

# Shaping the metaverse

1<sup>st</sup> ITU Forum on Embracing metaverse  
Outcome Document



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## Executive Summary

With growing government, industry, and public interest in the transformative potential of the metaverse, the International Telecommunication Union (ITU) and the National Cybersecurity Authority (NCA) of the Kingdom of Saudi Arabia organized the first ITU Forum on Embracing the metaverse in Riyadh on 7 March 2023.

The forum brought together more than 600 experts and leaders from industry, government, and academia to explore the opportunities and challenges presented by the metaverse.

One of the key messages that emerged from the forum was the importance of collaboration and international standards in realizing the potential of the metaverse. As the metaverse takes shape, it is critical that stakeholders work together to establish international standards and best practices to ensure interoperability, security, and accessibility.

Another important theme that emerged from the forum was the need to develop a metaverse which is equitable and inclusive. As the metaverse gains in prominence, it may exacerbate existing social and economic inequalities. For this reason, it is important to ensure that everyone has access to its benefits. To do this will require attention to issues such as digital literacy, accessibility, and the development of ethical frameworks that focus on the well-being of users.

The insights and recommendations generated by the forum will be an important resource for policymakers, industry leaders, and other stakeholders, including for experts of the ITU-T Focus Group on metaverse.

The forum covered a wide range of topics, with the following objectives:

- explore challenges and opportunities for an accessible, sustainable, and inclusive metaverse;
- foster the development of interoperability standards for an open and inclusive metaverse, and accelerate their development;
- debate the role of metaverse in transforming consumer experiences and business models across industries;
- discuss how metaverse can be used to achieve the Sustainable Development Goals and accelerate digital transformation;
- provide inputs and discuss relevant topics that can help accelerate the work of the ITU Focus Group on metaverse.



## Opening ceremony

The opening ceremony of the forum began with remarks from Alrebdi Alrebdi, Deputy Governor for Policies and Regulations, National Cybersecurity Authority who stressed the importance of cybersecurity. Ensuring the security of the metaverse users is critical to its success, and security measures must be incorporated into the early stages of its technological development.

Mansour AlQurashi, General Manager for International Affairs, Communications, Space and Technology Commission (CST), Kingdom of Saudi Arabia, underlined the many opportunities offered by the metaverse, many of which the Kingdom of Saudi Arabia is realizing in its tourism, development, and health sectors. Nevertheless, existing cybersecurity threats are expected to evolve in the metaverse. To tackle them, it will require a comprehensive understanding of the threats and cooperation between governments and industry to develop a safe and secure metaverse environment.

Doreen Bogdan-Martin, Secretary-General of the International Telecommunication Union (ITU) emphasized the important role of inclusive digital transformation in helping the world meet many of the development challenges before it. Speaking ahead of the International Women's Day, the ITU Secretary General called on everyone to work together in ensuring the metaverse is built in a way to reduce online violence currently experienced by women and girls, and that the metaverse provides a safe, inclusive, sustainable and accessible experience for all.

## Speakers



### **Alrebdi Alrebdi**

Deputy Governor for Policies and Regulations, National Cybersecurity Authority (NCA), Kingdom of Saudi Arabia



### **Mansour AlQurashi**

General Manager for International Affairs, Communications, Space and Technology Commission (CST), Kingdom of Saudi Arabia



### **Doreen Bogdan-Martin**

Secretary-General, ITU



### **Seizo Onoe**

Director, Telecommunication Standardization Bureau (TSB), ITU



### **Shin-Gak Kang**

Chairman of ITU-T FG-MV(metaverse)



## Opening ceremony cont.

Seizo Onoe, Director of Telecommunication Standardization Bureau (TSB), ITU stressed the important role the ITU played over the past 150 years as the platform of choice for governments, industry, academia, and key stakeholders for emerging technologies standardization activities. Seizo Onoe reiterated ITU's commitment to work with all stakeholders in laying the groundwork for technical standards that can encourage market entry, innovation, and cost efficiency in the metaverse, creating an underlying technology and business ecosystem that benefits all people.

