Jorrit Kuipers**  
Founder and CTO, Green  
Dino and robotTUNER



allowing to monitor the human driver and compare their actions with the autopilot's performance. This allows to assess the performance of both the bus drivers and the autopilot in various real-life scenarios.

Jorrit Kuipers emphasized his focus on safety metrics, highlighting his background in training and assessing human drivers. He uses the national driving procedures as his metrics, which are legally recognized for driving schools, examiners, drivers themselves, and the police in assessing violations. These metrics provide a uniform methodology for risk mitigation during examinations.

The driving procedures serve as the backbone of his methodology for assessing the performance of automated vehicles. He compares the data obtained from the autopilot's performance with data on human driving performance, using it as a reference model. He spoke about the safety metric called the Safety State Framework, developed by one of his companies called Green Dino. It helps to determine the driving style of both human drivers and autopilots by utilizing safety performance indicators.

These safety performance indicators are combined to calculate scores such as the "drive for safety" score. Jorrit Kuipers has already validated this score for use in driving simulators, as the behavior observed in simulators is applicable to real-world driving situations. The scores are accumulated to determine risk avoidance and safety scores, which have been proven to relate to accident involvement on the road for human drivers.

Highlighting the potential dangers of misperception in autonomous driving systems, **Kshitij Sirohi**, emphasized the need for a safe system to handle such cases, especially when an AI mistakenly detects objects like cars as dogs. He explained the autonomous driving stack, consisting of sensors such as cameras, lidar, radar, IMU, and GPS, which gather information about the surroundings. The perception component then uses this information to identify objects and drivable regions, which are further utilized by downstream tasks like localization, planning, and control.

He spoke about supervised perception, using deep learning-based neural networks, as being the prevalent approach for autonomous driving systems. Training data with labeled information for different objects like cars and people is provided to the network, enabling it to classify objects accordingly. However, Kshitij Sirohi highlighted the limitations of this approach when encountering untrained objects, such as dogs, and the network's tendency to misclassify them as known objects, leading to potential safety risks.



**Kshitij Sirohi**  
Doctoral researcher,  
University of Freiburg,  
Germany



Real-world examples were provided to illustrate the challenges faced in perception systems. Instances where a car was mistaken for a truck, a moon as a yellow traffic light, and noise causing misclassifications were shown to emphasize the need for addressing uncertainties and ensuring safe operations. Kshitij Sirohi also discussed the issue of training perception systems in specific environments and their limitations when encountering unfamiliar scenarios, like crowded streets or different types of vehicles.

To address these challenges, Kshitij Sirohi proposed incorporating uncertainty estimation in perception systems. Alongside class predictions, the network should also predict uncertainty, indicating its confidence in the results. He introduced different segmentation tasks, namely semantic segmentation, instance segmentation, and panoptic segmentation, which involve extracting information from the environment and identifying objects and background classes. Panoptic segmentation with uncertainty estimation was specifically highlighted as a task introduced by their research, allowing for better decision-making based on the overall uncertainty of predictions.

### Closing Remarks

**Bilel Jamoussi** emphasized the potential of autonomous driving to create a safer and more efficient transport system by reducing human intervention. He noted the importance of collaboration among automobile manufacturers, policymakers, and researchers in developing comprehensive regulations and standards for autonomous vehicles.

He mentioned the ITU Focus Group on AI for Autonomous and Assisted Driving and its work on an automated driving safety data protocol. Bilel Jamoussi also highlighted the AI for Road Safety Initiative, which aims to understand AI deployment on the road while ensuring safety and promoting a future where autonomous driving and safety coexist. He encouraged attendees to contribute to the initiative's activities and stay tuned for more episodes of the Digital Transformation Webinar series.



**Bilel Jamoussi**  
Chief of Study Groups, TSB,  
ITU



## Digital transformation of testing: federated testbeds as a service

Episode 27: 21 June 2023

### Overview

This Webinar answered a key question whether testing activities may migrate to virtual environments and whether testing as a service based on federated testbeds can facilitate enabling quicker time-to-market for products and services. It also examined up-to-date ecosystem of testbeds, including existing use cases and clarify on how federated testbeds framework defined in Recommendation ITU-T Q.4068 could help with such challenge.

### Opening Remarks

**Bilel Jamoussi** provided an overview of the webinar and its focus on the digital transformation of testing, specifically remote testing and federated test beds as a service. The increasing complexity of technological developments and the need for testing under diverse conditions and scalability led to the importance of experimentation within remote test beds. The goal was to explore whether testing activities could migrate to virtual environments and whether federated test beds could enable quicker time to market for products and services. The webinar also highlighted the ecosystem of test beds, existing use cases, and the potential of the federated test bed framework defined in recommendation ITU-T Q.4068. Bilel Jamoussi encouraged participants to visit the digital transformation website and register for future webinars to stay updated on technological advancements and ITU's work in digital transformation.

**Denis Andreev** briefly introduced himself as the ITU-T Study Group 11 Advisor, and provided a brief outline of the webinar which aims to examine testing as a service based on federated testbeds. He then explained how the audience can participate in the webinar and ask their questions.

Organized by:



**Bilel Jamoussi**  
Chief of Study Groups, TSB,  
ITU



**Denis Andreev**  
ITU-T Study Group 11  
Advisor, TSB, ITU



## Overview of the trend on remote testing, issues and challenges of standalone testbeds

**Muslim Elkotob** provided an overview of latest trends in remote testing and discussed associated challenges. He mentioned the development of a scalable model for a private network that can accommodate a large number of users, sub-topologies, and complexities. He highlighted the shift towards a flexible model in a large-scale test bed that incorporates open run, virtualized run, and cloud run. He emphasized the challenges of maintaining slices, building workflows, and validating new aspects in such a geographically expansive environment.

He emphasized the industry's demand for innovation in mobility, shared assets among stakeholders, automation of testing, continuous accessibility, unified management platforms, and data control in the data-driven economy. Muslim Elkotob spoke of the importance of a modular design of capabilities, the use of APIs for connecting different entities, and the potential for federation in complex workflows. Collaboration and data sharing among multiple operators were highlighted as means to expand knowledge, improve efficiency, and govern data sharing in a common framework.

The webinar also discussed the evolving ecosystem in beyond 5G, focusing on the shift towards standalone 5G and the software-based core. Muslim Elkotob mentioned the involvement of multiple stakeholders, including independent software vendors (ISVs) and SMEs, in providing a spectrum of services. The democratization of the value chain was emphasized, where open interfaces and complementary capabilities from various players enhance the ecosystem. He mentioned the importance of packaging and offering services in the right way and provided examples of industry trends, including the software-based factory by Hofer in Germany.

## Use cases for Testbeds/Federations and market needs for Testing as a Service (TaaS)

Discussing the importance of open architecture in testing and managing 5G and 6G innovations, **Anwer Al-Dulaimi** introduced the IW 5G 6G Innovation Test Bed project as an example of utilizing open 5G architecture. The project aims to create a cloud-based platform that replicates live networks, enabling academia to test algorithms and integrate components. The project goal is to build an accessible platform based on open source and open APIs for operators, vendors, and application providers, along with a separate platform for academia.



**Muslim Elkotob**  
Principal Solutions  
Architect, Vodafone



**Anwer Al-Dulaimi**  
Senior Manager of  
Emerging technologies &  
Innovations, EXFO



The platform's open-source design allows code modification, behavior change, and interaction with various interfaces. Technical teams automate installations and support different clusters for specific types of communication, based on 5G slice types. This platform is adaptable for future networks like 6G and facilitates integration with third-party resources through separate branches or clusters. The aim is to connect physical access points remotely to the core network, enabling global testing of various scenarios.

Anwer Al-Dulaimi discussed a recent agreement with YourCom which establishes a testing branch with physical access points on AWS to create core networks worldwide. He also spoke about the potential of replicating federated test environments across different countries to evaluate the architecture's APIs and their contribution to distributed architectures.

He highlighted a platform designed for directed testing, governed by I Totally, which offers accessibility for third-party applications through open APIs. The platform aims to create a mesh network that replicates real-life scenarios and incorporates an AI-driven test controller for managing testing and modeling traffic exchange between platforms. Anwer Al-Dulaimi emphasized the need for federated test beds that connect multiple platforms and slices. An open architecture built on open source and open APIs enables integration and development of new products and solutions.

In his presentation [Sicong Shao](#) focused on the challenges posed by smarter infrastructure and the necessity of a realistic test bed for collecting data, conducting experiments, and evaluating security approaches. He introduced the Fc test architecture, which aimed to establish a cybersecurity research framework. While implementing this architecture physically could be time-consuming and resource-intensive, the Fc test at the University of Arizona served as a use case for resilient water and 5G test beds. This architecture facilitated cost-effective implementation of research questions and supported the overall research process.

The Fc test involved several tasks, starting with the integration of new cybersecurity test beds into the system. The Test Band Manager was responsible for listing and authorizing test beds, while beacon messages were utilized to confirm availability and provide status updates. Communication and configuration checks were conducted during the setup process before granting access to the test bed. Furthermore, experiments were initialized, performed, and finalized using a digital train concept for real-time monitoring and data transmission.



**Sicong Shao**  
Research Assistant  
Professor, Arizona  
University



Sicong Shao discussed two use cases. The first involved the federation of smarter city water treatment and distribution services, where physical water treatment processes were implemented to collect data for cybersecurity research. The second use case focused on a blockchain-based methodology for trust modeling and quantification in 5G networks.

Concluding his presentation, Sicong Shao emphasized the importance of an open architecture and the need for community-driven test beds to tackle security and scalability challenges. The development of a framework that facilitates the discovery, integration, and isolation of geographically distributed cybersecurity test beds was seen as crucial for advancing research in the field.

Addressing the importance of resolving voltage and emergency call issues in the context of the ongoing sunset of 2G and 3G networks, [Wayne Cutler](#) emphasized the significance of prioritizing emergency call handling, particularly as 2G networks are phased out. He began by providing an overview of the background, including media reports that highlighted concerns about voltage drop ability in the United States and Europe. These reports raised questions about the availability of emergency calls in areas without universal coverage.

Wayne Cutler discussed the establishment of the Voltage and Emergency (VRE) task force, which was formed to investigate voltage and drop issues. The task force made recommendations regarding emergency call handling and voltage drop ability. He mentioned document I25, which pertains to adjacent testing, and the gap analysis performed on emergency call testing. Based on the findings and recommendations of the task force, new test cases were developed. The lack of universal coverage for emergency calls was highlighted as a significant issue.

He also provided background information on IMS emergency calls, the challenges posed by Sdhs, and the need for standardization. He mentioned document I92, which focuses on voltage profiling, and explained the distinctiveness of emergency calls compared to regular voice calls. Wayne Cutler also mentioned conducting a survey with device manufacturers to assess device behavior regarding emergency calls in the absence of normal voltage service. He also touched on device blocking issues, including unknown network blocking, where devices exhibit a lack of trust in certain networks, potentially hindering emergency calls.



**Wayne Cutler**  
Technical Director-Legacy  
Networks, GSMA





## Overview of the federated testbeds framework

Presenting the main components of the Federated Testbed Framework, **Cédric Crettaz** explained the goals of the framework to provide guidelines and support for developers in creating effective implementations of federations across different regions. The framework included the definition of improvements, interoperability, and federation, as well as a reference model for various types of federations and specifications for open APIs to connect with test beds. This framework is freely available on the ITU website.

Cedric Crettaz mentioned the requirements for API usage in test bed federations, along with examples and reference metrics. He highlighted the existence of test managers and levels of management and control components within the system, including IoT gateways. The universal broker played a crucial role in collecting data from each test bed, and actors such as test designers and executors contributed to the experimentation process. The framework recommendation described the use of 26 APIs and the presence of different test beds globally, including IoT, wireless, and voicemail run test beds.

He also discussed the creation of federations of federations, where multiple test beds could be interconnected through brokers. He provided an example of a previous project called Fire+, showcasing the architectural composition of the Federated Testbed Framework and the APIs involved. Cedric Crettaz mentioned a new project called Renewal Session, which aimed to support large-scale experiments in networking, 5G, and related technologies, with 25 partners based in Europe.

## Key areas of ITU standardization and studies on TaaS and federated testbeds

Discussing the focus on standardization activities and the importance of collaboration, **Giulio Maggiore** emphasized the need to collect information and work together to produce standardization as a part of the Ec. His presentation highlighted the impact of recent technological developments and the requirement for realistic test beds that can accommodate new vertical services. To facilitate this, a generic 5G testing framework was proposed, aiming to accelerate deployment and ensure configuration and time-to-market coverage.

Giulio Maggiore mentioned the previous work on Test Bed Federation and the objective of defining APIs for interconnection and interface. The focus group and workshops played a significant role in developing API specifications and gathering global input. Over the course of a year, 11 ongoing work items were produced, with four of them reaching a mature stage. The workshop



**Cédric Crettaz**  
Lead Researcher in ICT,  
Mandat International



**Giulio Maggiore**  
Telecom Italia



encouraged participants to propose use cases, particularly in the area of emergency response, such as testing for COVID-19 or other disaster scenarios.

He emphasized that the use cases are not limited to a specific location but can be accessed worldwide through the Test Bed Federation. Participants were invited to contribute and join the meeting in July to collaborate on defining and refining the use cases. The goal was to foster global collaboration and produce the necessary APIs for the Test Bed Federation. Furthermore, Giulio Maggiore discussed the evolving role of the Test Bed Federation, not only providing connectivity but also facilitating the secure and robust exchange of data. The integrity, availability, and interoperability of data were identified as crucial factors for successful services in the future. The industry aimed to enable 5G through a business case, with APIs playing a central role in the Federation model. The upcoming focus group meeting was seen as an opportunity to contribute and further advance the ongoing work.

### Closing Remarks

**Denis Andreev** expressed gratitude to all participants, noting the increasing interest and demand for testing configurations worldwide. He emphasized that this is just the beginning of a long journey towards fully virtual testing, which is a part of the digital transformation.

The concept of integrated testbeds will enable developers to access virtual testing environments and conduct various experiments for different types of products before launching them in the market. This will improve the quality of end products and reduce time-to-market. Denis Andreev looks forward to collaborating with industries, forums, and consortia, as well as vendors, developers, and suppliers to collect best practices. He invited interested parties to join the ITU Focus Group meetings and encouraged everyone to check the Digital Transformation Webinar series for more insights.



**Denis Andreev**  
ITU-T Study Group 11  
Advisor, TSB, ITU



## Digital transformation and Ethical use of technology for animals

Episode 28: 26 July 2023

### Overview

The deployment of technologies across sectors is largely predicated on a human-centric approach to digital transformation. Most of the digital technologies adopted are focussed on improving quality of life of “inhabitants”. As we frequently use the term “inhabitants” in the context of smart cities, we must also dwell on who qualifies as an inhabitant. We share our urban ecosystem with several other domesticated species. To take it a step further, we share the Earth with other species too.

This brings-up an important question – how do our actions in the digital age impact non-human animals? How can we ensure the ethical use of emerging technologies such as AI, IoT, digital twin in agriculture and biodiversity conservation?

This webinar sought to answer some of these burning questions.

### Opening Remarks

Opening the webinar, **Seizo Onoe** highlighted the opportunities presented by remote sensing technologies in achieving a sustainable future, including to protect animal species and biodiversity. It is important to create a global access to these capabilities, he emphasized.

He stressed to ensure that new technologies do not encourage harmful practices, such as factory farming or habitat destruction resulting from metal mining or infrastructure development. International standards could support efforts to prevent such practices.

Seizo Onoe mentioned that the ITU was working on new standards for technology companies to assess their biodiversity footprint and developing new sensor technologies to capture crucial data for climate science and tsunami warning systems. He also talked about the work of the Focus Group on "Artificial Intelligence (AI) and Internet of Things (IoT) for Digital Agriculture" (FG-AI4A) that aimed to support the creation of sustainable farming technologies.

Organized by:



**Seizo Onoe**,  
Director,  
Telecommunication  
Standardization Bureau,  
ITU



Seizo Onoe expressed gratitude to all participants, especially Professor Peter Singer, and acknowledged the support of the United Nations Environment Programme's (UNEP). Seizo Onoe concluded his remarks by emphasizing the importance of considering ethics and values when discussing AI and its implications on all living beings on earth.

