

Global Forum on Technology

Summary of the
inaugural event

*Shaping our future at the
tech frontier*

6 June 2023



OECD
Global Forum
on Technology



Note by the Secretariat

This document provides a summary of the inaugural event of the OECD Global Forum on Technology (GFTech), held in the margins of the 2023 OECD meeting of the Council at Ministerial level, on 6 June 2023 at OECD headquarters. The summary was drafted by Axel Froissart and Laura Kreiling of the OECD GFTech Secretariat and viewed by speakers and moderators.

Over 300 participants, including senior policy makers, leading technology experts, and a breadth of stakeholders from more than 50 countries attended the GFTech inaugural event, sponsored by the United Kingdom. The Secretariat wishes to thank the master of ceremonies, moderators and all the speakers, as well as the United Kingdom delegation to the OECD for its significant support.

Following opening remarks and a high-level policy panel, participants were invited to break into three groups to discuss, under Chatham House rule, three enduring cross-cutting themes for the development of responsible and values-based technology:

- 1) How can a more responsible and rights-oriented technology development and deployment be ensured?
- 2) How can emerging technologies foster resilient societies and better address climate change?
- 3) How can technology policy better anticipate and bridge digital and technological divides.

The afternoon began with a session focusing on horizon-scanning, enriched by the insights from breakout session rapporteurs. The latter was followed by deep dives of two specific technologies: Immersive technologies and synthetic biology. A closing plenary drew insights from the day to feed into future activities of the OECD Global Forum on Technology.

Launched at the December 2022 OECD Digital Economy Ministerial meeting, the OECD Global Forum on Technology is a venue for regular in-depth dialogue to foresee and get ahead of long-term opportunities and risks presented by technology. It facilitates inclusive, multi-stakeholder and values-based discussions on specific technology policy topics, responding to gaps in existing fora. Its outputs feed OECD policy discussions and can lead to the development of analytical work, standard-setting, and policy recommendations. Events are proposed by OECD delegations and organised by the Secretariat in co-operation with the host.

More information about the GFTech and its events is available at <http://oe.cd/gfttech>.

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Plenary session: Opening

Opening remarks

Speakers:

- **Mathias Cormann**, Secretary-General, OECD
- **Chloe Smith**, Secretary of State for Science, Innovation and Technology, United Kingdom

High-level panel: Shaping our future at the tech frontier

Moderator: **Chloe Smith**, Secretary of State for Science, Innovation and Technology, United Kingdom

Speakers:

- **Carme Artigas**, Secretary of State for Digital Transformation and AI, Spain
- **Jose W. Fernandez**, Under Secretary of State for Economic Growth, Energy, and the Environment, United States
- **Valeriya Ionan**, Deputy Minister for Eurointegration at the Ministry of Digital Transformation, Ukraine (video intervention)
- **Ulrik Vestergaard Knudsen**, Deputy Secretary-General, OECD

Key insights :

- **Towards shared values in technology:** To harness the opportunities and address the risks of digital and emerging technologies, like-minded countries need to formulate and coalesce around norms and moral standards.
- **Broadening the circle:** Rapid technological advances of a global scale call for international and multi-stakeholder platforms and frameworks. Including countries from the OECD and beyond, as well as a wide range of stakeholders, is paramount to rise to the challenge.
- **Result-oriented dialogue:** High-level conversations need to translate into practical steps and concrete commitments. Dialogue should be result-oriented.
- **Embracing anticipation:** Considering the pace of technological advances and their implications, governments and relevant stakeholders will need to direct their efforts towards anticipatory, forward-looking technology governance systems.
- **The role of the OECD Global Forum on Technology:** By facilitating the formulation of a shared value-based vision, serving as a platform for inclusive multistakeholder dialogue, providing evidence-based insights, and serving as a conduit to translate high-level discussions into concrete action, the GFTech will be a key resource in all four areas.

How can we best harness the enormous benefits of accelerating and deepening digital transformations and emerging technologies, while also managing the risks and disruptions they bring about? It is precisely “to foster dialogue and cooperation on [this] great policy opportunity and challenge of our time” that the OECD Global Forum on Technology (GFTech) has been designed. With these explanatory remarks, the OECD Secretary-General Matthias Corman opened the inaugural event of the GFTech on 6 June 2023, welcoming over 300 participants, including senior policy makers, leading technology experts, and a breadth of stakeholders from more than 50 countries, to discuss shaping our future at the tech frontier.

As Secretary of State for Science, Innovation and Technology of the United Kingdom Chloe Smith emphasised in her keynote address, governments will indeed need to go beyond traditional governance models and break down barriers between communities to harness the opportunities and address the challenges arising with emerging technologies. Conversations will need to be global and involve a wider community of governments and stakeholders aligned with these aims from the start, and the GFTech stands to be instrumental in these endeavours.