Concluding the opening ceremony, Shin-Gak Kang, Chairman of ITU-T Focus group on metaverse, highlighted the importance of the event in bringing together experts from around the world to develop a clear view and activity plan for the work of the Focus Group. Shin-Gak Kang emphasized the need for the metaverse to be built on a strong foundation of interoperable standards and encouraged all stakeholders to join the Focus Group and contribute to its important work.

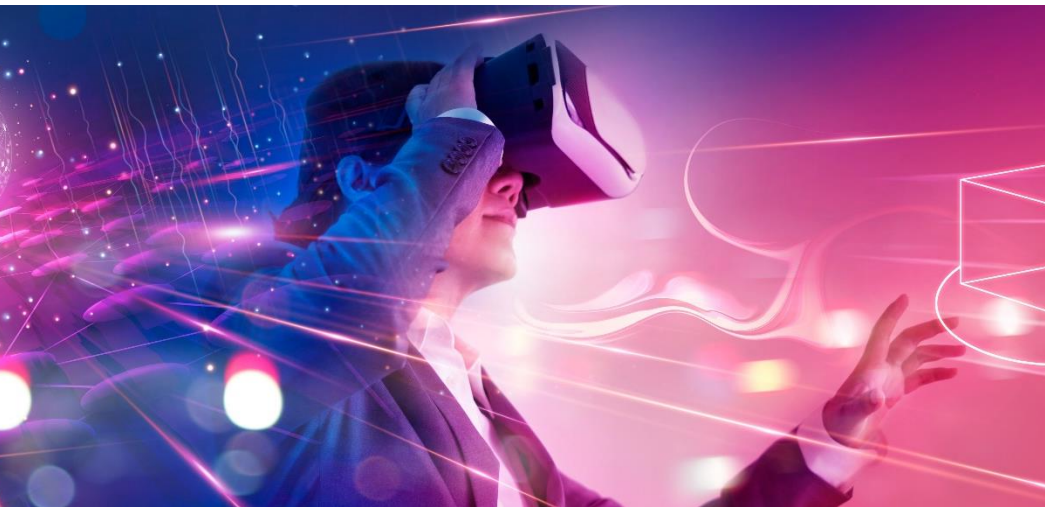
## One Life Two Bodies

In this presentation, DJ Agoria shared his insights on the intersection of art, music, and science in the digital universe. As an artist who has exhibited his work around the world, including at major NFT events in New York, Barcelona, London, and Berlin, he brought a unique perspective on the evolving role of Web3 for artists.

Discussing the impact of AI and technology tools on the metaverse, he provided a thought-provoking vision of what the future might hold, stressing that unlike our current experience of the web as spectators, the next version of the web will be about community experiences. He concluded with valuable insights into the potential of the metaverse for artists, and how Web3 and technology more broadly is shaping the creative landscape.



**Agoria**  
DJ and NFT Artist



## Setting the stage: why are standards important for the metaverse?

### Overview

To set the stage for the forum, Bilel Jamoussi, Chief of Study Groups, Telecommunication Standardization Bureau, ITU, spoke about the critical role of standards in the development and implementation of the metaverse.

The presentation highlighted the potential of the metaverse, which is expected to generate \$800 billion in revenue by 2024. It also emphasized that the metaverse is not dependent on one single technology but rather various technologies that support its layers. Bilel Jamoussi pointed out that there are already metaverse applications used in the consumer sector and industry, and that the metaverse presents opportunities to accelerate the achievement of the SDGs.

The ITU and its Study Groups are working on many of the enabling technologies required for the metaverse, including high-speed and low-latency networks, virtual reality and multimedia technologies, security and privacy, IoT and cities, and quality of service standards.

His presentation explored why standards are necessary to ensure interoperability and enable seamless experiences across different metaverse platforms, devices, and applications. Emphasizing the importance of developing open, transparent, and inclusive standards he encouraged forum participants to consider diverse stakeholder perspectives and to prioritize user safety and privacy.