Discussing the importance of digital transformation and its impact on society, environment, and economic development, **Balakrishna Pisupati** highlighted the work of the United Nations system to develop a Global Digital Compact by 2024. He explained that the purpose of the compact is to collaborate with governments and stakeholders who develop and apply technology, as well as focus on its adoption, use, and ethical implications.

Balakrishna Pisupati noted that UNESCO already has a specific program on ethics in artificial intelligence and that the United Nations Environment Programme (UNEP) is working on mainstreaming these discussions and approaches within its work program. When discussing conservation and environmental perspectives, Balakrishna Pisupati pointed out that the use of animals in research has significantly decreased due to technological advancements.

He expressed his interest in the specific elements that would be discussed during the webinar around AI ethics, as they could provide valuable input for policymaking and strategic development. Balakrishna Pisupati emphasized the importance of applying principles and processes to create fundamental, field-based changes that ensure the planet's safety and sustainability for everyone.

### **Keynote Speech**

In his keynote presentation, **Peter Singer** focused on addressing crucial ethical concerns surrounding artificial intelligence (AI) and its impact on non-human animals. While AI ethics discussions have largely centered on human-centric issues like fairness, bias, and the potential risks of superintelligent AI, Peter Singer drew attention to a significant oversight – the lack of consideration for the welfare of non-human animals. He pointed out that discussions on AI ethics predominantly revolve around humans, with minimal references to animals. However, he stressed the importance of incorporating animals into AI ethics, given that AI advancements can directly impact their well-being.

To justify the inclusion of animals in AI ethics, Peter Singer referred to the utilitarian perspective, citing the words of Jeremy Bentham, the founder of the English School of Utilitarianism, "The question is not, "Can they reason?" nor, "Can they talk?" but "Can they suffer?"". Jeremy Bentham emphasizes the moral



**Balakrishna Pisupati**  
Head, Environmental  
Policy, UNEP Nairobi



**Peter Singer**  
University Center for  
Human Values, Princeton  
University



significance of beings based on their capacity to suffer, regardless of their reasoning or consciousness. Hence, animals' ability to suffer grants them moral consideration, making their welfare an ethical concern that should not be overlooked. But Peter Singer also mentioned thinkers from other ethical traditions who also insist that the interests of animals be included in our ethical considerations.

Peter Singer argued that if animals hold moral value and AI affects them, then AI ethics should address their well-being. The presentation highlighted the United Nations AI ethics statement, which emphasizes the importance of avoiding harm caused or exacerbated by AI systems to individuals or collectives. While this statement acknowledges the significance of avoiding harm, Peter Singer emphasized the need to move beyond merely avoiding harm and to actively seek ways to create positive impacts for all sentient beings, including humans and non-human animals.

Expressing optimism about AI's potential to improve the world, Peter Singer discussed the opportunity for AI to assist in a to shift to a plant-based diet, which would benefit both animals and the environment. He also suggested that AI might help humans communicate with animals, leading to a better understanding of their needs and preferences. Furthermore, AI could aid in finding ways for humans to coexist with animals without constantly harming or competing with them.

In response to a question about being utilitarian, Peter Singer clarified that opposition to animal mistreatment does not necessarily require adhering to utilitarianism. He acknowledged that various ethical perspectives reject discrimination and prejudices against other species, and he hoped that speciesism, the bias favoring humans over non-human animals, would also be rejected in favor of acknowledging and respecting the interests of all species. By integrating ethical considerations for all sentient beings into AI ethics discussions, Singer believed that AI could contribute to a better world, where both human and non-human animals' welfare is valued and protected.

In his closing remarks, Peter Singer thanked the ITU for providing a platform to introduce these ideas and stressed the importance of the UN's leadership role in gaining worldwide acceptance of the idea that AI ethics should encompass all animals. He stressed the need for other bodies formulating ethical principles to include animals in their considerations, encouraging a broader awareness of AI's impact on animals.



In his presentation, **Yip Fai** outlined the ethical concerns surrounding autonomous vehicles, also known as self-driving cars, in relation to animals. While AI ethics discussions predominantly focus on human issues, he highlighted the potential consequences of self-driving cars on animals.

Yip Fai demonstrated that even in their prototype stage, self-driving cars have been involved in incidents where animals were hit, leading to fatalities and suffering. However, he pointed out that the lack of incentive to address this issue lies in the business priorities of companies. They are more concerned about potential public backlash if self-driving cars hit popular pets like dogs and cats, which could damage their reputation and lead to lawsuits. On the other hand, less popular animals may not be prioritized in detection and avoidance since their impact on profit or reputation may be minimal. He showed examples where self-driving cars failed to identify animals like pigeons and squirrels on the road, while successfully recognizing humans. This raised ethical questions about whether self-driving cars should be programmed to avoid animals and what actions should be taken when faced with a multitude of animals on the road.

Emphasizing the importance of considering the suffering of animals, Yip Fai urged that self-driving cars should be able to identify and avoid at least some animals, especially those of mid-size or larger. Ethical development of autonomous vehicles would involve taking appropriate actions to prevent harm to animals when it is safe for humans. He proposed that the next sensible step would be to include vertebrate animals, although the inclusion of invertebrates might face resistance due to its complexity.

Throughout the webinar, Yip Fai presented various case studies illustrating the impact of AI on animals and the ethical questions that arise. He also discussed AI applications used to communicate with animals and its implications for animal behavior manipulation. Additionally, he delved into the usage of AI in factory farming, expressing concerns about increased stocking density and reduced animal product prices leading to more animal suffering. He suggested using AI to support plant-based meat research to reduce animal suffering in factory farms. In conclusion, Yip Fai stressed the moral significance of animals and their welfare in AI ethics discussions. He advocated for ethical considerations and responsible AI practices to benefit animals and reduce their suffering.



**Yip Fai**  
AI Ethics Researcher,  
Princeton University



## Session 1: Coupling Animal Welfare and digital transformation

Sharing about the work of his organization, Wildlife SOS, **Kartick Satyanarayan** highlighted the role of technology in benefiting animal conservation efforts in India. Wildlife SOS, established in 1995, operates 12 rehab and rescue centers across India, catering to various animals such as elephants, leopards, tigers, bears, reptiles, and birds. Over the years, they have successfully rescued and rehabilitated numerous animals, including 700 bears, 200 leopards, and over 100 elephants.

Kartick Satyanarayan discussed Wildlife SOS's significant achievement in eradicating the inhumane practice of using dancing bears for entertainment across India. Through a 17-year effort, the organization worked with the community, employing microchips and technology to track and protect the bears, while simultaneously empowering local families with alternative livelihoods.

Furthermore, the organization actively works with enforcement agencies to address illegal wildlife trafficking. By using technology like tracking informants and tapping phone calls of traffickers, law enforcement agencies have been successful in their efforts.

Kartick Satyanarayan also emphasized the use of technology in wildlife conservation, including reuniting leopard cubs with their mothers, mitigating human-wildlife conflict, and tracking and conserving endangered species like the Levantine viper.

Highlighting the critical issue of the AI value alignment problem of ensuring that AI systems pursue goals and values aligned with human interests, **Soenke Ziesche** pointed out that this problem has thus far been exclusively related to humans. He also mentioned OpenAI's recent establishment of the "Super Alignment" department, specifically focusing on value alignment, but he stressed that it currently does not include research into non-human animals.

In his presentation he outlined three subproblems within the value alignment issue: value extraction, aggregation, and implementation into AI systems. He proposed the inclusion of non-human animals in this research, acknowledging the challenges it poses due to the vast variety of species and the difficulty in identifying their values and interests accurately.

Soenke Ziesche also mentioned OpenAI's recent establishment of the "Super Alignment" department, specifically focusing on value alignment, but he



**Kartick Satyanarayan**  
Co-Founder and CEO of  
Wildlife SOS



**Soenke Ziesche**  
Independent researcher



stressed that it currently does not include research into non-human animals. The challenges of this task also include aggregating values between humans and non-humans, addressing conflicting values between species, and the consideration of short-term preferences versus long-term health for non-human animals.

He emphasized the need for AI systems to be value-aligned not only with human interests but also with those of non-human animals, arguing that without such alignment, AI systems may pose existential risks and cause suffering to non-human animals. Soenke Ziesche concluded his presentation by proposing a futuristic scenario where value-aligned AI systems could act as custodians for non-human animals, considering human biases and incomplete knowledge about ensuring animal welfare. However, he also acknowledged the challenging nature of value alignment for both humans and non-human animals as a prerequisite for such a scenario to become a reality.

Discussing how artificial intelligence can be utilized to accelerate and pilot conservation efforts amid the biodiversity crisis, **Victor Anton** emphasized the urgency of preventing species extinction, estimating that around a million species were at risk. With background in wild biology, Victor Anton recognized the importance of accurate and real-time information to manage and protect endangered species effectively. However, he noticed a gap in conservation projects concerning AI implementation. Many community-led initiatives lacked knowledge and resources to harness AI's potential.

To address this gap, Victor Anton co-founded a non-profit organization with three pillars: conservation, community, and education. They focused on providing technology-driven solutions on the ground to accelerate wildlife protection. One such solution combined citizen science and machine learning to analyze underwater footage, aiding marine ecosystem monitoring. Additionally, Victor Anton and his team developed an open-source camera, the "wildlife watcher," to monitor cold-blooded animals like the giant wētā. They involved local students in this project, emphasizing community-driven science.

The organization also ran educational courses to raise awareness of AI's role in environmental preservation. Victor Anton invited interested individuals to contribute as "data rangers" with data science skills, "citizen scientists" helping with data classification, or partners/donors supporting their projects. Today the organization aims to bridge the conservation and AI gap, making AI tools accessible to local communities and fostering a collaborative effort towards protecting wildlife.



**Victor Anton**  
Founder and CEO,  
Wildlife.ai





Co-founder of Gainforest, a global non-profit organization, **David Dao** shared their mission to reverse and halt deforestation by 2030 using technology. He began the presentation with an audio clip to evoke the audience's imagination of nature, emphasizing that people's perceptions of nature vary depending on their cultural backgrounds. He explained that nature provides multiple benefits, not just carbon storage for climate change, but also cultural and biodiversity contributions. He stressed that humans have not treated nature well, leading to its deterioration at an unprecedented rate, as reported by the UN.

As an AI researcher, David Dao has a deep interest in using technology to support the environment. Gainforest, in collaboration with various conservation organizations globally, deploys AI solutions to detect and protect animals and biodiversity. They explored the concept of "inter-species money," where every species has its own bank account, and actions like observations contribute to its protection.

To demonstrate the effectiveness of this approach, Gainforest participated in the XPRIZE Rainforest competition. The challenge was to measure as much biodiversity as possible in a plot of land within 24 hours without entering the forest, promoting the use of drones and autonomous technology. While highlighting the opportunities in utilizing AI for data collection, including satellite imagery, drone-based monitoring, and environmental DNA sampling, he cautioned about AI overestimating carbon estimations and stressed the importance of community involvement to improve accuracy of AI models.

Working with citizen scientists Gainforest can enhance data reliability and discovered unknown animal species through DNA sequencing. To connect with these species, Gainforest translated DNA sequences into music notes, creating "DNA music." David Dao concluded by reiterating the significance of measuring biodiversity accurately and the need for continued research and community engagement to protect nature effectively.

### Closing Remarks

Providing closing remarks, **Bilel Jamoussi** expressed gratitude to all speakers, particularly Professor Peter Singer for his keynote presentation on the intersection of digital transformation and animal welfare. The webinar emphasized that digital transformation should not overlook the impact on non-human animals and biodiversity.

Technological advancements hold the potential to improve the quality of life for all living beings, including various species in both urban and natural ecosystems.



**David Dao**  
Co-Founder, GainForest



**Bilel Jamoussi**  
Chief of Study Groups, TSB,  
ITU



However, ethical considerations should not lag behind technological capacities. Bilel Jamoussi said that Professor Singer's quote, "We have to speak up on behalf of those who cannot speak for themselves," underscored the moral obligation to minimize the suffering of animals and flora in decision-making processes.

The webinar also introduced the concept of "speciesism," challenging anthropocentric thinking, and highlighted the idea of effective altruism and being utilitarian by leveraging emerging technologies like AI and IoT to address animal welfare. Bilel Jamoussi stressed that the ITU took pride in being one of the first UN agencies to address this topic and provide a platform for speakers to share their technological approaches in this domain.

Bilel Jamoussi encouraged the adoption of a more compassionate way of thinking in the digital age to preserve biodiversity and the overall ecosystem. The ITU aims to foster collaboration in developing digital solutions prioritizing the well-being of both humans and non-human inhabitants of the planet. In conclusion, Bilel Jamoussi called for exploring the potential of digital transformation to create a more inclusive and compassionate world for all living beings.



## Decade of Healthy Aging: Role of Digital Technologies

Episode 29: 22 August 2023

### Overview

According to UNDESA, as of 2019, there were over 703 million people above the age of 65, which constituted 9% of the global population. By the year 2050, this number is projected to reach 1.5 billion. To address challenges associated with the aging of populations and increase quality of life of older people, their families and improve the communities in which they live, the United Nations has declared the period from 2021 to 2030 as the Decade of Healthy Aging. The World Health Organization (WHO) has defined healthy aging as the process of maintain functional ability that enables well-being in older ages; and functional ability is being able to be and to do activities one value for as long possible.

In support to the Decade the ITU within the work on “Diversity and Inclusion” of the Development Bureau, developed since 2021 a dedicated programme on “Ageing in the digital world”. Additional tools and resources including Thematic Report on “Ageing in the Digital World from Vulnerable to Valuable” and other resources including on-line self paced training on ICT for better ageing and livelihood in the digital landspace and video tutorial were made freely available to support policy and decision makers efforts in addressing the challenge of the two global mega trends, the rice of technology and population aging.

ITU also prepared the document The Role of Digital Technologies on Aging and Health, which is part of the PAHO’s series “The Decade of Healthy Aging in the Americas: situation and challenges”.

Data-enabled technologies are important assets to support healthy aging. Additionally, the solutions provided by artificial intelligence (AI), smart wearables, and internet of things (IoT), are also examples on how the new and emerging technologies can help older adults in becoming self-reliant, monitor vitals, track behavioural changes, ease interactions with medical-care professionals, provide health information and send timely alerts in case of emergencies. Additionally, technology if designed and delivered in digital accessible formats with ICT digital accessibility standards and universal design principles in mind, can be used to ensure age-friendly digital environments, which can be favored functional ability for individuals with different levels of mental and physical capacities, as well as for tackling and avoiding social

Co-Organized by:



PAHO



isolation. For example, during COVID-19, older people with internet access, suitable ICT devices, and technologically literate coped better with lockdowns restrictions, as it helped in staying connected with family, received up-to-date information, and thus avoid isolation. Moreover, knowledge to access and use technology and related e-services to buy vital products including medicine and food was almost a compulsory requirement for independent living of older persons.

This webinar explored how digital technologies can offer scalable means for equipping patients with self-management techniques, offer feedback and support to improve patient confidence and independence among the elderly.

### Opening Remarks

**Seizo Onoe** welcomed attendees to the webinar and expressed gratitude for their support. He mentioned the joint report on Healthy Aging in Americas published earlier this year and anticipated continued growth in this collaboration. Seizo Onoe emphasized the importance of ensuring digital services are meaningful and user-friendly for everyone, especially for people with disabilities and the elderly.

He discussed the new standards published by ITU which addressed the specific needs of vulnerable groups. Seizo Onoe also highlighted the importance of meaningful connectivity for full participation in modern society. He mentioned the development of medical-grade devices such as connected blood pressure cuffs and activity trackers to help prevent and manage chronic conditions like diabetes, hypertension, and heart disease.

Seizo Onoe also discussed the development of standards for accessibility to help the elderly cope with declining eyesight and hearing and to stay connected with friends and family. A benchmarking framework was being developed to help developers and regulators certify AI solutions, similar to the certification of medical equipment. This effort was supported by the EU and the World Intellectual Property Organization. He acknowledged that health and wellness rely on more than just access to healthcare and emphasized the importance of digital technologies in promoting healthy aging. In closing, Seizo Onoe encouraged attendees to participate in ITU's work and to ensure that innovation benefits everyone around the world.