The GFTech has three objectives, explained the OECD Secretary-General. First, offering a cross-cutting policy lens on how to ensure responsible, values-based, and rights-oriented technology development. Second, supporting a better understanding of technology to inform technology governance. And third, ensuring inclusive, values-based participation to share good practices, build trust, and foster common and coherent approaches to technology. The inaugural event thus marked the beginning of a long-term effort to anticipate future developments and provide opportunities to shape and benefit from the transformation underway.

Building on these opening remarks, several high-level panellists lent their voice to this critical endeavour by highlighting the urgency to address the plethora of concomitant threats that humanity is facing, and emphasizing how technology, effectively steered by shared values, stood to help. The distinguished panellists spoke of an inflection point, whereby today’s decisions will shape the decades to come. Emerging technologies, such as synthetic biology, immersive technologies, artificial intelligence all carry tremendous promises. It was also noted that innovation can be a tool of resilience and freedom, which will notably help rebuild Ukraine after the war. But speakers made clear that risks and disruptions are part of the equation too: concerns for safety, security, divides, ethics, lack of access, and discrimination need to be anticipated and taken seriously.

Discussions emphasized that the task at hand is to build a broad coalition of partners committed to playing their part in ensuring that technology is designed, developed, deployed, and ultimately governed in a manner that is aligned with shared values. Guardrails will be critical to this task, agreed the high-level speakers, who noted the need to strike the right balance between innovation and regulation. They remarked that making use of a variety of governance tools would be necessary, but that all would need to embody a broader vision that can pave the way to a safe, democratic, and prosperous technological future.

The concluding part of the panel focused on outlining next steps. Speakers highlighted the need for a regular, forward-looking, and result-oriented dialogue on technology, as well as the importance for the like-minded to formulate and coalesce around norms and moral standards. They welcomed the role of the GFTech in providing such a platform for inclusive and value-based discussions on topics at the forefront of global technology policy and developments. Noting that the OECD has long successfully facilitated international dialogue and cooperation, they called on the GFTech to build on this extensive experience to foster a greater understanding of the ramifications of technological progress, advance development and sustainability goals, help prevent international fragmentation in standards and regulation, and ultimately support the translation of high-level discussions into practical steps and concrete commitments.

Breakout sessions

Breakout 1: Responsible, values-based and rights-oriented technology

Chair: **Nita A. Farahany**, Robinson O. Everett Distinguished Professor of Law & Philosophy, Duke Law School

Speakers:

- **Kei Koizumi**, Principal Deputy Director for Policy for the White House Office of Science and Technology Policy, United States
- **Elina Noor**, Senior Fellow, Asia Program, Carnegie Endowment for International Peace
- **Song Sanghoon**, Director General of ICT Policy Bureau, Ministry of Science and ICT, Korea

Key insights :

- **Shared values:** The panel emphasized the importance of developing and deploying technologies that reflect shared values such as privacy, pluralism, open markets, and human rights protection.
- **Anticipating societal and economic implications:** Participants agreed on the importance of pooling knowledge and perspectives to anticipate the implications of technological development on society and economies, and realize its potential while mitigating risks.
- **Principles and frameworks for technology governance:** The session highlighted the value of clearly articulated principles and frameworks to help integrate research results into decision-making and policy-making for technology deployment.
- **International collaboration:** Discussions emphasized the importance of international collaboration in responsible technology development and governance and the establishment of common principles and frameworks.
- **Public participation and democratic values:** The panel highlighted the need for public participation in technology assessment and governance, as well as a more thoughtful reflection on the meaning of democratic values in technology across different parts of the world.
- **Adaptable and resilient policy frameworks:** Speakers underscored the importance of ensuring that policy frameworks are adaptable and resilient enough to handle future technologies, requiring a proactive and anticipatory perspective.

With rapid technological advances expanding our capabilities in unprecedented ways, their ethical, legal and social implications grow increasingly complex. The breakout session 1 therefore sought to explore how to steer technological evolution in a manner that reflects our shared values. As opening remarks emphasized, a technology that advances without respect for human dignity is indeed not progress, but rather a regressive move cloaked in the veneer of advancements.

Panellists stressed from the start that while public policies have an important role to play, existing policy frameworks are not always up to the task. Laws and regulations need to evolve as our technologies do. In their eyes, this will require moving away from a reactive approach and embracing a proactive and forward-looking perspective to anticipate the broader implications of emerging technologies, harness opportunities from beneficial use, and ensure harms are not embedded in their development.