### Speaker



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

### Next steps

The metaverse presents an opportunity with significant potential for growth, but it also presents challenges related to security, privacy, and sustainability. The metaverse's success will depend on collaboration and cooperation among stakeholders, and the development of open standards that support interoperability. The ITU and its Focus Group on metaverse provides an open and collaborative platform for all stakeholders to address the challenges and opportunities presented by the metaverse.



## High Level Segment on "Into the beyond: Exploring the metaverse and why it matters"

### Overview

The High-Level Segment established a shared frame of reference and set the tone for the Forum's discussions by exploring the definition of the metaverse, its current state, its aspirations for utility, and possible obstacles in realizing its full potential. The moderator, Rudolph Lohmeyer, and the distinguished panel of speakers, including representatives from governments, international organizations, technology companies, and the gaming industry, discussed questions such as what the biggest challenges or obstacles are that the metaverse might face and how their respective organizations are supporting its success.

The speakers emphasized the need for a global regulatory discussion and the importance of shaping the metaverse to benefit those who do not have access to it. Collaboration and community-building were emphasized over monetizing content, with governance being open, transparent, and inclusive. The challenges highlighted included the digital divide, skills shortage, and security. Web3 was identified as a potential solution to add a layer of trust and improve trust interoperability and sustainability. The speakers also identified the metaverse's potential for realizing sustainable development goals, enhancing the value of user content, connecting governments with citizens, and realizing digital value. Education was singled out as an area where the metaverse could be used for significant benefits. Finally, the need for interoperability and security was emphasized to ensure that the benefits of the metaverse were accessible to all.

### Speakers



#### Rudolph Lohmeyer

Partner, Kearney, Head, National Transformations Institute | Global Business Policy Council



#### Gabriel Abed

Barbados' Ambassador to the United Arab Emirates



#### Agustina Brizio

Under Secretary of State for Public Innovation of the Chief of Cabinet of Ministers' Office, Argentina



#### Mounir Tabet

Deputy Executive Secretary UN-ESCWA



#### Manuel Barreiro

Founder & Chairman, Aston Group



#### Chris Duffey

Tech Futurist and Creative Director, Adobe and Author of "Decoding the Metaverse"



#### Bertrand Levy

Senior Vice President of Global Partnerships, The Sandbox



## Overview cont.

The High Level Segment underscored the importance of having an open and inclusive metaverse that can reach all stakeholders. It also highlighted the need for technical and regulatory requirements to design a seamless metaverse experience that can be interoperable and integrated, while addressing concerns around privacy, and security.

## Next steps

To take advantage of the benefits of the metaverse, there is a need to create a governance environment that fosters interoperability and security. Global regulatory discussions should take place to ensure that the metaverse is accessible to all and that its governance has community input. Efforts should also be made to bridge the digital divide and create opportunities for education using the metaverse. As the metaverse has the potential to generate significant economic value, governments and industry must work together to train the skilled workforce necessary to create and develop the metaverse. Additionally, governments and stakeholders must balance needs of public and private sector stakeholders to ensure that the metaverse benefits all. Finally, interoperability and sustainability must be emphasized by using Web3 to create a layer of trust that will enable all to work together and benefit from the metaverse's full potential.

## Speakers



### Rudolph Lohmeyer

Partner, Kearney, Head, National Transformations Institute | Global Business Policy Council



### Gabriel Abed

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### Bertrand Levy

Senior Vice President of Global Partnerships, The Sandbox





## Session 1: The next generation of cybersecurity: securing the metaverse

### Overview

The first session looked at the new cybersecurity landscape presented by the metaverse. With the increasing interconnectedness of physical and digital lives, metaverse cybersecurity requires a new set of considerations and approaches to protect all stakeholders, particularly children.