**Enrique Vega** emphasized the importance of the partnership with the ITU in celebration of the "decade of healthy aging." He also acknowledged the significant opportunities that the event had opened for collaboration with



**Seizo Onoe,**  
Director,  
Telecommunication  
Standardization Bureau,  
ITU



**Enrique Vega**  
Unit Chief, Healthy Life  
Course Unit, PAHO/WHO



various actors involved in the process of guaranteeing a positive change in the way aging is perceived and experienced.

Enrique Vega mentioned that the partnership with ITU had been crucial in identifying areas where they could contribute to developing more capacity for individuals to be part of the process of generating healthy aging. He highlighted that the concept of healthy aging had brought a new definition, shifting from the absence of disease to the capacity to develop and sustain functional ability. Enrique Vega emphasized the critical role of the digital environment in generating the functional ability of older people. He recognized the need to consider digital capacity as a key driver in the development of healthy aging, reducing the gap in this area, and increasing the possibility that the digital environment enhances the capacity for older persons.

He outlined the four major strategic areas of the decade, which included changing the way people think, feel, and act towards age and aging, promoting the generation of age friendly environments , and transforming the way health systems and services cater to older persons' needs. He also discussed the importance of guaranteeing basic human rights and long-term care services for those dependent on care. Enrique Vega concluded by expressing confidence that the webinar would help identify areas for improvement and advance the proper implementation of healthy aging concepts. He thanked everyone for the opportunity and expressed pride in their cooperation with the ITU.

### Session 1: Healthy Aging in the Digital Age

The moderator for this session was **Patricia Morsch**.

**Roxana Widmer-Iliescu** emphasized the shared goal of ensuring active participation in the digital society and healthy, happy aging for current and future generations. She highlighted the importance of accessible communication as a human right and the impact of technology on various sectors.

She discussed the need to include everyone in the digital society, regardless of age, gender, ability, or location. Roxana Widmer-Iliescu expressed hope for the future with developments in metaverse and artificial intelligence technologies, which could help older persons avoid loneliness and provide entertainment. She mentioned the use of robots in some countries to assist older people with health issues and tasks.

Roxana Widmer-Iliescu outlined three building blocks for digital inclusion: access to infrastructure, affordability of internet services and devices, and accessibility



**Patricia Morsch**  
Technical Officer, Healthy  
Aging, PAHO



**Roxana Widmer-Iliescu**  
Senior Coordinator, Digital  
Inclusion, ITU



of ICTs, policies, and standards. She emphasized the need for decision-makers to consider these factors in their work to ensure digital accessibility for everyone, including persons with disabilities.

She called on the industry and manufacturers to develop accessible digital equipment, technology, products, and services. She also emphasized the importance of addressing capacity building and providing digital literacy and skills training for older persons. Governments and organizations should invest in literacy programs to ensure full participation in the digital age. Roxana Widmer-Iliescu discussed the difficulties older persons encounter in the digital world, including isolation and the impact on their daily lives.

To conclude, she stressed the need to address the inclusion of older persons in the digital world seriously and find ways to support them through intergenerational support and governmental assistance. Appropriate legislation, policies, and strategies must be developed to adapt and include the entire population in the new digital system. Roxana Widmer-Iliescu reiterated the importance of designing and developing technology in digitally accessible formats and mentioned the ITU's development sector offers numerous resources, training, and reports on digital accessibility. She invited everyone to use these free, multilingual resources.

**Pierpaolo Palumbo** discussed his work in the Personal Health System Lab and his involvement with the ITU and WTO Focus Group on Artificial Intelligence for Health. In his presentation he outlined that falls are common among older individuals and are multifactorial, leading to psychological and physical consequences. About 10% of falls require medical attention, but they are preventable, with current interventions reducing fall risk by 20-30%.

He discussed the rich literature on fall prediction tools, ranging from early subjective evaluations to modern AI-based tools. He described traditional tools like the Timed Up and Go (TUG) test and newer tools incorporating digital technologies such as wearable inertial sensors. While prototypes of these modern tools have been developed, their reliability and transferability between populations and laboratories are uncertain.

In 2022, global guidelines for fall prevention recommended a simple decision tree based on clinical knowledge instead of digital technologies. Pierpaolo Palumbo and his colleagues emphasized the need for validation and incorporation of data and wearable sensors. They are part of the ITU and WTO focus group on AI for Health, which aims to establish a standardized assessment



**Pierpaolo Palumbo**  
University of Bologna, Italy



framework for evaluating AI-based methods in health diagnosis, triage, and treatment decisions.

Following a systematic review and individual participant data analysis to understand available datasets and algorithms for predicting falls, Pierpaolo Palumbo and his team identified around 30 datasets. They plan to invite authors to join them in sharing data and algorithms for benchmarking. By achieving external validation, Pierpaolo Palumbo believes they will gain trust from medical and scientific societies and clinicians.

With his experience in telemedicine, digital literacy for older people, and emergency alert systems, **Praveen G. Pai** emphasized the roles of anthropology, human behavior, and IoT design in shaping technology access and acceptance for elders, particularly in regions where people are less familiar with technology. He noted that while technology has rapidly advanced, its acceptance by elders in developing countries has not kept pace due to factors such as lack of familiarity, digital illiteracy, physical challenges, perceived irrelevance, privacy concerns, resistance to change, and negative stereotypes.

He highlighted the challenges faced by older adults when using technology, such as small screens and touch interfaces on smartphones, which can be difficult for those with age-related limitations or movement disorders. Dr. Praveen G. Pai stressed the importance of understanding anthropology in the context of developing countries to make technology more accessible and beneficial for older adults. He also mentioned that research should focus on how older adults in close-knit communities can use technology to maintain connections with family members who have migrated to urban areas.

Training and education are essential for teaching basic digital literacy, and usability, accessibility, privacy, security, and customizability are critical aspects of IoT design. Dr. Praveen G. Pai warned that unregulated technology could pose risks, such as financial exploitation, phishing, social engineering, hacking, and manipulation. To address these concerns, he shared plans for making Kerala more age-friendly, including bridging the digital gap, involving local community leaders, intergenerational learning, and developing community-based personal emergency response systems.

In conclusion, Dr. Praveen G. Pai emphasized the importance of research and collaboration in understanding grassroots realities and learning from global best practices. Age-friendliness evaluations of available technology and multi-center



**Praveen G. Pai**  
Professional, Geriatrics  
Medicine, Gerontology,  
and Public Health



research could help improve technology adoption and benefit older adults in developing countries.

### Closing Remarks

**Cristina Bueti** expressed gratitude to the speakers, moderator, and participants for their contributions to the webinar, discussing the transformational potential of digital technologies to empower an aging global population. She highlighted the power of collaboration between ITU and partners like PAHO, WHO in supporting older persons.

She emphasized the need for innovative solutions to support healthy aging, as the number of older persons is projected to double to 1.5 billion in 2050, making up 16% of the world's population. She stated that digital transformation requires the concerted efforts of various stakeholders, with ITU playing a pivotal role in developing international standards that serve the needs of all, regardless of age or background. The partnership between ITU, WHO, and other organizations exemplifies collaboration in developing open, interoperable, and human-centric standards. ITU standards provide guidance for facilitating health monitoring services and developing policies and strategies that assist countries in their development. Cristina Bueti mentioned the global initiative on AI for Health, led by ITU, WHO, and other partners, which aims to develop technical standards, policy guidance, and facilitate knowledge and data sharing to support evidence-based decisions regarding AI solutions for health.

In closing, Cristina Bueti encouraged those passionate about digital transformation to visit the ITU website to learn more about ongoing initiatives, such as the ITU Focus Group on metaverse and the Digital Transformation Webinar Series. She concluded by thanking the team behind the organization of the webinar, the participants, speakers, and moderators for their contributions to the important discussions on this topic.



**Cristina Bueti,**  
U4SSC Focal Point and  
Counsellor, ITU





## ChatGPT: risks and rewards of generative AI in cities

Episode 30: 4 September 2023

### Overview

The emergence of ChatGPT has brought Generative-AI to the centre-stage given their capability to leverage natural language processing techniques.

As ChatGPT can provide quick access to cohesive information, their role in the public sector offices in cities can be ideal as wait times for information exchange and provision to inhabitants can be reduced significantly. Within cities, Generative AI including ChatGPT could find application in the health sector by responding to clinical related queries, which can serve as an indispensable tool in case of research-based queries. However, its application in medical emergencies, still remains to be further tested.

Based on the type of data they are trained with, Generative AI could also prone to significant degree of mistakes or misinformation. Furthermore, we are also now grappling with burning questions associated with plagiarism in the using these platforms in education.

This Webinar explored the increasing application of Generative AI in cities while delving into how to balance the ethical and transparency issues revolving around this technology across sectors including health and education.

### Opening Remarks

In his welcoming remarks, **Seizo Onoe** discussed the potential of generative AI in transforming urban environments and its role in optimizing various aspects of city life. He mentioned that generative AI could help urban planners simulate scenarios and predict outcomes, such as improve traffic flow and reduce energy consumption. Seizo Onoe emphasized the importance of inclusivity through participatory urban planning, allowing inhabitants to express their priorities and address diverse societal needs.

However, he acknowledged the need to address data privacy and security concerns. He stressed the necessity of establishing robust frameworks, guidelines, and standards to protect personal information and ensure responsible use of generative AI, especially in critical sectors such as healthcare.

Organized by:



**Seizo Onoe,**  
Director,  
Telecommunication  
Standardization Bureau,  
ITU



Seizo Onoe highlighted the significance of transparency and accountability in ensuring that generative AI does not perpetuate systemic biases or inequalities.

### Keynote Speech

**Ramy Fathy** discussed the responsible use of generative AI in cities, highlighting the traditional challenges that cities face, such as sustainability, GHG emissions, traffic congestion, and energy efficiency. To tackle these challenges, he emphasized the importance of technology enablers like ICT infrastructure, IoT, and artificial intelligence.

He explained that the digital transformation journey for smart cities takes multiple years and requires a people-centric approach to ensure sustainability, inclusivity, and prosperity. He explained how the ITU supports digital transformation through standardization, joint activities with international organizations, and engagement platforms like United for Smart and Sustainable Cities (U4SSC).

Generative AI, according to Ramy Fathy, has multiple potential use cases in cities, including traffic management, urban planning, community engagement chatbots, language translation, healthcare, art generation, and driving digital twins. However, he also acknowledged the potential threats posed by generative AI, such as deep fake attacks, fake sensor data, AI-powered cyber attacks, privacy attacks, bias, and misinformation.

To address these threats, Ramy Fathy suggested implementing overarching responsible use frameworks that incorporate detection tools, cryptographic techniques, AI-driven detection models, strong anonymization techniques, generative models that capture minority modes, and fact-checking algorithms. In conclusion, he emphasized the importance of responsible AI use in cities to ensure safety, privacy, and ethical considerations while harnessing the potential benefits of generative AI.

### Session 1: Application Scenarios of Generative AI in Cities

The moderator for this session was **Samridhi Shoor**.

**Yousef Khalili** discussed the concept of cognitive cities, highlighting the differences between smart cities and cognitive cities. While smart cities are based on real-time data, cognitive cities rely on predictive analytics and understanding the potential behaviors of citizens. Cognitive cities focus on anticipating events and building human-centric experiences.



**Ramy Ahmed Fathy,**  
Vice Chairman of ITU-T  
SG20, ITU



**Samridhi Shoor**  
Director, Meta asset  
research center, the  
Metaverse Council



**Yousef Khalili**  
Chief Commercial Officer,  
TONOMUS



He explained the relevance of artificial intelligence (AI), particularly generative AI, in cognitive cities and the importance of data protection and privacy. He also outlined various use cases and applications of generative AI in reshaping urban planning, healthcare, transportation, media, entertainment, and education.

In his presentation, Yousef Khalili emphasized the potential benefits of generative AI for cities, including unlocking productivity and growth, generating insights for outcome-driven decisions, accelerating innovation and creativity, and enhancing sustainability and happiness of citizens. He concluded by stating that Neom aims to build a fully cognitive, sustainable, and autonomous city, with their cognitive blueprint at the core of their vision. At the same time, he stressed the importance of trust and ethical frameworks surrounding the use of generative AI and technology. He argued that people will only use these technologies if they trust that their data is safe and remains under their control.

**Weng Marc Lim**, spoke about the potential and pitfalls of generative AI in education, focusing on four key paradoxes based on an article he and his team published in the International Journal of Management Education. He explained that generative AI can be both a friend and a foe in education. It can facilitate knowledge acquisition, design assessments, and validate learning goals, but it also raises ethical concerns around plagiarism. To preserve educational quality, he suggested educators should reimagine assessments and design them in a way that students cannot rely solely on generative AI.

The second paradox highlighted by Weng Marc Lim was the capability of generative AI, which depends on how well it has been trained and the prompts it receives. He emphasized the need for user education and training for educators and students on how to effectively use AI tools, such as prompt engineering.

The third paradox underscored the tension between accessibility and restrictions in generative AI. Weng Marc Lim noted that while these tools can make quality education more accessible, premium models may limit features or usage. He called for prioritizing equity and ensuring a reasonable response timeframe from AI tools for those without premium access.

Lastly, Weng Marc Lim discussed the psychology of restrictions, cautioning that banning generative AI might make it more attractive to students. He suggested educational institutions develop guidelines for using generative AI responsibly and take shared responsibility in learning creation and assessment design.



**Weng Marc Lim**  
Dean and Professor,  
Sunway University



In summary, Weng Marc Lim urged treating generative AI as a tool rather than a threat, prioritizing equity, and continuously evaluating and adapting approaches for better results in education.

**Gabriel Nobis** presented a research project on a diffusion model called Diff Infinite for generating large histological content. The presentation focused on two main challenges in AI for histopathology: dealing with large whole slide images and working with small, sparsely annotated datasets.

To tackle these challenges, Gabriel Nobis and his team trained a generative model on a small, sparsely annotated dataset to augment the dataset and improve the performance of downstream applications. The chosen generative model was the diffusion model, which can generate high-quality and diverse data but is relatively slow at sampling time. The team used a semi-supervised approach for training the model and a classifier-free guidance approach for segmentation mask generation.

The results showed that their method outperformed other methods for generating large images in terms of improved precision and recall. Diff Infinite also did not generate tiling effects, which can be an issue with other methods. Gabriel Nobis and his team also evaluated the performance of their model when augmenting the dataset for classification and segmentation tasks. In three out of four cases, augmenting the data improved performance. Surprisingly, the best performance in the classification task was achieved when training only on synthetic data.



**Gabriel Nobis**  
Researcher, Fraunhofer  
HHI



## Digital Tourism: Bridging the gap between communities and destinations

Episode 31: 27 September 2023

### Overview

The concept of digital tourism is aimed at improving travel efficiency, the quality of life of the inhabitants and the overall touristic experiences. The process of digital transformation also stands to impact the tourism industry by delivering technological interventions based on AI, IoT, VR to create responsive and adaptive environments and systems and to deliver services that can respond to customer requests personalizing services related to hotel and airline bookings, language interpretation, navigation within a given destination, and even baggage handling.

This Webinar explored the impact of emerging technologies on tourism in cities, while also underscoring the key strategies required for cities to employ digital technologies for enhancing quality of services for tourists and reducing operating time and cost of tourism-related services.

### Opening Remarks

On the occasion of World Tourism Day, **Seizo Onoe** discussed the significant transformation the travel sector has experienced due to emerging technologies such as AI, virtual reality, and more recently, the metaverse. He mentioned how these advancements have simplified travel for many, making the world a smaller place. These technologies have enabled individuals to plan their travels from the comfort of their homes, making tourism more accessible.

He further elaborated on how the evolution of tourism has transformed our experiences, with technologies like augmented and virtual reality allowing tourists to immerse themselves in the culture and history of a place from the comfort of their own home. Seizo Onoe highlighted the usefulness of mobile apps in providing real-time navigation, language translation, and information on locally available cuisine and main tourist attractions.