The speakers acknowledged that anticipating the impact of technological development on society and economies is nevertheless a complex issue, which calls for a collective effort. They emphasized the need for interdisciplinary and inclusive conversations that invite diverse perspectives and cultivate a holistic understanding of the societal and economic impacts of technology. From trade unions to civil society groups, youth representatives and religious leaders, all actors and stakeholders must be included in the process to achieve responsible technology development and deployment. Furthermore, they noted that research results must find pathways to inform policy and technology development, notably through clearly articulated principles and frameworks such as the OECD Recommendation on Artificial Intelligence (AI), among others.

The discussion did not shy away from the difficulties faced by such endeavours. As a panellist noted, broad public participation must inform research and governance frameworks if we are to live up to our democratic values, but the sheer diversity of our societies makes it a tall order. Moreover, the discourse about values-based technology governance itself can be understood very differently in different parts of the world, remarked another speaker, who pointed out that the landscape is more textured and complex than a binary division between democratic and authoritarian ways of governance. It was also noted that historical trends in technology use in certain parts of the world continue to translate in the present and should be accounted for more explicitly. Likewise, it was suggested that questions about responsibilities, values and rights may need to be further unpacked at the practical level to navigate potential trade-offs between equally noble objectives.

The room discussions that followed offered possible avenues of solution to rise to these challenges. Several participants pointed to the need to continue regarding human rights as a common guiding framework – but one that may need to be enriched through a new set of rights for the digital age. The importance of applying a human-centric approach to innovation was broadly highlighted, as was the need to educate both citizens and policymakers to technological advances and their implications. In this regard, the establishment of the GFTech itself was lauded as a promising pathway to strengthen the evidence base and share best practices in a collaborative and inclusive manner.

The discussions made clear that the stakes are significant as technological innovation can only deliver tangible benefits for citizens if they place trust in its virtues. Ensuring today that our policy frameworks are resilient and adaptable enough to handle the technologies of tomorrow will therefore be paramount. Ultimately, this breakout session thus highlighted the critical need for our societies to learn from the past, embed shared values in technological development, and thereby ensure emerging technologies effectively remain a catalyst for human advancement.

Breakout 2: Emerging technologies to address climate change and foster resilient societies

Chair: Kenneth Cukier, Deputy Executive Editor, The Economist

Speakers:

- **Shinichi Nakatani**, State Minister of Economy, Trade and Industry, Japan
- **Giulia Gregori**, Head of Strategic Planning and Corporate Communication, Novamont
- **Hila Cohen**, Deputy Head, WFP (World Food Programme) Innovation Accelerator, United Nations World Food Programme

Key insights :

- **Harnessing emerging technologies:** The panel emphasized that new innovations like synthetic biology and precision agriculture offer huge potential for sustainability across diverse sectors, if guided properly.
- **Measurement matters:** Speakers noted that improved data collection, metrics, and shared standards are essential to help set evidence-based sustainability goals and accurately benchmark global progress.
- **Enabling policy frameworks:** Discussions made clear that governments need to establish ambitious policy frameworks that incentivize emerging technology development through clear timelines, innovative financing mechanisms, regulatory visibility and directionality.
- **Fostering broad adoption:** Panellists highlighted that training programmes and human-centered design can ensure technology solutions effectively meet on-the-ground needs and facilitate adoption at scale.
- **Forging strong collaborative partnerships:** The session underscored that tackling complex global challenges requires sharing knowledge and deploying solutions through new levels of coordination and collaboration across borders, sectors, and stakeholder groups.

How can emerging technologies foster more resilient and sustainable economies and societies, and thereby enable them to address some of the greatest global challenges of our time? Exploring that critical question was the focus of the second breakout session.

Scene-setting and opening perspectives highlighted that the world faces concurrent - and often interlinked - emergencies, related to food, energy and overproduction. But speakers also made clear that these challenges present opportunities. From the development of new materials and crops capturing more CO₂ thanks to synthetic biology, to the reduced need for inputs through precision-farming, room discussions abounded with examples pointing to the key role of emerging technologies in unearthing new, more sustainable solutions.

Panellists emphasized that clear and reliable frameworks are nevertheless essential to support problem-driven innovation and the scaling up of solutions. A speaker called for regulations that steer technological advances rather than hinder their deployment. Others highlighted the key role of governments in setting timelines and providing regulatory visibility through a clear sense of direction. The speakers also called for innovative financing mechanisms and frameworks that give long-term stability for investments. The WFP innovation accelerator programme with its micro-insurance programme for farmers, for instance, is an example of how supporting start-ups can be an effective approach for local change.

To foster green transitions through emerging technologies and monitor their own environmental impacts, speakers remarked that measurement would also be critical. Setting and meeting realistic goals requires the capacity to assess the problem and track progress. Data generated by digital technologies were noted for their potential to provide public policies with essential inputs and enable coordinated action, including on e-waste. However, this requires agreement on common measurement frameworks and standards – a role for which some deemed the OECD to be very well-suited.