Bushra Alahmadi spoke about the integration of multiple technologies that play a vital role in the development of the metaverse, including IoT, blockchain, AI/ML, VR and AR, 5G, and edge computing. She also highlighted the importance of cybersecurity in the metaverse, as the immersive experience could introduce new threats and attack vectors. Kavya Pearlman discussed the challenges and opportunities that the metaverse presents as it collects and processes an ever-increasing amount of data. She also pointed out the increased risk of cognitive critical infrastructure attacks as the attack surface will be expanded to the human brain in the metaverse. Vincent Affleck talked about the UK's research and innovation expertise in metaverse technologies, and the need to exploit the potential of metaverse platforms for the benefit of industry and consumers. He also noted that development of new regulations takes longer than the technological advances which require them. Finally, Natasha Jackson emphasized the need to work together to address the complex challenges posed by the metaverse, including personal privacy, security, data protection, and child rights. The panelists stressed the need for collaboration and global standards to address metaverse cybersecurity challenges. The session was moderated by Ahmed Etman, Managing Director at Accenture.

### Speakers



**Ahmed Etman**  
Managing Director, Accenture Security



**Bushra A. Alahmadi**  
Chief Scientist, Innovation Labs, Saudi Information Technology Company (SITE)



**Kavya Pearlman**  
Founder & CEO, XRSI



**Vincent Affleck**  
Consultant, Department for Science, Innovation and Technology, United Kingdom



**Natasha Jackson**  
Head of Public Policy and Consumer Affairs, GSMA



## Next steps

The integration of multiple technologies will enable immersive experiences, but this also introduces new cybersecurity threats and attacks. The metaverse is still in the research phase, and regulatory policies need to be developed for the society to benefit from the opportunities offered by the metaverse. It is essential to secure networks, build confidence in the metaverse through open standards and interoperability, and focus on personal privacy, security, data protection, and child rights. As the metaverse evolves it should be decentralized, based on a bottom-up approach, and open standards.

## Speakers



**Ahmed Etman**  
Managing Director, Accenture Security



**Bushra A. Alahmadi**  
Chief Scientist, Innovation Labs, Saudi Information Technology Company (SITE)



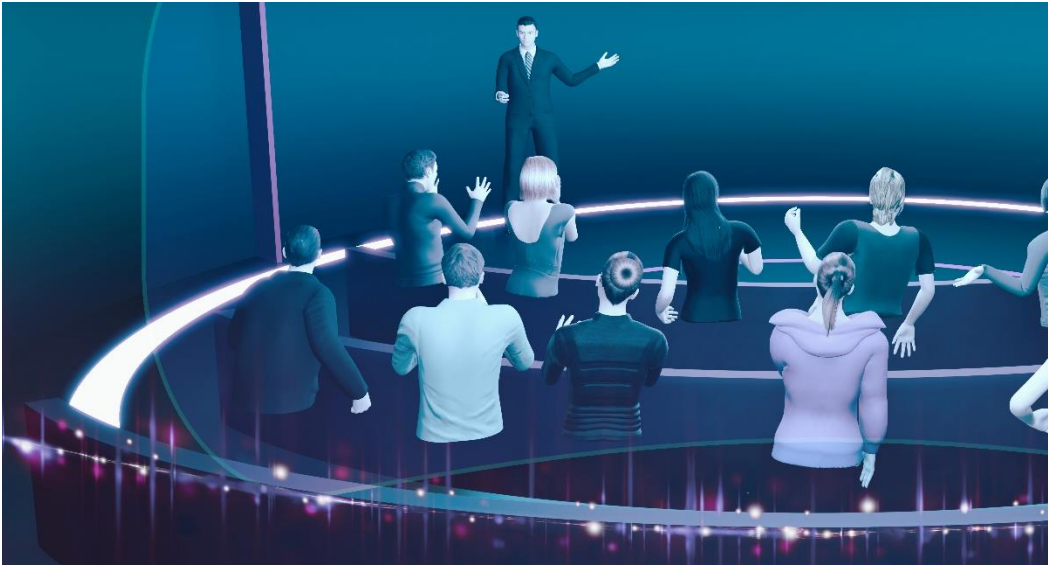
**Kavya Pearlman**  
Founder & CEO, XRSI



**Vincent Affleck**  
Consultant, Department for Science, Innovation and Technology, United Kingdom



**Natasha Jackson**  
Head of Public Policy and Consumer Affairs, GSMA



## Session 2: From science fiction to a virtual reality: metaverse use cases and requirements for the future of the metaverse

### Overview

The metaverse is rapidly growing in popularity, with the government, industry organizations, and enterprises entering the market. The second session of the forum focused on the potential applications of the metaverse and the requirements needed for its successful uptake. The discussion focused on how the metaverse could augment, advance, and accelerate human progress in various fields, such as tourism, education, and manufacturing.