Speaking about the United for Smart, Sustainable Cities (U4SSC) initiative, Seizo Onoe discussed digital tourism in the smart city context. He concluded by

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**Seizo Onoe,**  
Director,  
Telecommunication  
Standardization Bureau,  
ITU



expressing excitement over the potential of immersive technologies, including the metaverse, to enrich the tourism experience in unprecedented ways.

**Sandra Carvão**, emphasized the resilience of tourism and its importance as a driver of change, opportunity, and social justice. With international tourism arrival numbers back to 84% of pre-pandemic levels, there is an opportunity for tourism to lead to a more sustainable future. At the same time, it is important to address new challenges faced by the sector, including demographic changes, climate change, and technological developments.

Sandra Carvão discussed the significant impact of the COVID crisis on the sector, and how technology has demonstrated its potential, particularly for small communities. She mentioned the UNWTO's focus on tourism for rural development as an example of how smaller communities and destinations could overcome their challenges with the help of technology. She also emphasized the need to understand and master technology, ensuring its integration in making the sector more sustainable, inclusive, and resilient. She stressed the importance of communities having access, capacity, and knowledge, and shared her enthusiasm for the UNWTO's work in creating and advancing smart destinations in both urban and rural areas.

### **Session 1: Digital Transformation in the Tourism Industry**

Session 1 was moderated by **Martin Brynskov**

**Ramón Ferri Tormo** discussed the ongoing work to improve the understanding of city dynamics, emphasizing the importance of providing city planners with a comprehensive view of city activities, including tourism. He stressed the need to bridge the gap between community experiences and the realities of tourist destinations.

Ramón Ferri Tormo mentioned the ongoing efforts to develop methods for viewing city activities holistically and creating interoperable solutions for different city challenges. He noted that his team has created a reference framework for managing smart, sustainable cities. He also discussed the establishment of a data sharing space that would allow a large number of actors to share data.

In his presentation he detailed the concept of a smart destination platform, which would include the destination and the technical infrastructure. He explained that this platform would offer a range of services, including artifacts,



**Sandra Carvão**  
Chief of Tourism Market Intelligence and Competitiveness, UNWTO



**Martin Brynskov**  
Chair, Open & Agile Smart Cities



**Ramón Ferri**  
Director of Institutional Relations, SEGITTUR



APIs, intelligence, and dashboards. He further stated that his team had identified 23 common services to provide to all destinations.

Concluding his presentation, Ramón Ferri Tormo discussed the proposed work plan for his team, with the aim of finalizing all work by the end of next year. He also highlighted his team's collaboration with the World Tourism Organization (UNWTO) to identify best practices in the use of technology in tourism management.

**Alberto Bernal Garcia** presented a report "Smart Tourism, a path to more secure and resilient destinations" which provides insights into how destinations worldwide can transition to smart touristic destinations. This report emerged during the recovery from the COVID-19 pandemic and aimed to demonstrate how technologies and digitalization could advance tourism towards resilience, competitiveness, and sustainability.

Alberto Bernal Garcia also highlighted the development of norms and standards for smart destinations. He stressed that the transition from a regular city or destination to a sustainable and smart destination was crucial to improving the management and tools for smart destinations. The report also discussed smart platforms for touristic destinations. These platforms facilitated a data-driven economy in the tourism industry and allowed for the development of an open innovation ecosystem.

He concluded by mentioning that the report included numerous use cases and solutions, as well as success stories of different smart destinations already using smart platforms to manage their public services in a smarter and more sustainable way.

**Jessika Weber** emphasized the need for digital technology to be accessible to communities using participative approaches. She suggested that these technologies could help improve digital policymaking. She also discussed the challenges faced by cultural tourism, including uncertainty, climate change, and over-tourism. Noting the impact of these challenges on local communities, she underscored the importance of technology in solving these problems.

According to Jessika Weber, tourism cannot be seen as a closed system, since it relies on other systems like transportation and healthcare. She highlighted the need for new methods and tools to engage stakeholders and different types of communities, and expressed the hope that digital tools could be part of the solution. She described a project she was involved in that focused on assisting remote and rural regions in accessing their tangible and intangible cultural



**Alberto Bernal**  
Director Territorios  
Phygital, Indra Minsait



**Jessika Weber Sabil**  
Professor, Digital  
Transformation in Cultural  
Tourism, Academy for  
Tourism of Breda  
University of Applied  
Sciences (NL)



heritage. The project aimed to create a sustainable solution for these destinations, and one of the tools developed was an applied and serious game to engage stakeholders.

Jessika Weber also mentioned another project called Digital Tourism, which examined how different tools like AR and VR technologies could be used in different destinations. She concluded by stressing the need for strategic networks and interdisciplinary teams to successfully implement digital tools. She insisted that these tools should ultimately benefit the communities, as it's their stories, locations, and insights that form the core of these projects.

### Closing Remarks

**Cristina Bueti** expressed gratitude to all the speakers and participants for their valuable contributions and engaging discussions on World Tourism Day. She appreciated the enthusiasm and expertise displayed, which highlighted the potential of emerging technologies to transform the tourism sector and create more inclusive, efficient, and enjoyable experiences for all.

She underscored the importance of digital transformation in reshaping the tourism industry, emphasizing the power of harnessing artificial intelligence, IoT, and virtual reality to create responsive and adaptive environments. She also suggested that digital tourism has the potential to foster strong connections between communities and destinations, allowing cities to develop targeted strategies to attract visitors while preserving their unique cultural heritage and promoting sustainable tourism practices.

Lastly, she mentioned ITU's newly established Focus Group on metaverse, with one task group specifically looking at the use of metaverses for tourism. She invited everyone to join the Focus Group, stating that its success depends on the collective efforts of cities, governments, industries, local communities, and international organizations.



**Cristina Bueti,**  
U4SSC Focal Point and  
Counsellor, ITU





## “Fashioning” the Metaverse to Accelerate Digital Transformation: What has gone out of style

Episode 32: 2 October 2023

### Overview

As digital transformation percolates different industries, how can fashion remain behind?

With the rise of consumer power, the fashion industry is now increasingly seeking to leverage frontier technologies such as metaverse to comprehend customer behavior, respond to market trends and tailor their retail information. In this quest, brands are also aiming to capitalize on the growing interest in immersive digital experiences bestowed by the metaverse for shopping, while also adopting sustainable procurement chains for their products.

This fire-side chat provided insights on how the fashion industry is now embracing the metaverse to improve existing business and retail processes and customer experiences across their value chains.

### Opening Remarks

**Seizo Onoe** welcomed attendees to the webinar and discussed the evolving metaverse ecosystem and its largely unexplored potential across various industries, particularly in fashion. He highlighted the unique opportunities the metaverse offered, such as creating customizable avatars that can model clothing and accessories from different parts of the world. Seizo Onoe also outlined the possibility for brands and designers to create virtual clothing collections and establish virtual stores where customers could try on and purchase clothing according to their preferences.

He further explained that the metaverse could enable digital fashion shows with avatar models on virtual runways, such as the Metaverse Fashion Week, which had been ongoing since 2022. Seizo Onoe stated that the adoption of the metaverse in the fashion industry would depend on how technology and customer behaviors evolved. He emphasized the need for industry stakeholders to adapt to these changes and explore new ways to engage with customers in the metaverse.

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**Seizo Onoe,**  
Director,  
Telecommunication  
Standardization Bureau,  
ITU



## Session 1: Laying the Foundation of Metaverse in Fashion

**Samridhi Shoor** expressed her belief that every business can innovate and bring fresh perspectives to the metaverse. She recalled how brands jumped on the metaverse bandwagon in early 2021 without fully understanding how it could add value to their brand strategy. She discussed the trend of brands approaching her team to explore the potential of generative AI, often without a clear understanding of how it could provide value beyond PR purposes. She emphasized the role of strategists in shaping the market and helping brands understand how to effectively utilize the metaverse and digital fashion.

Discussing human-computer interfaces, Samridhi Shoor spoke of the potential impact on the fashion industry if people could not only see but also feel digital designs. She also highlighted the potential changes to e-commerce with the introduction of blockchain-based currency systems and supply chains. She envisioned a point where all these fragmented technologies would converge to create the metaverse.

**Sasha Wallinger** described herself as a 'hidden connections detective' working to foster unexpected partnerships and collaborations. Coming from a background in sustainable fashion, she saw the potential for fashion to be an adaptive change agent and a significant global business indicator. She noted that brands, both large and small, are looking to understand how to engage with new audiences in the digital space. Also highlighting the breaking down of traditional silos within organizations, where a technologist would need to communicate with a designer to understand how a runway show could integrate with a digital asset or ecosystem.

Discussing the potential of technology in fashion, she emphasized the importance of the human body as a tool and the intersection of health and wellness with fashion. Talking about the entrepreneurial ecosystem around digital fashion, Sasha Wallinger suggested that it is not slowing down and is gaining pace. She saw vast potential for business opportunities in this realm, touching on various areas like wallets and gaming ecosystems. She spoke about the possibilities of virtual stylists and the shift from physical to virtual closets.

Finally, Sasha Wallinger encouraged participation in the Web 3 community, expressing her belief in its welcoming nature. She stressed the importance of collaboration and saw potential for growth in open-source platforms. She saw potential for both B2B and B2C models in the digital fashion space, and



**Samridhi Shoor**  
Director, Meta asset  
research center, the  
Metaverse Council



**Sasha Wallinger**  
Chief Marketing Officer,  
Innovation & Foresight  
Strategist & Founder,  
Blockchain Style Lab



encouraged problem-solving and innovation, while highlighting the importance of sustainability, and advocating for responsible business practices.

**Clare Tattersall** discussed the concept of digital fashion week and the immersion it offers in the digitalization of the fashion industry. She emphasized the significance of thought leadership, innovation, creativity, and community in these experiences. She highlighted the difference between innovators and the broad audience, and between digital natives and those used to the traditional fashion industry. She praised the rapid technological advancements and the need for designers to adapt to these changes, stressing the importance of having a brand vision, and understanding how and where to engage with the audience.

She noted the prominence of gaming in the metaverse, with designers building businesses and generating income by creating digital assets for sale in the metaverse. Clare Tattersall commented on the opportunities for designers, but also urged caution, suggesting brands need to carefully consider how a metaverse presence fits within their overall brand strategy. She shared her excitement about technological advancements, particularly in the field of health and wellness. She expressed a preference for augmented reality (AR) over virtual reality (VR) headsets, seeing AR as a way to layer creativity onto the existing world.

Clare Tattersall stressed the importance of making the fashion industry more sustainable and environmentally friendly. She suggested that this could be achieved by reducing the production of physical assets and designing in the virtual space instead to conserve resources and water. Tattersall identified the challenge for big brands in deciding how to move forward, suggesting they could learn from the adaptability of independent designers.

Lastly, she discussed the importance of choosing the right approach for each brand and mentioned that she feels agnostic towards the web 2 and web 3 metaverse experiences. Despite recent negative perceptions around blockchain technology and NFTs, she emphasized their potential value, especially for artists, in terms of agency over the sale and resale of their products and proof of authenticity for the luxury industry.

**Holly Wood** spoke about her attraction to the innovation space, particularly for the opportunities it presents for artists to use blockchain technology and NFTs. She commented on the growth of the NFT space and its impact on digital fashion, noting that the field is still in its very early stages. She emphasized the importance of continual evolution and refinement in the industry and applauded



**Clare Tattersall**  
CEO & Founder, Digital  
Fashion Week



**Holly Wood**  
CEO & Founder of  
HollywoodLabs.io. and the  
Future Fashion Summit



brands that are experimenting and being playful with technology. She also highlighted the significance of audience engagement in these spaces.

She observed that many brands initially found it challenging to understand where digital innovation fits within their company structures. Holly Wood suggested that the most impactful approach is for brands to develop highly skilled individual teams that can explore how innovation can be applied across the organization. She mentioned the emergence of new roles such as Chief Experience Officers, who are responsible for overseeing these explorations.

Holly Wood noted that the metaverse has been developed by brands that have committed to their vision and have learned from each other, fostering a culture of open-source sharing and collaboration. She also discussed the potential impact of digital fashion on the creative and artists community. She emphasized the opportunities it provides, especially for small and agile businesses. Holly Wood highlighted the significant gap in the market for creative direction in digital fashion, suggesting that a collaborative approach could be successful.

She concluded by discussing the potential of blockchain-powered ecosystems and the importance of fully integrated e-commerce in whichever ecosystem brands choose to work within. Lastly, Holly Wood emphasized the importance of inclusivity as a core principle in the fashion industry and the potential of the metaverse to contribute to sustainability conversations.

### Closing Remarks

**Cristina Bueti** spoke of people seeking new ways to express themselves online, just as they do offline, and that fashion allows individuals to create unique items to reflect their personalities, cultures, and societies. She noted that fashion had entered the digital realm, as evidenced by the growth of customizable avatars in digital fashion, demonstrating strong consumer interest.

She discussed how younger generations, who spend significant time online, have embraced digital fashion as a new trend. Cristina Bueti expressed pride in the ITU's commitment to fostering global collaboration and supporting the development of international standards that enable digital transformation, including fashion.

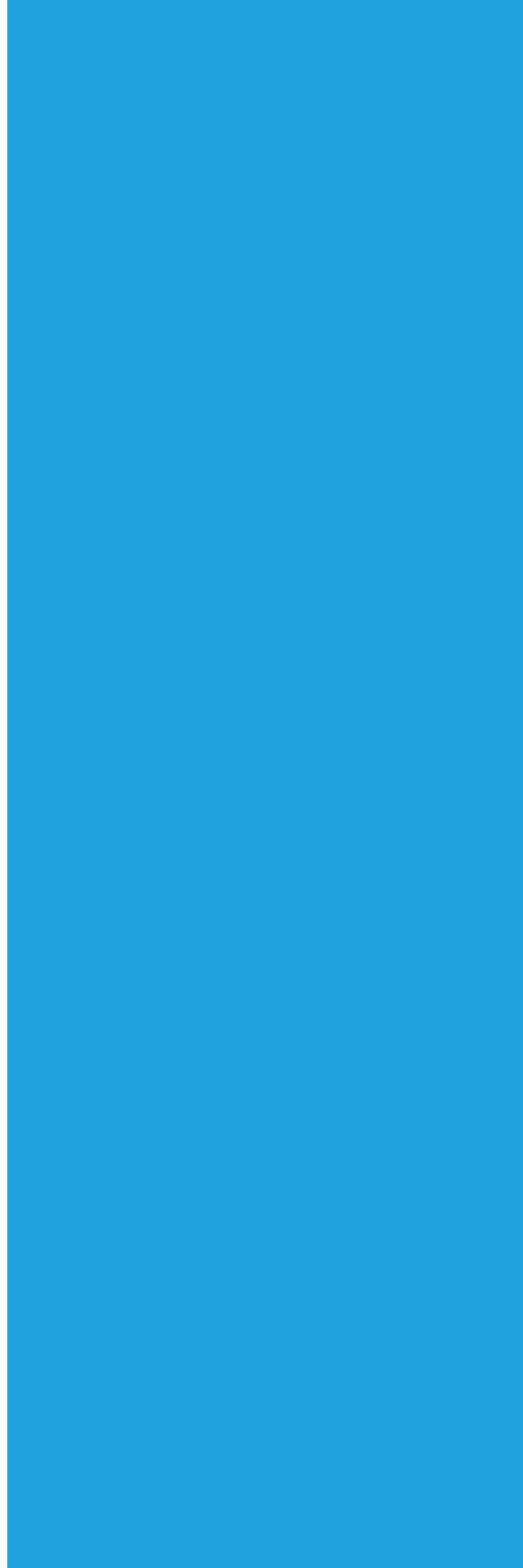
Cristina Bueti noted that since December 2022, the ITU Focus Group on metaverse had engaged over 15,000 experts worldwide to work on various aspects of the metaverse and how international standardization could help in its development. In conclusion, she emphasized the importance of collaboration



**Cristina Bueti,**  
U4SSC Focal Point and  
Counsellor, ITU



and partnership in realizing the full potential of the metaverse for the fashion industry.





## Disaster risk reduction in the digital transformation age: Leveraging emerging technologies

Episode 33: 13 October 2023

### Overview

On International Disaster Risk Reduction Day, experts within the field of disaster management discussed how to fill the knowledge gaps and foster evidence based decision-making for disaster risk reduction strategies through the adoption of technologies such as AI, IoT, digital twin and even the metaverse!