Another key question at the crossroads of technology, policy and international cooperation that could benefit from a deeper international dialogue is that of intellectual property rights. Some participants stressed its importance in driving innovation forward, whereas other raised the issue of dependence on technology imports and pointed to the need of working with partners to deploy existing technology across the whole value chain, and scale up solutions across geographies. To reach the sustainable goals, building trust between the different stakeholders was also noted as key.

This breakout session put forward a number of concrete suggestions to policymakers, including establishing mechanisms for stakeholder exchanges, such as the GFTech; ensuring that customers are critical and conscious; embracing forward-looking policy approaches that incorporate experience curves and harness social intelligence; enabling competition and fostering knowledge transfers; and designing innovation strategies that support the development of emerging technologies by providing clear timelines and directionality. Moreover, the social implementation of solutions is often the hardest part, remarked a speaker. Training programmes for the workforce were therefore described as paramount to ensure the benefits of emerging technologies can be widely shared both by people, and for the planet.

Discussions ultimately made clear that time is the essence when it comes to addressing major environmental challenges like climate change. But emerging technologies are not only rich in promises; they are also progressing at a very rapid pace themselves. For the participants and speakers of this breakout session, they therefore represent a key asset to address environmental challenges and foster resilient societies – one that effective and coordinated action must urgently allow our economies and societies to harness.

Breakout 3: Digital and technology divides

Chair: Timo Harakka, Minister of Transport and Communications, Finland

Speakers:

- **Pichet Durongkaveroj**, Executive Director, Bangkok Bank Pcl.; Former Minister of Digital Economy and Society, Thailand
- **Chris Fabian**, Co-founder of the Giga initiative, UNICEF
- **Noha Adly**, Research and Development Advisor to the Minister of Communications and Information Technology for Research and Development, Egypt
- **José Juan Haro**, Director Wholesale & Public Affairs HISPAM, Telefonica Hispanoamerica

Key insights :

- **Digital and technology divides:** Discussions highlighted that uneven access to technologies and their building blocks creates barriers to equal opportunities and the achievement of the Sustainable Development Goals (SDGs).
- **Infrastructure, knowledge, and opportunity divides:** These were said to be the three major divides that need to be addressed to achieve an inclusive digital transformation.
- **The '3As Principle':** The panel emphasized the importance for connectivity infrastructures to meet the '3As Principle' of Availability, Accessibility, and Affordability.
- **Innovative partnerships:** Speaker called for creative solutions and innovative public-private partnerships to address connectivity challenges, notably to incentivize the expansion of connectivity in remote areas.
- **Education and awareness:** It was stressed that access does not necessarily translate into usage, and that it is essential to also invest in digital literacy and raise awareness about the opportunities and risks associated with Internet use.
- **Inclusive-by-design:** Room discussions highlighted that local populations must be provided with the possibility to contribute to the economic cycle of technologies by adapting them to local realities.
- **Open markets, international cooperation, and solidarity:** These were all said to be necessary conditions to capitalize on connectivity, prevent the perpetuation of development traps, and avoid policy and governance fragmentation.

Rapid technological advancements and transformative innovations have come to define the current era. However, uneven access to technologies and their building blocks across different geographical regions, genders, and age groups stands as a significant barrier to the achievement of the SDGs. This breakout session therefore sought to explore how to bridge digital and technology divides and ensure that no one is left behind in our increasingly technology-driven world.

Laying out the scene, a panellist identified the infrastructure divide, the knowledge divide, and the opportunity divide as three major challenges to be addressed. Connectivity, he explained, must abide by the '3As principle' of Availability, Accessibility and Affordability: if Internet access is widely available but unaffordable – or inexpensive but unreliable - it will not allow people to thrive in economies and societies where connectivity has become instrumental to education, culture, good health, and decent livelihoods. The concern that left-out populations themselves are often unaware of what they are missing out on was also raised, along with the risk that governments may miss seeing value in stepping in. At the same time, it was noted that if serving the bottom quantile of the population is not profitable for private actors, goodwill is unlikely to suffice to see this gap addressed in a sustainable fashion.

The crux of the challenge, therefore, is to effectively incentivise economic actors to expand good and affordable connectivity to everyone. To do so, creative solutions and innovative partnerships will be key, panellists emphasised. The UNICEF's Giga Initiative, for instance, not only serves as a vector of development and accountability by connecting remote schools worldwide, but also champions the concept of "connectivity credits." Modelled on carbon credits, they allow creating tax and financial incentives for companies to connect areas that are more difficult to reach. Moreover, highlighting the benefits of e-governance can provide states with an impetus to act, remarked a panellist. Room discussions also made clear the value of exchanging on best practices, with participants sharing their own lessons from experience, such as making use of beverage vendors' infrastructures to provide connectivity in the remotest parts of a country.