The session was moderated by Radia Funna, futurist and creator of the xHuman theory, with speakers from industry, academia, and the United Nations. Yuntao Wang presented ten observations on the global metaverse industry development with a focus on China, highlighting that while the industry is seeing explosive growth there are still issues to overcome; such as insufficient technology tools and unclear concept boundaries. Blockchain technology was identified as a key technology to realize the credible flow of data in the metaverse. Natalia Bayona emphasized that the metaverse is an important innovation for the world of tourism, with technology being a key pillar of digital transformation, youth empowerment, and economic development. According to Shane He, the metaverse is expected to significantly accelerate network traffic growth, with improved network capabilities being key to realizing metaverse opportunities.

### Speakers



#### Radia Funna

Futurist and creator of the xHuman theory



#### Yuntao Wang

Deputy Chief Engineer of Cloud Computing and Big Data Research Institute, China Academy of Information and Communications Technology



#### Natalia Bayona

Director of the Innovation, Education and Investments Department World Tourism Organization (UNWTO)



#### Shane He

Program Manager and Strategist, Nokia



#### Alison B Lowndes

Senior Scientist, Global AI | NVIDIA



#### Renato De Castro

Executive Director, RMA Advisory



#### Khaled Koubaa

Founder, Medeverse



### Overview cont.

Alison B. Lowndes highlighted the role of large-scale digital twins to bring new insights, optimization and process efficiency in manufacturing, consumer, construction, and even space exploration sectors. Khaled Koubaa spoke of the metaverse as the next evolution of the internet being conceptualized and designed by different stakeholders. He called on everyone to work together and to learn from past lessons of rapid technological transformations. Renato De Castro described the metaverse as the urbanization of the internet, with technology, business, and user experience in tribes serving as its building blocks.

### Next steps

For the metaverse to succeed, investment and development needs to focus on improving its enabling technologies and applications. The manufacturing industry will play a key role in commercializing the metaverse. It will be necessary to establish open standards for interoperability and create a single standards-based, hardware-independent metaverse not controlled by a few companies. Network capability was identified as a key factor which will enable the metaverse to move beyond our living rooms and be more widely adopted by consumers. Finally, it is important to continue exploring new use cases of the metaverse for different industries, including tourism, manufacturing, and public services, and to identify areas where it can bring transformational change.

## Speakers



### Radia Funna

Futurist and creator of the xHuman theory



### Yuntao Wang

Deputy Chief Engineer of Cloud Computing and Big Data Research Institute, China Academy of Information and Communications Technology



### Natalia Bayona

Director of the Innovation, Education and Investments Department World Tourism Organization (UNWTO)



### Shane He

Program Manager and Strategist, Nokia



### Alison B Lowndes

Senior Scientist, Global AI | NVIDIA



### Renato De Castro

Executive Director, RMA Advisory



### Khaled Koubaa

Founder, Medaverse



## Session 3: Metaverse under the microscope: interoperability and integration of the metaverse(s)

### Overview

The third session of the forum explored the technical and regulatory requirements necessary for designing a seamless metaverse experience that is open, inclusive, and interoperable. Moderated by Shoaib Yousuf, Managing Director and Partner, BCG, the panel discussed the importance of interoperability in the metaverse and identified various challenges, such as the absence of common technical standards and enabling infrastructure.