### Opening Remarks

**Seizo Onoe** spoke about the potential of AI, drones, and robots in disaster management, stating that these technologies could help search for survivors, assess damage, and provide relief supplies like medicines and food. He further explained that these technologies could run simulations of disease scenarios to improve understanding and preparation for disasters. These and other capabilities were being studied in the ITU Focus Group on AI for natural disasters.

He highlighted the work of ITU Focus Group on metaverse and how it too could support effective disaster management. Seizo Onoe showcased new ITU standards under development to provide for submarine cables to be equipped with climate hazard monitoring sensors. He also noted that these sensors could provide accurate early warnings for tsunamis and valuable data for climate science. He added that this standardization work was the result of ITU collaboration with the World Meteorological Organization, and together they were building on the minimum set of requirements and service via a Joint Task Force for smart cable systems.

**Stefan Uhlenbrook** discussed the need to better understand new technologies such as artificial intelligence, the Internet of Things, drones, and digital twins to understand and manage disasters, particularly water-related disasters like floods and droughts. A recent flood event in Libya was a wake-up call, emphasizing the need for new technologies and observation tools to understand and predict such disasters. He noted that recent advancements in science and technology have created new avenues for mitigating the adverse effects of such hazards.

Co-Organized by:



United Nations  
Convention to Combat  
Desertification



**Seizo Onoe,**  
Director,  
Telecommunication  
Standardization Bureau,  
ITU



**Stefan Uhlenbrook**  
Director Hydrology, Water  
and Cryosphere, WMO



Dr. Stefan Uhlenbrook highlighted the potential of artificial intelligence in flood management and the development of new predictive forecasting tools. The new Focus Group on Artificial Intelligence for natural disaster management is very timely. He also mentioned the global initiative, "Early Warnings for All," which aims to cover everyone around the globe with an early warning system within five years. He had acknowledged the challenge of this initiative and the collective effort required from various organizations such as WMO, ITU, UNDRR, and IFRC to make it a reality.

### Keynote Presentation

**Hwirin Kim** from WMO spoke about the importance of celebrating International Disaster Risk Reduction Day and focused her talk on hydrology. She emphasized the need to better understand the status of hydrological events and using innovative methods for data collection and sharing, modeling and forecasting, and information dissemination to do so.

Hwirin Kim discussed various initiatives and systems that WMO has in place to support its Member States, particularly in developing countries. These include the Associated Program on Flood Management, the WMO Hydrology Observation System, and the HydroHub initiative. She also stressed the importance of capacity building and mentioned various programs that WMO has for this purpose, including distance learning courses and hands-on training. These programs aim to enable authorities and agencies to improve and continue their work independently.

In closing, she highlighted the importance of emerging technologies, such as AI, drones, and IoT sensors in hydrology. One example is the use of 3D printing to set up new stations and measurement facilities at a lower cost. Lastly, Hwirin Kim urged everyone to read the WMO annual report, the State of Global Water Resources, which provides detailed information on water resources and latest global water trends.

### Session 1: Leveraging emerging technologies for disaster management

**Muralee Thummarukudy** in his remarks emphasized the crucial role of disaster risk reduction. Having worked with almost every disaster of the 21st century, he understood the significance of focusing on disaster risk reduction rather than just response.

Muralee Thummarukudy suggested that disaster response often received more attention, while disaster reduction was less glamorous but ultimately lifesaving.



**Dr. Hwirin Kim**  
Head of Hydrological and  
Water Resources Services  
Division, WMO



**Muralee Thummarukudy**  
Director, G20 Global Land  
Initiative



He stressed the importance of the world investing more time and energy into disaster risk reduction. He also expressed his gratitude to the World Meteorological Organization for their ongoing activities related to technology and capacity building for disaster risk reduction.

**Elena Xoplaki** spoke about natural hazard management and early warning systems. She stressed that human-induced climate change was causing more frequent and intense extreme weather events, resulting in significant impacts on nature, society, and the economy. Elena Xoplaki said that these impacts were amplified in certain regions due to factors such as population growth, rapid urban development, and increasing frequency and intensity of extreme weather events. She also outlined the work of the ITU Focus Group on AI for Natural Disaster Management of which she is Vice-Chair.

She discussed the role of AI-based algorithms, computational power, and publicly available datasets in addressing these challenges, raising questions about leveraging AI to enhance understanding, detection, forecasting, and communication of natural hazards. She also spoke about the Horizon Europe Medusa Project, coordinated by the WMO, which aims to build a scalable early warning system over the greater Europe, Mediterranean, and Northern African areas. The project offers multi-hazard capacity building for emergency responders, efficient response mechanisms, and fully addresses the early warning cycle from data and models to public safety.

**Md Nasir** presented a case study on Project Sunny Lives in India, focusing on the classification of dwelling types and risk assessment for disaster vulnerability using satellite imagery. The project was supported by a non-profit organization called Seeds, which works towards building disaster resilience in low-income areas. Md Nasir mentioned that India ranked fifth in the world for weather-related disasters, with over two million houses being lost to floods every year.

Md Nasir explained the role of AI in assessing the vulnerability and risk of buildings to flooding. Conducting ground surveys to classify buildings based on their dwelling types was time-consuming and not scalable. Therefore, his team used machine learning to automatically classify buildings over a larger region using satellite imagery. He outlined the machine learning model they used for this purpose, which was designed to identify the different types of buildings or dwellings based on their roofs, a good indicator of the construction material and the resilience of the building.



**Elena Xoplaki**  
Senior Scientist I Acting  
Head of the Climatology,  
Climate Dynamics and  
Climate Change Research  
Group, Justus Liebig  
University Giessen,  
Germany



**Md. Nasir**  
Senior Applied Research  
Scientist, Microsoft, United  
States





Md Nasir reported that the model has been deployed in December 2020 in two regions affected by cyclones, and it had accurately assessed the risk level in more than 80% of the cases. He concluded by suggesting that the model could be improved by using different architectures and new data collection and could be extended to other regions and disasters.

**Giriraj Amarnath** discussed the importance of frontier technologies in risk management, with a focus on regions such as Africa and Asia. He emphasized the need for these technologies to be understood and utilized by policymakers at both national and international levels. Giriraj Amarnath highlighted the significance of these technologies in the face of increasing climate change uncertainties, mentioning the use of tools like remote sensing, GIS, and drones. He stressed the importance of technologies in disaster management and the need for a comprehensive approach that covers all phases of risk management, from preparedness to response.

Giriraj Amarnath discussed the need to break institutional silos through collaboration with governments and NGOs. He highlighted the relevance of technological applications to agriculture and their potential to stimulate economic growth by reducing damage and exposure. He highlighted the use of AI-based prediction models in flood forecasting and early warning, and the importance of customizing global models to national contexts. He also noted the potential of technology to provide emergency maps and assist in future climate investment planning.

Giriraj Amarnath mentioned the recognition of these novel solutions by the Group of Earth Observation in 2020. He discussed the development of a village-level parametric product using remote sensing and IoT sensors, which involved the active participation of local communities. He concluded by summarizing the AI-based tools' support in developing automated contingency measures for various stakeholders, from farmers to financial institutions.

**Cameron Chell** shared his experiences using drones in various disaster scenarios, recounting instances where drones were used to save human lives. He discussed recent applications of drones in managing floods, mapping and surveying, and wildfire management. He detailed an incident in Europe where drones were initially deployed to monitor the movement of landmines during a flood but were eventually used for identifying people stranded on rooftops. The drone was used to evaluate the health conditions of the stranded individuals and to guide rescuers to their locations.



**Giriraj Amarnath**  
Principal Researcher -  
Water Risks to  
Development and  
Resilience, International  
Water Management  
Institute (IWMI)



**Cameron Chell**  
Co-Founder, Draganfly  
Innovations, United States



In disaster scenarios, Cameron Chell explained how drones are equipped with various sensors, including thermal cameras, to collect real-time and detailed data from close proximity. He highlighted how these drones help in survivor searches, especially in earthquake scenarios where people may be buried under rubble. He also discussed the use of Lidar mapping, a technology that uses drones to capture millimeter-resolution data. This technology is particularly useful in pre-disaster scenarios and for wildfire management.

**Teppo Rantanen** discussed the role of technology in disaster management in a city context, using the example of Tampere, Finland. He spoke about the city's ongoing project to leverage new technologies to enhance city operations and improve citizens' lives. Their program, Data Driven City for Citizens, focuses on using data to improve daily life, particularly for the most vulnerable populations.

Teppo Rantanen discussed Tampere's five flagship programs of transformation, which include using data for businesses, creating an international inclusive city, supporting youth, safe pedestrian city planning through digital twins, and creating a sustainable city. He highlighted the importance of digital twins and a "city brain" for managing cities in new ways. He also discussed the use of technology in disaster recovery, outlining the stages of understanding, planning, and implementation.

Teppo Rantanen highlighted the potential of digital twins, XR, generative AI, and enhanced connectivity in managing disaster events. Digital twins can track and manage situations, while XR can improve the user experience. Generative AI can support on-time responses, and enhanced connectivity can underpin the operation of drones, autonomous vehicles, and devices. He concluded by emphasizing the potential of real-time data from crowdsourcing to update digital twins continually, aiding in disaster management.

### Closing Remarks

**Bilel Jamoussi** emphasized the vital role of innovation in mitigating the effects of natural disasters, and how digital technologies could empower meteorological agencies to better monitor earth systems, detect natural hazards, and identify those requiring aid promptly. He highlighted the ITU's unique position to convene key stakeholders to address the responsible application of digital technologies in disaster risk reduction.

Bilel Jamoussi underscored the immense potential of digital technologies, such as AI, immersive technologies, and digital twins, in improving disaster risk reduction. However, he also cautioned against the potential harm or



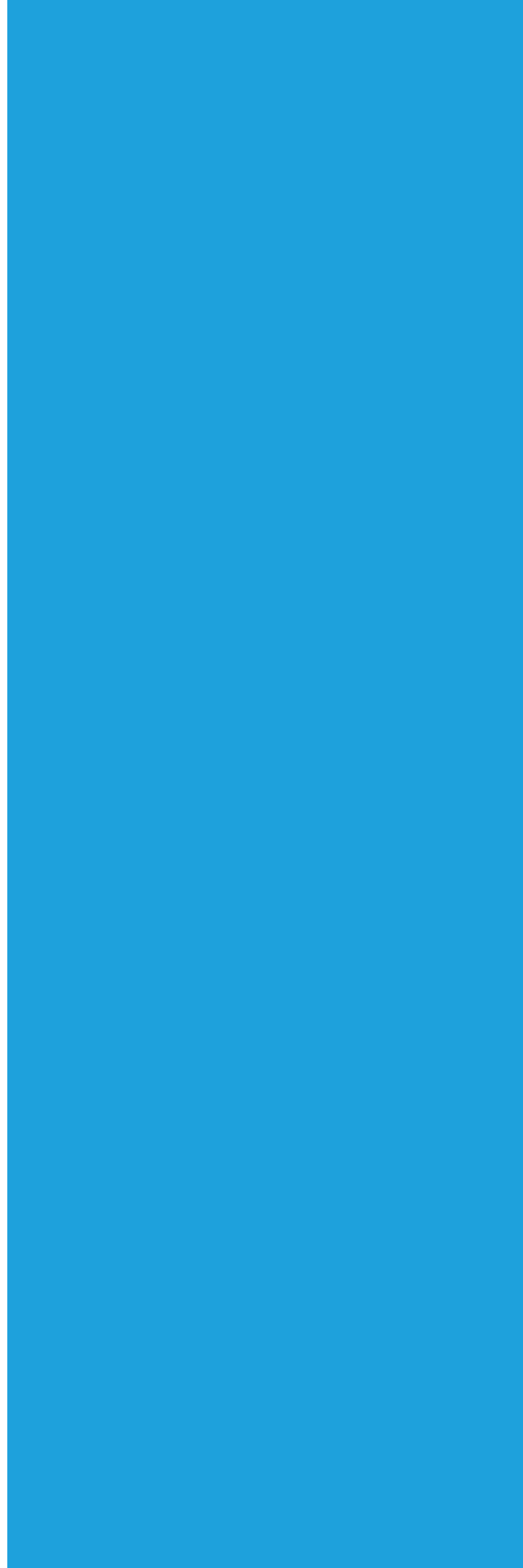
**Teppo Rantanen**  
Executive Director of  
Economic Policy,  
Competitiveness and  
Innovation, City of  
Tampere, Finland



**Bilel Jamoussi**  
Deputy Director & Chief of  
Study Groups, TSB, ITU



marginalization of underrepresented groups through the use of these digital systems. He concluded by thanking participants for their contributions during the webinar to the important discussion on protecting the planet and its people.





## What is a citiverse? And how can it contribute to sustainable city development?

Episode 34: 24 October 2023

### Overview

On 24 October 2023 GCH and ITU organized a webinar on the citiverse to explore how it can help Local Regional Governments (LRGs) to develop people-centered sustainable cities and what is required on the regulation and technical sides. An excellent line of speakers presented their views, shared their experiences and explained the challenges stakeholders face from the local through the regional to the global level.

Citiverse might offer new administrative, economic, social, policy-making, and cultural virtual goods, services, capabilities to local governments and community actors such as citizens and local businesses. It might be a gamechanger for local and regional governments to accomplish future city-developments successfully and sustainably, and offer better and more efficient services in several areas, such as:

- internal connectivity of city-owned buildings, security systems and services;
- traffic monitoring, predictive traffic management and sustainable mobility planning;
- data-services related to weather, climate and extreme weather events;
- management of energy flows in a city in conjunction with other sectors;
- zero pollution actions, including air, water, soil pollution and waste management;
- sustainable urban design, including built infrastructure and nature-based solutions.

But how cities can use citiverse to implement the 2030 Agenda for sustainable development, foster innovation and create new opportunities for their inhabitants? What is the role of the relevant international organizations?

Co-Organized by:





## Session 1: How a 'Citiverse' can help LRGs to develop people-centered sustainable cities?

This session was moderated by [Andras Szorenyi](#).

[Davis Mwamfupe](#), mayor of Dodoma eloquently described that the rapid growth of cities across the globe but especially in Africa represents a challenge and tests the limit of infrastructure development and equitable delivery of services. Planning future needs and designing inclusive, resilient and sustainable cities require complex approaches that might be well supported by digital technologies. A citiverse can provide sufficient data to enable LRGs to make well founded data-driven decisions. Its predictive power can become a valuable asset for mayors to envision the future urban landscape and discover the social, environmental and economic potential of the city.

[Okan Geray](#), strategic planning advisor at Dubai Digital Authority indicated that a large majority of our social, economic and environmental challenges are manifested in cities and elaborated on the combined framework of SDGs and local priorities in creating cities' own agenda. The metaverse - and therefore the citiverse – is one of the most disruptive emerging technologies with a potential to redefine urban living and redesign urban planning in addition to economic opportunities. Its standardization is necessary but not sufficient. To harness this technology to redesign cities and reimagine the economy, we need to join efforts to identify the cities' needs and share the good practices. This is the best way for LRGs to help each other to achieve their maximum potential. The Dubai Metaverse Strategy aims to make Dubai the No.1 in the region and one of the top 10 cities globally in terms of metaverse economy. Multilevel cooperation is also key to overcome the numerous challenges, including standardization, regulation and governance, data privacy, security and safety, as well as interoperability.

[Cristina Bueti](#) from ITU explained how multistakeholder collaboration can contribute to answer the different technological, societal, economic and governance challenges. ITU supports cities by developing and implementing international standards (ITU-T Recommendations) and policies that can help to accelerate their digital transformation leveraging emerging technologies including IoT, digital twin, AI and metaverse. She reported that a new ITU Focus Group on metaverse (FG-MV) has been established. The group is open to all stakeholders and has already developed a series of deliverables covering a wide range of topics, including opportunities and challenges, ethical concerns, accessibility, sustainability, and policy and regulation. She gave concrete



**Andras Szorenyi,**  
Senior Policy Advisor, GCH



**Davis Mwamfupe,**  
Mayor of Dodoma,  
Tanzania



**Okan Geray,**  
Strategic Planning Advisor,  
Digital Dubai, United Arab  
Emirates



**Cristina Bueti,**  
U4SSC Focal Point and  
Counsellor, ITU



examples where citiverse can bring added value to local and central governments, like the use of smart contracts to facilitate municipal services, creation of decentralized virtual administrative hubs, etc. She echoed the importance of establishing a new Digital Coalition on CitiVerse as suggested by the FG-MV. This new coalition would enable partnerships among cities and would foster innovation in cities by creating sandboxes as well as sharing best practices and solutions.