The panel emphasized that the infrastructural challenge nevertheless pales in comparison to the human one. Speakers concurred to say that affordable access does not automatically translate into usage: for local populations to harness their new digital affordances, they must also be informed of ensuing opportunities, and equipped with the skills necessary to seize them. In other words, culture and mindsets are important pillars of the digital transformation. As a panellist noted, remote populations will be more inclined to adopt digital tools if they perceive them as a vector of improvements in their standards of living. However, discussions highlighted this also entails investing in education systems, training the workforce, as well as supporting community information workers who can provide last mile services and share their know-how with local populations. For the speakers, this is even more critical that connectivity also has a darker side: they emphasised that populations accessing the Internet for the first time are highly vulnerable to cyber-risks, and should be informed and protected accordingly.

Acquiring the skills and capabilities to adopt technologies may, however, only represent a first step in preventing the turbocharging of development traps by digital means. As one of the delegates emphasised during room discussions, a sense of ownership is equally critical: previously underserved populations should be provided with the possibility to adapt them to their local contexts and enabled to contribute to their economic cycle. In his words, emerging technologies should not only be value-based, but also development-oriented. Open markets, mutually beneficial partnerships between countries, international cooperation and solidarity were all brought forward as necessary conditions to capitalise on connectivity and emerging technologies.

The third breakout session ultimately made clear that for our technological future to reach its full potential, it will be critical to ensure everyone has an opportunity to shape it. And to do so, discussions highlighted that "inclusive-by-design" may well need to become a guiding framework - whether to bridge technology divides, or prevent fragmentation in technology governance and policies.

Plenary session: Technology deep dives

Insights from breakout sessions: Looking to the future

Rapporteurs:

- **Richard Johnson**, Chair, Technology and Innovation Committee, Business at OECD (BIAC); CEO Global Helix LLC
- **Pam Dixon**, Founder and Executive Director, World Privacy Forum; Civil Society Information Society Advisory Council (CSISAC)
- **Amanda Ballantyne**, Director, Technology Institute, American Federation of Labor and Congress of Industrial Organizations (AFL-CIO); Trade Union Advisory Committee (TUAC) to the OECD

Speakers:

- **Daniel Erasmus**, Author, Futurist, Inventor
- **Matthias Weber**, Professor, Austrian Institute of Technology, Head of Department, Center for Innovation Systems and Policy

Key insights :

- **Acknowledging temporal dynamics:** It was noted that the institutional adjustments required to accommodate technology developments tend to lag behind the fast pace of innovation.
- **Interactions with global and societal developments:** Speakers emphasized the existence of intricate interactions between emerging technologies and broader global and societal developments, which are bound to prompt reconfigurations of international significance.
- **Importance of foresight:** Discussions made clear that by providing a toolbox to explore the wide range of possible futures, foresight can help us prepare ahead.
- **Future literacy:** The panel called on education systems to nurture the ability to consider future developments to bolster the potential of foresight in technology governance and beyond.
- **Collaborative networks:** Speakers highlighted the need to develop networks that enable exchanges with a wide range of diverse stakeholders to better harness our collective knowledge and expertise.
- **Integrating foresight to institutional processes:** Panelists argued foresight should become integral to public and corporate policies on emerging technologies to be effective.

Emerging technologies open a spectrum of possible futures wider than ever before. It is with this observation that a keynote speaker began his intervention in the plenary session “Looking to the Future”, which subsequently explored how foresight could shed light on the challenges and opportunities that emerging technologies may bring about.

Further to brief presentations of the key insights from breakout sessions, speakers probed how foresight could inform the governance of frontier technologies. As one of the keynote speakers emphasized, the pace of development of some of these technologies is indeed much faster than the processes of institutional or political adjustments required to accommodate them. In his words, foresight can help our societies and politics prepare ahead by eliciting some of these differences in temporal dynamics.

The task at hand, however, was recognised as complex. Speakers emphasized that emerging technologies cannot be thought of in silos, nor in isolation from their environment. Advances in one technological field may not only interact with those in another, but also impact broader global and societal developments. As a panellist remarked, emerging technologies notably stand to influence global tectonics – and to be impacted in turn by these reconfigurations. Humility and a recognition of the fundamentally uncertain nature of the future will therefore always be required, insisted another speaker. Nevertheless, all concurred that mapping possible horizons provides a valuable compass to navigate disruptive changes.