The speakers highlighted the potential benefits of metaverse interoperability, including enhanced collaboration, innovation, and economic growth. The session also focused on the role of regulatory bodies in ensuring that metaverse development is aligned with the social and economic needs and achievement of the Sustainable Development Goals. In his presentation, Per Fröjd, noted that while the metaverse offers XR applications, there are still technical challenges that need to be overcome to design a seamless metaverse experience. He highlighted that the 5G infrastructure will play a significant role in addressing some of the technical challenges facing the metaverse today. Emphasizing that the metaverse is geospatial, bridging virtual and reality, Nadine Alameh, noted that the metaverse is more than just games. She cautioned against reinventing the wheel and instead urged all stakeholders to work towards interoperable and collaborative standards development. In his remarks Hussein Abul-enein explained the need for policy level collaboration on the metaverse in addition to technology regulations. Outlining the need to regulate digital platforms including the metaverse, Andrey Perez, outlined the need to balance online freedoms with accountability for governments, industry, and users.

### Speakers



**Shoaib Yousuf**

Managing Director and Partner,  
BCG



**Per Fröjd**

Vice President International  
Standards, Ericsson



**Khalid AlShathri**

General Manager of Emerging  
Technologies, Communications,  
Space and Technology  
Commission (CST), Kingdom of  
Saudi Arabia



**Andrey Perez**

Regulatory Expert, Agência  
Nacional de Telecomunicações  
(ANATEL), Brazil



**Nadine Alameh**

CEO & President, Open  
Geospatial Consortium



**Hussein Abul-Enein**

Head of Middle East at Access  
Partnership



## Overview cont.

In addition, increasing network capacity requirements to handle metaverse data flows will require new industry and government initiatives to ensure the network infrastructure can meet this new demand. Describing the different layers of the metaverse, Khalid AlShathri, shared the view of the metaverse from a regulator's perspective as infrastructure, devices, platforms, and use cases. He noted that in addition to regulatory, the metaverse faces several challenges, including compute infrastructure limits, data security challenges, network infrastructure capacity, lack of a skilled workforce, high energy consumption and sustainability issues, and lack of interoperability and compatibility. In his view, compared to IoT, the metaverse today has much lower interoperability.

## Next steps

Several challenges need to be addressed to enable wide metaverse adoption. The technical requirements of designing a seamless metaverse experience need to be solved to create an immersive and inclusive metaverse. There is also a need for standards and interoperability to ensure that the metaverse is accessible and inclusive to everyone. Collaboration is crucial in this effort, and no one organization can do it alone. The development of a skilled workforce is also necessary to address some of the challenges, particularly in data security. The adoption of 5G infrastructure will enable advanced XR scenarios and potentially address some of the technical challenges facing the metaverse. To ensure the sustainability of the metaverse, there is a need to address energy consumption and environmental issues. Finally, there is a need for continued experimentation and development of the metaverse to address challenges and improve interoperability.

## Speakers



**Shoib Yousuf**  
Managing Director and Partner,  
BCG



**Per Fröjdh**  
Vice President International  
Standards, Ericsson



**Khalid AlShathri**  
General Manager of Emerging  
Technologies, Communications,  
Space and Technology  
Commission (CST), Kingdom of  
Saudi Arabia



**Andrey Perez**  
Regulatory Expert, Agência  
Nacional de Telecomunicações  
(ANATEL), Brazil



**Nadine Alameh**  
CEO & President, Open  
Geospatial Consortium



**Hussein Abul-Enein**  
Head of Middle East at Access  
Partnership



## Closing remarks

Dr Bilel Jamoussi thanked the Kingdom of Saudi Arabia, particularly the National Cybersecurity Authority, the Communications, Space and Technology Commission (CST) and the Saudi Information Technology Company (SITE) for hosting the Forum. He also thanked the moderators, speakers and all Forum participants. Over 600 participants joined in person and online, representing governments, industry, and creative the community.

Forum attendees were able to gain a 360-degree view of the metaverse through the diverse perspectives shared by representatives from both government and private sectors.

Collaboration was emphasized as a key aspect for advancing the development of the metaverse, with all interested stakeholders encouraged to join the Focus Group on metaverse. Overall, the Forum served as an important platform for exploring the potential of the metaverse and promoting collaboration among all stakeholders.

## Speaker



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



**For more information**

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