**Isabel Wetzel** from UN Habitat shed light on the people-centered smart cities program run in collaboration with national and local governments to advance digital transition. To secure this goal several milestones are necessary to reach: constructing resilient infrastructure, increasing digital literacy, building local capacity on technology, providing practical tools and playbooks to LRGs. We must assure the balance between working for the SDGs and meeting the real needs of the residents. Closing the digital divide is key to avoid negative impacts on marginalized and vulnerable populations.

**Cristina Martinez**, deputy head of smart technologies for communities unit at the European Commission emphasized that our joint efforts should follow the principles of sustainability, inclusivity and accessibility. The Commission works on a broad spectrum of regulatory issues and possible citiverse applications, like citizens engagement, public service distribution, education, entertaining, tourism and cultural heritage. The AI algorithms enrich considerably the citiverse ecology, which should provide access to citizens, local governments, businesses via their avatars.

### Question Period

*Answering to questions*, several speakers mentioned that citiverse can offer a radically new experience and opens up numerous possibilities for the local governments. It is more about the expectations what we want to create and how can local governments use it to function more efficiently and offer better services for the citizens and local businesses. It is challenging to set regulation before the technology is fully developed, but multistakeholder cooperation can help to identify the key requirements.

Citiverses might be gamechangers for LRGs to successfully and sustainably accomplish people-centered city-development for a smarter future. The Covid-19 pandemic for example showed how important local data is, and the citiverse makes the collection of these data – by type, by source, etc. – more efficient. However, it is of crucial importance to avoid the mushrooming of different



**Isabel Shirin Enyonam Wetzel,**  
Programme Officer, UN-Habitat



**Cristina Martinez,**  
Deputy Head for Smart Technologies for Communities, European Commission



citiverses, because the lack of interoperability and shared security would block reaching its full potential.

United Nations entities – like ITU and UN-Habitat – as well as the EU play a leading role in ensuring that cities can bring their fair share to accelerating digital transformation while bringing connectivity to the public and bridging the digital divide. New forms of cooperations involving LRGs exist in all organizations: the Digital coalition on citiverse, United for Smart Sustainable Cities and the Partner2Connect at ITU, the Global alliance of mayors on digital transformation at UN Habitat, and the European digital infrastructure consortium at the EU.

Digital transformation, smart city development, use of the emerging technologies like the metaverse and citiverse are crucial areas for LRGs. Strategically assembled, properly regulated and efficiently managed people-centered citiverses have the potential to answer the challenges of rapid urbanization and can contribute to the development of cities as agents of solutions to achieve the Sustainable Development Goals. Good examples exist already on all continents – Dodoma, Dubai, Singapore, and Tampere, just to mention a few – and others will follow for sure.



## How to successfully develop People-Centred citiverse?

Episode 35: 30 October 2023

### Overview

The citiverse is a concept for a network of interconnected virtual worlds that are synchronized with their physical counterparts. It is envisioned as a way to create more inclusive, sustainable, and participatory cities.

Smart city initiatives have often focused on technology for its own sake, rather than on how technology can be used to improve the lives of people. This has led to some smart city projects being expensive, inefficient, and even harmful.

It is important that we develop a people-centered citiverse, which is one that uses technology to solve real-world problems and improve the quality of life for all residents. This means that people should be at the heart of the city planning and development process.

For example, smart city platforms can allow residents to submit feedback on city services or vote on proposed projects. It can also improve the quality of life for residents in a number of ways, such as by reducing traffic congestion, improving air quality, and making it easier to access essential services. Also, it can help to attract new businesses and industries to the city, and they can also help to create new jobs in the citiverse related sector. Overall, people-centered citiverse have the potential to make cities more livable, sustainable, and equitable for all residents.

### Opening Remarks

**Bilel Jamoussi** discussed the need to transform cities into hubs of innovation, efficiency, and sustainability in an age of increasing urbanization. He introduced the concept of 'citiVerse', a fusion of metaverse and cities, which uses advanced technologies for comprehensive real-time insights into city dynamics. According to Bilel Jamoussi, this concept could potentially revolutionize urban planning and management by providing a holistic understanding of city life. He further mentioned the ITU focus group's work on CitiVerse, led by Dr Christina Yan Zhang and Cristina Martinez, to provide a clearer definition of 'citiVerse' and how it could be beneficial for city planning.

Co-Organized by:



**Bilel Jamoussi**  
Deputy Director & Chief of  
Study Groups, TSB, ITU





Bilel Jamoussi also referred to the work of the ITU Study Group 20, an expert group focusing on developing standards to assist cities in accelerating their digital transformations. He highlighted the United for Smart Sustainable Cities (U4SSC) initiative, a global UN effort that collaborates with governments, international organizations, and industry leaders to enhance the urban ecosystem through digital transformation.

**Luis Nava Guerrero** spoke about the significance of incorporating new technologies for societal betterment, emphasizing the need to align new technologies with community needs. While acknowledging the magnitude of the challenge, he highlighted the importance of a global vision to drive local solutions and responses. He described the Latin American continent, specifically the city of Querétaro in the center region of Mexico, the next center of innovation, with a vibrant technology community.

In closing, Luis Nava Guerrero expressed his conviction of the importance of placing people at the center of their decisions making in future intelligent cities. He envisaged a future where young people not only use technology but also create it. He concluded by emphasizing the significance of future prosperity, innovation, and opportunities for all.

**Jung Sook Park** in her remarks introduced WeGO, an organization focused on smart city development, and one of the largest and oldest membership-based organizations in the world. She acknowledged the significance of the concept of 'citiverse' and thanked ITU and the Metaverse Institute for inviting WeGO to be part of the discussion. She emphasized the importance of people-centered smart cities, particularly after the pandemic and drastic climate change, as they prioritize the well-being and needs of residents leading to more sustainable, inclusive, and livable urban environments.

She spoke about WeGO's program and activities focusing on human-centered smart city values, mentioning the Seoul Smart City Prize, which promotes innovative yet inclusive smart city models, and the WeGO IMD Smart City Index, which focuses on citizen-centric data. She also mentioned the WeGO Smart City Champion, a youth program aimed at fostering knowledge sharing and capacity building in the field of sustainability, and smart city development. Finally, Jung Sook Park stated that WeGO supports the initiative on people-centered cityverse led by ITU and expects it to bring about digital transformation that makes cities more livable, sustainable, and adaptable for all inhabitants.



**Luis Nava Guerrero**  
Municipal President of  
Querétaro



**Jung Sook Park**  
Secretary General, WeGO



**Edlam Abera Yemeru** expressed her appreciation for being part of the discussion on transforming cities into smart urban spaces. She mentioned that UN-Habitat, the UN agency responsible for promoting and supporting sustainable cities and human settlements, places a lot of emphasis on smart city development. She stressed the importance of people-centered smart cities, which prioritize the well-being and needs of residents, resulting in more sustainable, inclusive, and livable urban environments.

She highlighted five principles that UN-Habitat promotes for people-centered smart cities, all of which she believes are relevant to the concept of 'citiverse'. These principles include empowering people and communities, making access to technology equitable, responsibly managing data and digital infrastructure, building trust and securing digital assets, and capacity building for stakeholders.

In her closing remarks, Edlam Abera Yemeru stressed that UN-Habitat has been tasked by countries worldwide to develop international guidelines for people-centered smart cities. She stated that these guidelines, which will be finalized by 2025, will take into account the notion of the citiverse as a forward-looking aspect of the entire smart city development trajectory.

### **Session 1: Shaping the citiverse in the Digital Age**

The moderator for this session was **Christina Yan Zhang**.

**Roland van der Heijden** discussed the concept of the metaverse, including its potential implications and impact on the future of urban life. Speaking about the 'citiverse' (European pendant of 'American' MV), he described the movement of the city towards the integration of the social, physical and digital city into a digital urban community, where people will fluidly move between physical and digital surroundings and every hybrid form inbetween. He noted that the metaverse is footloose, meaning it can exist anywhere and doesn't necessarily have to be tied to a physical location. A city is per definition (also) a physical construct, so to what extent is the digital urban community the same or different as the concept of the metaverse/citiverse?

Van der Heijden also touched on the changing behavior of younger generations, who are more comfortable in digital surroundings. He highlighted the emotional potential of the metaverse, recalling a video of a mother in South Korea reconnecting with a VR representation of her deceased daughter.

He said that the key to the metaverse's development is interoperability, not only in terms of technique but also semantics, function, organization, and ritual. He



**Edlam Abera Yemeru**  
Chief of the Knowledge and Innovation Branch, UN-Habitat



**Dr Christina Yan Zhang,**  
CEO, Metaverse Institute



**Roland van der Heijden**  
Program Manager Digital City, City of Rotterdam, The Netherland



emphasized the need for a shared research agenda and the involvement of all stakeholders, including citizens, companies, and government. In closing, Van der Heijden stressed the crucial role of governments in ensuring ethics, safety, transparency, and inclusivity in the digital world.

**Marwan Alzarouni** discussed Dubai's approach to the metaverse and its potential impacts. He outlined the city's physical and digital assets, emphasizing how Dubai aims to enhance the experiences of its residents, citizens, and visitors, by reducing friction in various user journeys. He noted that the metaverse is not just about its economic value but how it changes human interactions and impacts lives. Marwan Alzarouni also highlighted the importance of privacy and citizen empowerment in governing their own data. He further divided the metaverse into two categories: the big tech metaverse, which includes places for socializing, working, learning, and shopping; and the web 3 metaverse, which focuses on value exchange. He stressed that Dubai is exploring both aspects.

Marwan Alzarouni also introduced the Responsible Metaverse Self Governance Framework, a set of guidelines focused on digital identity, data protection, copyright and IP of digital goods, and legal enforceability. He emphasized the importance of these guardrails in shaping Dubai's approach to the metaverse. He concluded by discussing some metaverse use cases such as Barbados's virtual embassy and the UAE's metaverse strategy. He stressed the importance of data privacy, protection, and cybersecurity, noting that these are high priorities for Dubai. He concluded by discussing the city's commitment to digital wellbeing, transparency, inclusiveness, diversity, and safety by design.

**Teppo Rantanen** spoke about the development of a people-centric universe and metaverse in the city of Tampere, Finland, stating that for the past five to six years, they have been focusing on human-centered transformation with the primary goal of enhancing the lives of their citizens through technology, specifically for those who face challenges using new technologies. The team has made systematic progress, working in collaboration with companies and utilizing the best global resources. The first phase of their smart city program engaged 450 companies on more than 200 use cases. The aim was to improve social, urban, and ethical services based on actual needs, with citizens as co-creators of urban interventions.

He outlined the city's vision for 2040 and shared the initial steps taken through five flexi programs, each focusing on a different aspect of city life. They addressed how businesses can grow using data, AI, and new technologies and



**Marwan Alzarouni**  
Strategic Advisor, Dubai  
Department of Economy  
and Tourism



**Teppo Rantanen**  
Executive Director of  
Economic Policy,  
Competitiveness and  
Innovation, City of  
Tampere, Finland



how they can better serve the international people coming to Tampere. They also focused on promoting equal learning opportunities for the youth, creating a safe pedestrian city, and developing a sustainable city. Teppo Rantanen discussed the use of an IoT platform, an app that provides information about CO<sub>2</sub> emissions, traffic, and air quality, and the importance of good governance and trust among citizens. The vision is to build a responsible, sustainable, and ethical city that combines physical and virtual worlds using new technologies centered on improving people's lives.

**Nicholas You** presented a case study from Guangzhou, China, a city where he works. He explained how the city, during the COVID-19 lockdown, distributed kits to pregnant women for conducting six basic tests at home. These tests were linked to a 5G network, and the data was shared with hospital health workers via the cloud. If the system detected any anomalies, doctors were immediately alerted and could advise the woman on the safest place to go for additional help. This system was so successful that it was adopted for newborns to monitor neonatal jaundice, a condition which is prevalent in Northeast Asia. Using this system, serious cases of neonatal jaundice dropped by more than half, and no deaths were reported.

The system is being extended to monitor a child's health until they are 18 years old. The goal is to use the data collected to create a digital twin of the baby using only DNA information. This digital twin can then be used to predict potential health issues, providing an early warning system for parents and doctors. Nicholas You also explained how the digital twin could help identify whether a real-world child's ailment was medically caused or socially determined, by comparing the child's health with that of the digital twin. This would allow for preventative measures to be taken based on housing conditions, lifestyle choices, etc. He concluded by highlighting the importance of data trust and suggested the use of an independent third party to hold custody of the data for model building, but not for long-term storage.

**Ian Oppermann** spoke about the challenges of building a safe and accessible metaverse, which is often described as an advanced version of the Internet, presenting unique challenges and opportunities, particularly around behaviors, practices, and work health and safety issues. He highlighted the ambiguity in the metaverse regarding identity and legality of actions. He raised questions about the appropriateness of representing oneself as a different gender, age, or personality in the metaverse, especially when it comes to engaging in services or transactions.



**Nicholas You**  
Executive Director,  
Guangzhou Institute for  
Urban Innovation



**Ian Oppermann**  
Chief Data Scientist, NSW  
Government, Australia



He pointed out that the metaverse could be more accessible for people with disabilities than the physical world, but the standards of engagement and representation in the metaverse are still undefined. Ian Oppermann stressed the need for standards in the rapidly evolving metaverse. For example, Standards Australia is using an alternative pathway to develop standards for child safety in the metaverse, acknowledging the need to adapt to rapidly changing technologies. In closing, he stressed the importance of working on technological enabling standards and trustworthiness, as well as making progress on data usage, IoT, and digital twins.

**Ralf Ma** discussed his work with the IEEE Metaverse Standards Committee, with its work dating back to 2017. During this time technology evolved, leading to a change in the Committee's scope. He explained that the Committee is responsible for developing and maintaining standards, recommended practices, and guidelines for virtual reality and augmented reality. This was done through an open and external process to promote them globally.

Ralf Ma further explained that the Committee is developing standards such as the P. 2048 for metaverse words, terminology, definition, and technology. He mentioned that they also had standards regarding ethics for the metaverse and identity in the metaverse. He discussed the three core technologies for the metaverse, namely spatial computing, persistent computing, and trust computing. Ralf Ma made clear that the importance of trust computing, which includes blockchain and decentralized finance, was still a matter of debate.

Ralf Ma also mentioned that they had initiated standards projects for the metaverse, including numerous standards for supporting technologies like cloud computing, big data, and web 3. He concluded by citing Singapore's ambition to become the world's smartest city as a good example for metaverse and AI policy makers.

### Closing Remarks

**Cristina Bueti** concluded the webinar by thanking all who contributed to the successful event. She specifically acknowledged Dr. Christina Yan Zhang from The Metaverse Institute for her partnership in organizing the webinar, as well as the Secretary General of WeGO and colleagues for their opening remarks.