How then are we to best harness the potential of foresight in technology governance? The panellists identified three critical ingredients to do so. Firstly, fostering “futures literacy” – that is, the ability to consider future developments in present-day decision-making processes – was said to be paramount. It was noted that this forward-looking perspective is not a natural instinct for human beings, who tend to prefer to extrapolate past developments and decide on that basis. Yet, such capabilities can be nurtured from an early age, argued a speaker, who pointed out that schools in countries such as Finland already do so very effectively.

Secondly, developing networks that enable exchanges with a wide range of stakeholders was presented as a necessity to escape tunnel vision and truly harness our societies’ collective intelligence. Discussions highlighted that foresight should draw from a collective pool of knowledge and expertise by developing and deepening engagement with businesses, labour organisations but also civil society at large. However, this also gives rise to a tension, noted a leading practitioner, as a solid knowledge of the issues at hand are equally critical to foresight methodologies. Reconciling such antagonistic objectives was therefore said to require more work and novel efforts – a task that the GFTech stands ready to support.

Lastly, the speakers stressed that to become more effective, foresight would need to receive the attention it deserves. From climate change to the increased precariousness of workers in the platform economy, our societies have too often woken up late to some of the negative impacts of technological developments, remarked some of the breakout rapporteurs. It is thus timely for foresight to become integral to both public and corporate decision-making processes, concluded the speakers. While tomorrow will remain filled with surprises, they made clear that the potential benefits and risks of emerging technologies call on us to be prepared for them – and that the foresight toolbox has great potential to help in this endeavour.

A deep dive into synthetic biology

Keynote: Drew Endy, Professor and Martin Family Fellow in Undergraduate Education, Stanford University; President, The BioBricks Foundation

Panellists:

- **Matthew Chang**, Director, Singapore Consortium for Synthetic Biology; Dean's Chair in Medicine and Associate Professor, National University of Singapore
- **Benson Mburu**, Principal Scientist, National Commission for Science, Technology and Innovation, Kenya
- **Kenneth Oye**, Professor of Political Science, Professor of Data Systems and Society, Director of the Program on Emerging Technologies, MIT
- **Claudia Vickers**, Adjunct Professor, Queensland University of Technology; Former Director, Synthetic Biology Future Science Platform, CSIRO

Key insights :

- **The third age of biotechnology:** Keynote remarks highlighted that synthetic biology marks the third age of biotechnologies, as it allows "synthetizing" and "printing" DNA, thereby enabling the "composition" of life itself.
- **The ultimate manufacturing platform:** It was noted that as synthetic biology harnesses the power of nature to organize atoms, it may provide humanity with the "ultimate manufacturing platform." It has a wide range of potential applications and it may prove instrumental in addressing some of the critical challenges faced by humanity.
- **Enduring barriers to progress:** Getting synthetic biology advances from research labs to the real world and taking them to the scale required to achieve planetary impact remain significant obstacles to progress.
- **Policy interventions for advancement:** A range of policy interventions, including tax mechanisms, public-private partnerships, agile regulatory frameworks, and carbon taxation, were described as paramount to accelerate the development and scaling of synthetic biology.
- **Mitigating risks, learning from historical precedents:** Speakers remarked that the field of synthetic biology is going through phases that resemble those digital technologies previously followed, which underscores the need to learn from the past. They emphasized that regulation and cooperation would be required to mitigate concerns.
- **Need for international cooperation:** Discussions made clear the need for greater international cooperation and clarity in regulatory responsibilities. Speakers stressed that the OECD could play a significant role in fostering this collaboration, addressing the consequences of regulatory divergences, and supporting public acceptance through standards.
- **Unlocking planetary scale flourishing:** Synthetic biology, if properly regulated and supported, was said to have the potential to enable "planetary scale flourishing". For the panellists, policymakers should now strive to guide this technology towards its full potential.

Opening the deep dive into synthetic biology, keynote remarks made clear that for all their futuristic overtone, biotechnologies have long been integral to the human journey. Focused on domestication and breeding, the first generation of biotechnology can be traced back millennia. Their second generation, defined by the newfound abilities of humans to edit existing lineages, occurred over the last 50 years with the emergence of genetic engineering. But according to the presenter, biotechnology have now entered their third age: that of synthetic biology. He explained that synthetic biology is no longer solely about reading or sequencing DNA; it effectively enables to write and print it. In his words, the core promise of synthetic biology is therefore the “composition” of life itself. And whilst it remains lesser known that generative Artificial Intelligence, the speaker claimed it may well prove to be the “real” general-purpose technology.