Stating that the webinar offered a valuable opportunity to delve into the concept of interconnected virtual worlds mirroring physical counterparts, Cristina Bueti praised the speakers for their insightful presentations and sharing their knowledge. She emphasized the importance of shifting focus from



**Ralf Ma**  
Chair IEEE Metaverse  
Standards Working Group

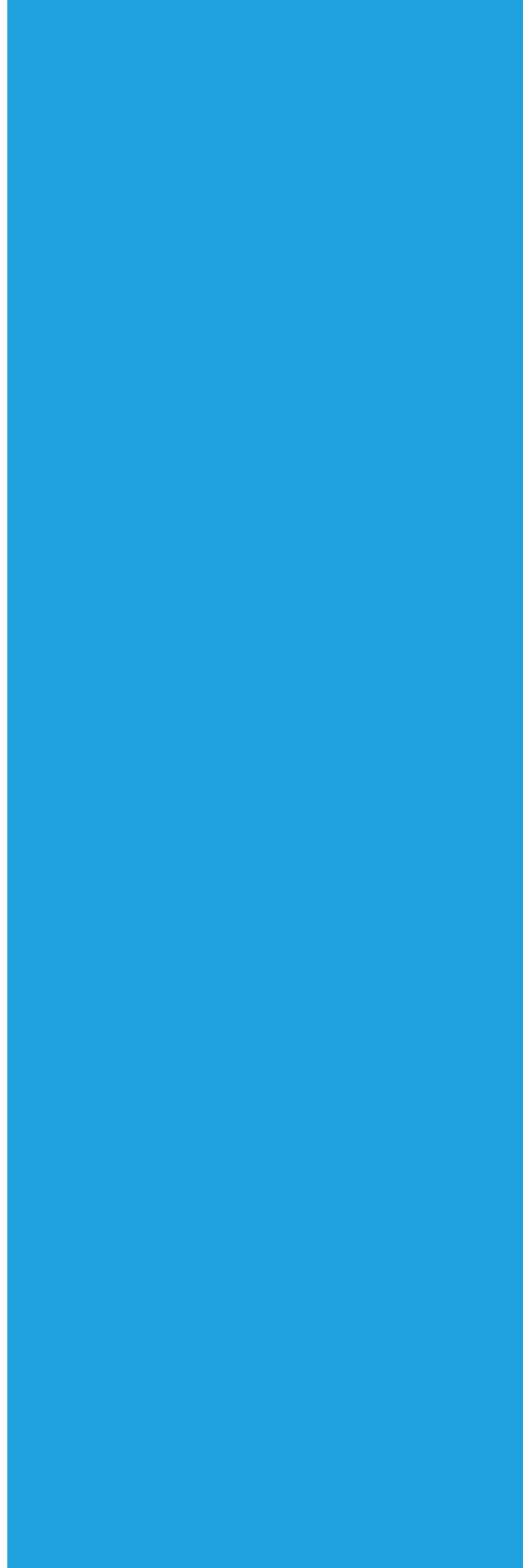


**Cristina Bueti,**  
U4SSC Focal Point and  
Counsellor, ITU



technology to how it can enhance life, solve problems, and improve quality of life, with the aim to build people-centered smart cities.

She also mentioned the potential of smart city platforms to enable inhabitants to provide feedback on city services and projects, fostering more engaged inhabitants. Cristina Bueti encouraged participants to join the ITU, and its Focus Group on metaverse, to contribute to the development of smart city standards and guidelines, highlighting the benefits of digital transformation in making cities smart and sustainable.





## World cities day: digital transformation for a better urban life

Episode 36: 31 October 2023

### Overview

Cities of the 21st century are plagued with challenges associated with urban sprawl, pollution, limited resources, waster disposal problem, housing issues. Digital transformation in cities has reinvented hopes of improving sustainability, resilience, and livability of cities by leveraging digital technologies of the new age. On the occasion of World Cities Day, join us to celebrate successes in reshaping our global urban future, while we also deliberate on the key challenges to be overcome.

This Webinar explored how digital transformation can help improve the adaptability and scalability of cities to facilitate the delivery of amenities while enhancing efficiency of operations and strengthening the backbone of cybersecurity architecture across all urban verticals – all in alignment with the Sustainable Development Goals (SDGs).

### Opening Remarks

**Seizo Onoe** discussed the challenges faced by city administrators and how they were considering the use of digital technologies to reshape services offered in urban areas. He explained how cities could increase efficiency, boost economic development, enhance sustainability, and improve the quality of life for inhabitants through these technologies. He demonstrated how cities were utilizing these strategies to speed up their recovery from COVID-19 and to achieve the 2030 Sustainable Development Goals.

He stressed that international standards developed in the ITU were aiding cities worldwide to be more efficient, sustainable, and beneficial for their inhabitants. Seizo Onoe also detailed the ITU's rich history in supporting the development of innovative technologies and activities. He highlighted the work of the U4SSC initiative as an example, explaining how ITU collaborated with 19 other UN partner agencies to create a platform to assist cities in aligning their digital transformation initiatives with the Sustainable Development Goals.

Co-Organized by:



**Seizo Onoe,**  
Director,  
Telecommunication  
Standardization Bureau,  
ITU



## Session 1: Setting the Stage for Digital Transformation in the Urban Ecosystem

This session was moderated by [Eleanor Varley](#).

[Non Arkaraprasertkul](#) highlighted the significant shift in approach to urban development and technology integration. He spoke of the need to start by understanding the needs of the people, rather than enforcing solutions on them, proposing that this approach, which he had been advocating for over the past five years, could help avoid backlash from citizens. He shared examples of cities that had invested heavily in technology, but the results were unsatisfactory due to a lack of understanding of the people's needs and capacities. Non Arkaraprasertkul argued that many cities were focusing too much on supply-side economy, leading to buildings that remained unused, and cities that were uncomfortable for residents due to excessive surveillance.

Non Arkaraprasertkul stated that his experiences taught him that good intentions, funding, and programs were not enough to ensure successful urban development. He emphasized that the key to avoiding these pitfalls was to understand and meet the demands of the citizens. Non Arkaraprasertkul proposed a citizen-centric approach to building livability, arguing that technology was merely a tool to fulfill the needs of the people. He concluded by stating that the success of a Smart City should be measured by the happiness of its citizens, not the number or sophistication of its technologies.

[Bugge Holm Hansen](#), representing the Copenhagen Institute for Future Studies, advocated for long-term thinking in the development of smart cities. The institute's mission, he explained, is to reduce complexity and short-term thinking, and to help create a common language for discussing the future of cities. He emphasized the need to examine mega trends affecting cities and address the uncertainties they present. He shared his experience working with city innovation, pointing out challenges such as aging populations and wealthier cities. He posed the question of who cities should be made better for - the elderly, children, or tourists, highlighting the many uncertainties at play when discussing better cities.

He also touched on the digital aspect of cities, specifically mentioning the uncertainties around artificial intelligence. He urged for early discussions about the impact of technology on cities both in the short and long term. He suggested that it's not as important to predict the future as it is to be prepared for different possible futures. He argued for investing time and resources in preparing for different futures and being able to choose the preferable one.



**Eleanor Varley**  
Director, Culture, Art and Media Lab (CAMLAB), International Metaverse Council (IMC)



**Non Arkaraprasertkul**  
Senior Expert in Smart City Promotion



**Bugge Holm Hansen**  
Senior Futurist & Head of Innovation and Technology, Copenhagen Institute for Futures Studies





Bugge Holm Hansen concluded by quoting Ludwig Wittgenstein, "The limit of my language means the limit of my world," to emphasize the need for creating a common language for discussing the future of cities.

**Varda Taneja** discussed the concept of smart cities in India and how the country is drawing from best practices around the world to build a cohesive framework for urban development. She noted that the Indian Government was focused on developing high-quality infrastructure not just for its citizens, but also for foreign investors. To this end, the government has laid out a roadmap for smart cities, with a significant budget allocation for a 5-year period to develop 100 smart cities across the country.

According to Varda Taneja, by 2030, cities in India are expected to accommodate 60% of the urban population and contribute 70% to the country's GDP. She highlighted the challenges of managing such a large population and land resources and stated that the development of smart cities was imperative for the country's sustainable growth. Varda Taneja stated that all these initiatives were aimed at providing better services, improved mobility, increased safety, and greater energy efficiency. She concluded by saying that India's approach to smart cities, which involved collaboration between governments and companies, was showing signs of success.

**Pontus Westerberg** spoke about the quality of urban life and its various facets, such as affordable housing, public transport, public space, good urban planning, resilience and the appropriate use of technology. He noted that sustainable cities are the goal, as outlined by Sustainable Development Goal 11, but admitted that many cities are not currently sustainable. He pointed out that cities produce approximately 80% of the world's carbon emissions and a billion people live in informal settlements.

He shared his observation that digital transformation in cities often focuses more on technology than on creating a good city. Pontus Westerberg emphasized that a balanced focus on both good urbanism and digital transformation is needed to improve the quality of urban life. He advocated for a "people-centered smart city", where technology and innovation are used to better the lives of residents.

Pontus Westerberg also touched on the importance of human rights and the need to overcome the digital divide. He mentioned a few initiatives in the UN that are working towards these goals, such as the United Smart Sustainable Cities platform, which is a collaboration of 19 UN agencies. He concluded by



**Varda Taneja**  
Vice President, Invest India



**Pontus Westerberg**  
Programme Officer, UN-Habitat



saying that the UN Member States have called for UN-Habitat to lead a process to develop international guidelines on people-centered smart cities. These guidelines are expected to be ready by June 2025, and will serve as a tool for Member States to develop their own local and national smart city plans.

### **Closing Remarks**

**Cristina Bueti** concluded the webinar by expressing gratitude to all contributors, emphasizing that the webinar discussions highlighted the potential of digital transformation in combating urban challenges such as pollution, waste management, and housing issues. She noted that digital transformation can offer innovative solutions to enhance sustainability, resilience, and livability of cities. She outlined how it can improve adaptability and scalability of cities, streamline service delivery, enhance operational efficiency and strengthen cybersecurity of digital infrastructure.

She reminded everyone that the essence of the digital revolution is to enhance the quality of life for all city inhabitants, in line with the objectives of the Sustainable Development Goals. Cristina Bueti concluded her remarks by stressing the importance of collective efforts towards creating smart, sustainable cities and communities.



**Cristina Bueti,**  
U4SSC Focal Point and  
Counsellor, ITU



## Digital transformation in the pharma Industry

Episode 37: 14 November 2023

### Overview

In recent years, new digital technologies have transformed the pharma industry landscape by enhancing pharmaceutical product development, operational business processes and forecasting demand and supply models, along with supporting diagnostics, and telemedicine channels.

This Webinar explored the paradigm shift witnessed by the Pharma industry post COVID-19, as the world shifts from traditional pharmaceutical value chain operations to digital transformation to meet its medical needs.

### Opening Remarks

**Seizo Onoe** spoke about the pharmaceutical industry becoming data-driven and the growing role of automation in reducing human errors, thereby enhancing patient safety. He discussed that patients were interacting with pharmacists through digital platforms for consultations, medication management, and remote prescription filling. Seizo Onoe also highlighted that technologies like Artificial Intelligence are being used to analyze large volumes of health data to predict patient needs and optimize inventory management. He stressed the importance of such capabilities during global health emergencies like COVID-19.

Seizo Onoe further mentioned the global dialogue on AI for good, emphasizing that AI and healthcare are natural companions. He declared that the ITU was working to increase AI's contribution to healthcare in collaboration with the World Health Organization and World Intellectual Property Organization. However, he also warned about potential risks that need to be mitigated, especially in healthcare, a sector dealing with sensitive data. He concluded by underscoring the need for data security, patient privacy, and supporting healthcare professionals in developing the skills required for a high-tech environment.

Organized by:



**Seizo Onoe,**  
Director,  
Telecommunication  
Standardization Bureau,  
ITU



## Session 1: Re-writing a healthier future with technology

The moderator for this session was **Gauri Deoras**.

**Haider Alleg** discussed the slow but ongoing disruption in the healthcare industry, suggesting that the current definition of healthcare might evolve into a healthcare model and a sick care model, with more industries such as wellness and food entering the healthcare model. He identified another trend where the industry is transforming into a service platform rather than just a producer of molecules or med tech. This shift, he explained, is due to emerging technologies that are forcing the industry to devise new experiences for patients, doctors, and consumers.

Haider Alleg argued that the pharmaceutical industry might need external help to adapt to these changes due to the size of the required regulation and the unique nature of launching a digital health program. He highlighted the increasing focus of governments and payers on prevention rather than treatment, leading to the rise of value-based healthcare.

Discussing the internal availability of data between healthcare systems, he said that more health systems are working on building interoperability, though it would be a gradual process. Haider Alleg concluded by predicting a shift in the patient-doctor relationship over the next 5 to 10 years. He speculated that doctors would be aided by assisted models to make better decisions due to the growing complexity of diseases and personalized care. He also suggested that individuals would be more assisted in their daily health-related decisions through models provided by digital healthcare.

**Gregory Krieger** expressed his vision of radically improving the lives of patients, healthcare communities, and healthcare professionals. He acknowledged the challenges of having a real impact, despite the relative ease of raising funds and generating revenue. He described his current digital health solutions, and presented new all-in-one software that manages a medical establishment. He shared that over 30 medical establishments in Switzerland, involving more than 113 healthcare professionals, are currently using this platform.

Gregory Krieger addressed the challenges faced in developing the app, mentioning the excessive costs of software development due to rising developer salaries. He also discussed the difficulties in migrating existing medical establishments to new software. He said that his platform does not yet meet HIPAA requirements but is mostly GDPR compliant, explaining that the goal is to have a global impact and to make quality healthcare accessible to everyone. He



**Gauri Deoras**  
Consultant  
GD Consulting & Coaching



**Haider Alleg**  
General Partner  
Allegory Capital



**Gregory Krieger**  
CEO & Co-founder,  
Kralys SA



noted that consuming healthcare services is a complicated process and that their new platform aims to enhance the patient's experience.

**Basem Higazy** discussed the changing roles within the healthcare sector, particularly in pharmaceuticals and med-tech. This transition is driven by consumerization trends and advances in technology, including artificial intelligence and machine learning. Basem Higazy elaborated on his organization's work, which he described as a technology company and a healthcare delivery institution. The organization developed a virtual clinic platform to assist doctors in forming virtual clinics for various conditions. Their mission is to aid people with complex health conditions. He argues that the current healthcare delivery system fails to address the needs of such patients and emphasized the need for integrated solutions.

Furthermore, Basem Higazy discussed the importance of patient engagement and the shift of pharmaceutical companies from merely manufacturing drugs to integrating in the full life cycle of the drug. He also highlighted the move towards personalized medicine, supported by advanced analytics, real-world evidence, and generative AI. In closing, Basem Higazy stressed the need for a neutral platform for communication and the importance of acknowledging the power of companies that hold substantial amounts of data. He suggested that organizations like the ITU should incentivize these companies to share their data in a collaborative manner.

### Closing Remarks

**Cristina Bueti** expressed her gratitude to all participants and took the opportunity to highlight the transformative power of digital technologies and their immense potential to revolutionize the pharmaceutical industry. She underscored the importance of utilizing digital technologies to enhance pharmaceutical product development, streamline operational processes, and improve demand and supply forecasting models.

She emphasized that the shift from traditional pharmaceutical operations to digital transformation is not merely a futuristic concept but a current reality in meeting global medicine needs. Cristina Bueti stressed the crucial role of digital transformation in supporting diagnostic procedures and telemedicine channels. As the webinar concluded, she encouraged all to remember that digital transformation in the pharma industry requires continuous learning and adaptation.



**Basem Higazy**  
Co-founder  
Consulto



**Cristina Bueti,**  
U4SSC Focal Point and  
Counsellor, ITU



Cristina Bueti invited webinar participants to join the work of ITU Study Group 20 on IoT and smart cities, which works on developing standards and guidelines related to public health and emergency management. She also urged participants to continue the conversation beyond the webinar, contributing to the digital health dialogue at ITU.



## Localizing the Sustainable Development Goals: Invest NYC SDG Initiative

Episode 38: 16 November 2023

### Overview

With less than ten years remaining to achieve the 169 targets and 247 indicators embedded in the United Nations Sustainable Development Goals (SDGs), global stakeholders including governments, and the private sector may require additional guidance in navigating the use of emerging technologies in the digital age to drive sustainability, support urban resilience, urban mobility and ensure food security.

Accordingly, the Center for Sustainable Business (CSB) at the New York University launched the Invest NYC SDG as a multi-year initiative to facilitate the transition to a more sustainable, inclusive, and resilient urban economy in New York City by leveraging the SDGs.

This Webinar elaborated on the multistakeholder Invest NYC SDG initiative, while presenting the recently published [Global Change Begins at Home: Advancing the UN SDGs in NYC](#).

### Opening Remarks

In his opening remarks **Seizo Onoe** highlighted that New York City was the first in the U.S. to align its urban development strategy with the UN Sustainable Development Goals. He underscored the importance of policy guidelines and knowledge sharing among cities and communities globally. Seizo Onoe emphasized that progress would require creative thinking, innovative models, and collaboration among government, companies, academia, and civil society.