Nature harvests 90 terawatts of energy - four and a half times what the human civilization operates on - and uses it to organize atoms, explained the keynote speaker. In his eyes, humanity could therefore secure the ultimate manufacturing platform by partnering correctly with biology. Moreover, this goal may be increasingly within reach. In the words of another panellist, synthetic biology finds itself on a slope of enlightenment, where scientists now better understand what this technology can - and cannot - deliver. Correspondingly, they can decide what sort of problems they wish to apply it to. From the reprogramming of microbes to grow food out of CO₂ to distributed breweries of essential medicines, discussions highlighted that synthetic biology has a vast range of potential applications. According to one of the speakers, this is particularly significant for the achievement of our sustainability goals, with synthetic biology having the potential to accelerate emissions reduction, speed up carbon sequestration, provide bio-based materials, and propel a transition towards truly circular economies.

Yet, panel discussions also made clear that this hopeful technological future faces significant barriers. Speakers remarked that getting technologies out of universities and research labs, for one, is easier said than done. Furthermore, scaling synthetic biology solutions to the levels required to deliver planetary impacts was said to remain a critical challenge. A range of policy interventions that stands to help were nevertheless highlighted in the course of panel discussions. Tax mechanisms supporting start-ups were said to be key to the acceleration of their development. Public-private partnerships were also described as essential to bring these technologies to fruition at scale. Moreover, speakers noted that agile regulatory frameworks that welcome community consultation and input will be critical to conciliate public buy-in on the one hand, and freedom to operate for synthetic biology firms on the other. Last but not least, the panellists stressed that developing an environment that makes these types of technologies competitive, notably through proper carbon taxation, would be paramount.

Regulation and cooperation will be required to unlock the benefits of synthetic biology; they will also be crucial to ensure they do not come to be outweighed by its risks. It may be too early to know whether rapid advances in biotechnologies, combined with digital tools, will effectively usher in a networked bio economy, also referred to as “bio-net” by the keynote speaker. Yet, discussions revealed that, in many ways, the field of synthetic biology appears to be going through similar phases as digital technologies before it, with an early sense of optimism and democratic aspirations giving way to concerns around divides in access, security threats, and risks associated with dual use. While one speaker argued that synthetic biology promised to be democracies’ natural ally by providing an equitable foundation for “making via growing”, another contended that it is not yet clear whether the economics will lead towards greater competition, or increased concentration. And if panellists noted that the synthetic biology field has a long history of constructive self-governance, they also made clear that its growing industrialisation will call for more regulation.

This plenary session made clear that the governance of synthetic biology has much to learn from historical precedents. The panel notably highlighted several action pathways where the OECD could help catalyse progress. “We need to observe, gather information, share information, and support each other across the world as we push this technology forward”, noted a speaker. “There is a need to generate more success stories centred on our shared values”, emphasised another. And since the field has proved driven primarily by most developed countries up to now, the OECD should foster greater international cooperation between the Global North and Global South, stressed a third.

Panel discussions further revealed that the division of regulatory responsibilities has yet to be clearly established. National policies remain characterised by their extraordinary diversity, explained the speakers, who indicated they would welcome greater clarity. Emphasising that synthetic biology is a technology whose transformative impact ultimately hinges on public acceptance, they also called on the OECD to address some of the unanticipated consequences of regulatory divergences, and stressed that synthetic biology standards incorporating biosafety, security and sustainability elements have the potential to take the field to new heights. In their eyes, coordinated international action would thus represent a highly welcomed development.

It is therefore with an ambitious agenda for the OECD, and other international bodies, to take up that the deep dive into synthetic biology concluded. Panellists ultimately made clear that scientific advances in synthetic biology have brought us to the edge of a precipice of risks, or possibilities. In their eyes, policymakers should now play their part to allow our societies to rise to these challenges – and perhaps even help “unlock planetary-scale flourishing”.

A deep dive into immersive technologies

Keynote: Judith Okonkwo, Founder, Ìmísí 3D

Panellists:

- **Pradeep Khanna**, Executive Director, Asia Pacific, VR AR Association (VRARA); CEO, Global Mindset; Co-Founder InSquare
- **Simone Kliass**, Co-founder and Board member, Brazilian Extended Reality Association
- **Kavya Pearlman**, CEO and Founder, XR Safety Initiative
- **Rehana Schwinniger-Ladak**, Head of Interactive Technologies, Digital for Culture and Education, European Commission

Key insights :

- **A transformative potential:** Immersive technologies such as VR, AR, and MR were said to form an extended reality continuum that stand to transform industries, foster empathy, create deep human connections, and turn storytelling into "story-living".
- **Diverse use cases:** Panelists explained that immersive technologies have diverse use cases in healthcare, retail, manufacturing, and entertainment, among others. Their benefits in education were regarded as particularly promising, notably in resource-constrained environments.
- **Magnified risks for pre-existing concerns:** Immersive technologies were said to also magnify pre-existing risks and concerns, including around privacy, security, ethics, and disinformation. With humans now placed directly in the loop, these will warrant caution and a proactive approach.
- **Balanced regulatory frameworks:** To maximize the benefits and mitigate the risks of immersive technologies, speakers called for balanced regulatory frameworks which incentivize safe, responsible, and trustworthy innovation.
- **The inclusion and sustainability imperatives:** Discussions emphasized that immersive technologies will need to be accessible by everyone if they are not to deepen divides. According to the speakers, this requires broadening the ecosystem and ensuring that regulatory frameworks prioritize inclusivity, accessibility, and sustainability.