Speaking about Invest in NYC SDG initiative, Seizo Onoe described how it recognized the importance of local solutions to local challenges and provided guidance valuable to other sustainability initiatives. He also highlighted the role of emerging technologies such as Artificial Intelligence and the Internet of Things in achieving the SDGs. In closing, Seizo Onoe stressed the importance of bringing together experts from different sectors and regulatory authorities and invited all to join in driving ITU's work with their contributions and consensus decisions.

Co-Organized by:



**NYU | STERN**  
Center for  
Sustainable Business



**Seizo Onoe,**  
Director,  
Telecommunication  
Standardization Bureau,  
ITU



## Keynote Speech

**Bill de Blasio** stressed the urgency of the topic of Sustainable Development Goals, noting that the world was behind in its goals and expressed gratitude to local and regional government members for their efforts. He emphasized the importance of grassroots initiatives and the need for new approaches to reach the SDGs. He thanked everyone at NYU and the Stern Center for Sustainable Business for their work in promoting sustainability.

Bill de Blasio shared his experience with the Invest NYC SDG initiative, which was inspired by his administration's local efforts in New York. He also thanked the International Telecommunication Union for sponsoring the event. He recalled when he took office in 2014, he found New York City to be an unsustainable place, with inequality prevalent in almost every aspect of life in the city. In response, his administration published a plan in 2015 called "One NYC," which aimed to address inequality and set challenging goals.

Bill de Blasio highlighted three areas where they set ambitious goals: climate, education, and housing. In terms of climate, they mandated legal retrofitting of big buildings and eliminated on-site fossil fuel energy creation. In education, they launched a universal pre-kindergarten program. In housing, they set a vision for 300,000 new affordable apartments. Bill de Blasio concluded his talk by thanking everyone at NYU and the center, and encouraged participants to aim high, create, and disrupt. He expressed hope that the webinar would inspire participants to take a chance, push harder, and not give up in their efforts towards creating a sustainable future.

## Presentation: Global Change Begins at Home: Advancing the UN SDGs in NYC

**Marianna Koval** discussed the importance of localizing the SDGs and partnering with various sectors, including government, academia, and private organizations, to achieve New York City's sustainability goals. She shared her experiences of advancing sustainability goals in New York City and highlighted the importance of translating high-level goals into tangible projects.

She also touched on the impact of the 2020 global pandemic and social justice issues in the US, which led to a shift in their focus to prioritize equity and social justice goals. Marianna Koval also mentioned the importance of coalition building, being adaptive, and forging connections to secure resources. She concluded by emphasizing the need for concrete plans, patience, and radical new thinking to achieve ambitious goals. She encouraged the audience to join



**Bill de Blasio**  
former Mayor of NYC



**Marianna Koval**  
Director of the Invest NYC  
SDG Initiative, NYU





her in creating a more sustainable and equitable future, one community at a time.

### Session 1: Digital Transformation and the SDGs

This session was moderated by **Will Kennedy**.

**Sameer Shetty** discussed the impact of India's digital public infrastructure on financial inclusion, specifically addressing the country's sustainability goals. He highlighted the Unified Payments Interface (UPI), a system enabling instantaneous, free payments between any bank accounts in India. UPI has democratized digital payments, with India recording approximately 10 billion transactions monthly.

He also spoke about account aggregators, regulated entities enabling consumers to digitally share their financial information. This system has been particularly effective in improving access to credit, allowing banks to process loans digitally, significantly reducing costs and making credit accessible to a larger population. Samir Shetti emphasized the transformative power of India's digital public infrastructure in democratizing financial services and enhancing financial inclusion, particularly for previously excluded segments of the population.

**Nour Riad** discussed the work of Fongit, Switzerland's innovation incubator, located in Geneva, and their mission to support entrepreneurs in turning technologies into successful businesses that generate economic and social value. Fongit supports over 150 startups by offering coaching, administrative support, community events, workshops, and financing.

She described the two main startup programs at Fongit: Innovation Initiation and Startup Support, designed for startups at different stages with varying focuses and criteria. In 2021, Fongit established the Fongit Innovation Fund (FIF) as a financing tool to accelerate innovation processes within universities and other research institutions based in Geneva. The FIF focuses on providing funding for technological innovations in life sciences that contribute to achieving the Sustainable Development Goals. Esther Pan Sloane shared her experience working on the Sustainable Development Goals (SDGs), particularly the advancements made in democratizing access to credit for millions of Indian borrowers and other local innovations to actualize these goals. She highlighted the challenges faced when mobilizing investment for the SDGs, particularly with risk-averse investors who want to see financial returns.



**Will Kennedy**  
Senior Programme Officer  
UN Officer for Partnerships



**Sameer Shetty**  
President & Head – Digital  
Business and  
Transformation, Axis Bank



**Nour Riad**  
Marketing,  
Communications and  
Engagement Manager,  
Fondation Genevoise pour  
l'Innovation Technologique  
(FONGIT)



**Ether Pan Sloane** emphasized the importance of finding companies that achieve double and triple bottom lines, like those reducing waste and contributing to global decarbonization while still being profitable. She mentioned that companies seeking private sector investment finance need to meet rigorous requirements to secure funding.

Ether Pan Sloane also discussed the role of governments in setting guidelines and providing funding to reduce the risk for private sector investors. Using the example of the digital payment system in East Africa, she outlined how development assistance money and grant money can stimulate growth in certain sectors. She concluded by encouraging participants to use known tools such as grants, concessional finance, blended finance models, and government policy initiatives to solve these challenges and achieve the SDGs.

### **Concluding Remarks**

At the conclusion of the webinar **Bilel Jamoussi** expressed his gratitude to the speakers and participants for their insightful contributions. He highlighted the urgency of collective efforts to achieve the sustainable development goals (SDGs), with less than a decade left to meet all 169 targets of the 17 goals. He emphasized the challenge and opportunity to utilize emerging technologies to deliver a more sustainable, resilient, and secure world.

He pointed to the Invest NYC SDG Initiative, launched by the Center for Sustainable Business at New York University, as a model for other cities and regions. This initiative shows how a multi-stakeholder approach can facilitate the transition to a more sustainable, inclusive, and resilient urban economy.

Encouraging continued conversation beyond the webinar, Bilel Jamoussi invited participants to share insights and collaborate in harnessing digital transformation for sustainable development. He looked forward to continued collaboration and encouraged participants to register for future digital transformation webinars and stay updated on the latest developments.



**Esther Pan Sloane**  
Managing Director,  
Avenue Capital Group



**Bilel Jamoussi**  
Deputy Director & Chief of  
Study Groups, TSB, ITU



## The Interplay Between Human Rights and Technology

Episode 39: 8 December 2023

### Overview

To celebrate the Human Rights Day, annually on 10 December, we invited the leading experts within the field of human rights in cyberspace during our Episode 39: “The Interplay Between Human Rights and Technology” and explored the complex relationship between human rights and the digital realm.

Last February, UN High Commissioner for Human Rights, Volker Türk, emphasized the necessity of incorporating human rights into technical standards during a high-level meeting at the World Standards Cooperation (WSC). Moreover, several Human Rights Council and UN General Assembly resolutions address human rights and digital technology issues and the development of the “UN Secretary-General’s Guidance on Human Rights Due Diligence for Digital Technology Use” is currently underway.

Our discussion tackled essential questions, including safeguarding privacy, data protection, the impact of emerging technologies on our rights, and the crucial role of technical standardization.

### Opening Remarks

**Seizo Onoe** highlighted the importance of discussing how society plans to live harmoniously in an interconnected world. He mentioned the wealth of data available and how it can be used to care for each other and lead happier lives. However, he also noted the potential harm and mistrust that could arise. Seizo Onoe stressed the need to like what is reflected online and acknowledged the complexity of these challenges. He expressed hope that the webinar would be the first of many discussing human rights and technology.

He emphasized the interplay between human rights and technology and the need for an inclusive and transparent standardization process. Seizo Onoe also highlighted the commitment of the ITU to ensure that AI is used for good and does no harm. Finally, he stressed the importance of inclusion and the need for experts from all disciplines in the technical standardization process. He talked about the digital transformation and convergence in different industries and the need for everyone to influence their work.

Organized by:



UNITED NATIONS  
HUMAN RIGHTS  
OFFICE OF THE HIGH COMMISSIONER



**Seizo Onoe,**  
Director,  
Telecommunication  
Standardization Bureau,  
ITU



**Peggy Hicks** underlined the pertinence of the Universal Declaration of Human Rights to the digital age, despite the document being drafted 75 years ago. She emphasized the potential of digital technology to advance human rights, including privacy and freedom of speech. She mentioned the B-Tech project, which works with technology companies to ensure their responsibilities under the UN guiding principles on business and human rights are fulfilled.

She identified three key issues related to technology and human rights. First, she mentioned the necessity of standard setting, acknowledging the openness to incorporating human rights in this area but also the institutional barriers. Secondly, she discussed digital connectivity and the need to tackle the digital divide and internet shutdowns. Lastly, she acknowledged the significant challenges posed by traditional AI, emphasizing the need to scrutinize the breakthroughs in generative AI and their implications for human rights. Peggy Hicks concluded her speech by encouraging the audience to review the generative AI project materials available on their website, which provide a thorough exploration of the impacts of generative AI on human rights.

### **Session 1: The interplay between Human Rights and Technology**

This session was moderated by **Tim Engelhardt**.

**Nicholas Oakeshott** discussed the United Nations Refugee Agency's (UNHCR) use of digital technologies in protecting the rights of the forcibly displaced and stateless. He noted that while these technologies have proven beneficial in providing information and assistance to marginalized communities, they also pose new human rights risks. For instance, social media platforms have been used to deliver critical protection information to people fleeing conflict quickly and at scale, but these platforms have also seen an increase in hate speech and have been exploited by malicious actors to target refugees.

He discussed how the application of international human rights law in the development and deployment of digital technology provides a universally accepted framework for identifying and assessing these impacts. The UNHCR has been using digital technology for many years to help register refugees and manage their protection cases. He also acknowledged the challenges and risks associated with processing the sensitive personal data of vulnerable individuals, particularly refugees and asylum seekers, especially in situations of conflict and fragility. To manage these risks, UNHCR has incrementally strengthened and implemented policies and guidance, including the recent adoption of a broader general policy on data protection and privacy. It is also actively contributing to



**Peggy Lynn Hicks**  
Director, OHCHR



**Tim Engelhardt**  
Human Rights Officer,  
OHCHR



**Nicholas Oakeshott**  
Senior Policy Officer,  
UNHCR



OHCHR's development of new UN System-wide Guidance on Human Rights Due Diligence and digital technologies.

Nicholas Oakeshott concluded by emphasizing the importance of technical standards in assessing human rights impacts of high-risk technologies, such as biometric facial verification. He noted the need for testing beyond the laboratory to consider the actual users and circumstances of technology use. He also highlighted the risks of digital exclusion and the importance of promoting refugee connectivity and digital inclusion as a key human rights issue.

**Marek Janovský** highlighted that the Czech Republic, being part of the EU, has a significant stake in the process of regulating new technologies. He emphasized the importance of setting appropriate boundaries for these technologies to ensure they serve humanity without stifling innovation. He mentioned that the EU is working on finalizing negotiations on the AI Act, which could serve as an example for other countries.

He further mentioned that the Czech Republic promotes a human rights-based and human-centric approach to technologies and standardization. Emphasizing the importance of transparency, responsibility, and clarity in the context of new technologies, particularly artificial intelligence, Janovsky stressed the need for transparency in the algorithms used. Marek Janovský spoke about the importance of including startups, scale-ups, and the young generation in these discussions, as they are the ones who will drive future development. He underscored the necessity of translating the language of human rights to technical organizations like ITU.

Lastly, Marek Janovský discussed the Czech Republic's engagement with other countries, citing a cooperation with the African Union. He highlighted the country's involvement in drafting the digital global compact and its work with the UN Tech envoy in New York. He also mentioned an initiative presented at the ITU Council in July, which advocated for a human rights-based approach to standardization development.

**Mallory Knodel** outlined her work in open, multi-stakeholder standards bodies and how this model has been crucial for human rights actors' participation. She emphasized the need to pay attention to the details of technical standards design and to engage deeply in the debates on protocol specifications. However, she acknowledged that the level of engagement required is high and time-intensive across all bodies, including at the Internet Engineering Task Force



**Marek Janovský**  
Diplomat, Permanent  
mission of the Czech  
Republic to the UN



**Mallory Knodel**  
CTO, Center for Democracy  
& Technology



(IETF), World Wide Web Consortium (W3C), Institute for Electrical and Electronics Engineering (IEEE).

She recalled that with the International Telecommunication Union (ITU), one must be part of a Member State delegation or an observer member to participate. Despite these restrictions, she encouraged Member States to build diverse and inclusive multistakeholder delegations. While the W3C and IEEE organizations require membership, they also allow for invited specialists to participate in their groups and mailing lists.

Mallory Knodel emphasized the importance of building community among underrepresented stakeholders in order to set the agenda in these bodies. She pointed to the success in creating the Human Rights Protocol Considerations research group within the Internet Research Task Force, a companion to the IETF. She highlighted the impact of the efforts of civil society organisations in promoting human rights issues and suggested that the time and effort required for engagement has the potential for significant impact for groups invested in the human rights to access information, privacy, free expression and association, in particular.

**Emilar Gandhi** stressed the importance of reaching out to all stakeholders, with an emphasis on the under-represented groups. She explained the efforts made to connect with these groups and the challenges encountered. She stressed the importance of identifying the potentially affected stakeholders to comprehend the risks they might face due to their policies. Gandhi underlined the need to prevent and mitigate any future harm.

There are a number of ways to achieve this. Firstly, she emphasized the importance of identifying stakeholders, specifically within under-represented communities, and the necessity to build trust within these relationships. Secondly, she highlighted the need to understand mutual goals and ensure transparency when meeting with stakeholders. Meeting these groups where they are, considering the format of the engagement, was another vital step. She noted that the means of engagement, such as a Zoom call, might not be suitable for everyone due to factors like power cuts or expensive data.

The fourth strategy was proactive engagement for the global majority. Lastly, she spoke about building the stakeholders' capacity to contribute meaningfully to the conversation. Emilar Gandhi concluded by saying that under-represented groups are not voiceless. She stressed that everyone should be able to extract the same outcomes with the same effort.



**Emilar Gandhi**  
Head of Stakeholder  
Engagement, Meta



**Sheetal Kumar** identified two primary challenges in embedding and mainstreaming human rights in standards, namely internal capacity and access, as well as the transparency of discussions and processes. She noted that the narrow expertise often seen in standards discussions doesn't always include the multidisciplinary knowledge needed to ensure human rights are adequately reflected and embedded. While there are some positive examples, such as the Human Rights Protocol Considerations group at IRTF, she pointed out that there's still a siloed lack of capacity in this area.

The second challenge was access and transparency. She cited high costs for engagement, restrictive participation modalities, and lack of access to documents as barriers to transparency. However, she also suggested some forward-moving recommendations. For the ITU she suggested advocating for more inclusive processes, ensuring transparency, and providing access to documentation. She also encouraged the inclusion of under-represented groups in discussions and the implementation of human rights due diligence processes. Sheetal Kumar stressed the importance of understanding the complexity of the Internet governance ecosystem and the roles of different bodies within it.

### **Concluding Remarks**

In closing the webinar, **Bilel Jamoussi** expressed appreciation to all speakers, moderators, and participants. He highlighted the significance of the intersection between rights and technology, particularly ahead of Human Rights Day. He also discussed the impact of artificial intelligence, the importance of privacy and data protection, and the role of technical standardization, insisting that these are not just technical concerns but reflections of our societal values and commitment to human dignity.

Bilel Jamoussi invited all participants to join future dialogues and contribute to shaping the future of digital transformation. He underscored the role of the ITU as an open platform for addressing these pressing issues and called for insights, expertise, and commitment to balance human rights and technology with the goal of creating a better future for all.



**Sheetal Kumar**  
Consultant, Global  
Partners Digital



**Bilel Jamoussi**  
Deputy Director & Chief of  
Study Groups, TSB, ITU



**For more information**

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