The entrance of a major technology company into the market announced the day prior offered a timely news hook for the technology deep dive session on immersive technologies. Keynote remarks noted that the power of these technologies has been recognized for some time, with applications in areas such as space exploration and military training, but their relative democratization over the last decade has propelled a renaissance in their development and applications. In this session, panellists from across the globe offered accounts of their experience with these technologies, with discussions culminating in insightful exchanges on their transformative potential and no less significant risks.

Speakers underlined that immersive technologies, such as virtual reality (VR), augmented reality (AR), and mixed reality (MR), should be approached as an extended reality continuum. They also pointed out the need to start thinking more expansively about these technologies, which may soon encompass additional senses, such as touch, taste, and smell. The exchanges made clear that one does not need to wait for the so-called 'metaverse' to fully arrive before paying heed to immersive technologies. As one of the speakers put it, we are already moving to an era where we will no longer be looking at a computer, but rather through a computer. In her eyes, the implications could not be more significant.

On the opportunities side, panellists pointed to diverse use cases spanning education, healthcare, retail, entertainment, and more. One speaker noted that immersive learning tools could provide students in resource-constrained environments with experiences like virtual field trips and science labs, and may thereby prove instrumental in achieving inclusive and equitable quality education (SDG number 4). Others emphasized productivity enhancements and innovation potential for industries like manufacturing, automotive, and aerospace where they enable replacing physical prototypes with digital twins. Moreover, immersive technologies were lauded for their ability to foster empathy and create deep human connections by turning storytelling into "story-living".

However, panellists also made clear that their potential could be harnessed for less palatable ends. Comparisons were made to past harms from social media, with one panellist describing their advent as the coming-of-age of constant reality capture. Devices are now capable of identifying headset wearers and inferring their biometric data, raising significant privacy concerns. Moreover, the speaker explained that the technological ability to put users at the centre of vivid narratives, combined with rapid advances in generative AI, could soon turn immersive technology into vehicles of incredibly compelling disinformation.

Whilst challenges of a technical nature such as motion sickness and latency problems remain to be solved by technologists, speakers concurred that the most significant challenges will fall on policymakers, who will need to design policies and regulatory frameworks that incentivize responsible and trustworthy innovation in the field. Beyond privacy and ethical concerns, a balanced approach that maximizes the benefits of immersive technologies and mitigates their risks will also need to carefully consider the duality of their impact on the environment. Speakers explained that while immersive technologies can help raise awareness of climate change, reduce the need for travel and decrease the carbon footprint of manufacturing, they will also generate e-waste and require tremendous amounts of energy to operate.

The session made clear that societies cannot afford immersive technologies to remain the preserve of the rich, and encouraging inclusive and climate responsible development will be critical. Panellists stressed that by blending the virtual and physical worlds, these technologies place humans in the loop and thereby stand to transform our lived experiences. With our shared reality in the balance, the discussions thus concluded with a powerful plea to broaden the ecosystem of immersive technologies, and welcome everyone to their use and development.

Plenary session: Closing

Moderator: Kerri-Ann Jones, Deputy Secretary-General, OECD

Panellists:

- **Timo Harakka**, Minister of Transport and Communications, Finland
- **Claire Giry**, Director General for Research and Innovation, Ministry of Higher Education and Research, France
- **Kenneth Cukier**, Deputy Executive Editor, The Economist
- **Nita A. Farahany**, Robinson O. Everett Distinguished Professor of Law & Philosophy, Duke Law School

Key insights :

- **Instrumental value of innovation:** Panellists stressed that innovation and technology are to be valued for their potential in improving livelihoods and empowering communities. Human-centric technological developments are critical to achieve such goals.
- **Dual nature of technology:** It was noted that technology can bring immense benefits and transformative change, but also has the potential to deepen divisions and bolster oppression. Speakers highlighted the need to account for this dual nature of technology.
- **Aligning incentives with values:** Speakers emphasized that aligning economic incentives with shared values is critical to guide innovation. They noted that technology offers tools to reshape the world, but that it is ultimately shared values that will determine what that world comes to resemble.
- **Inclusivity and human progress:** Both the concept of “inclusiveness-by-design” and the call for a human rights-based approach to innovation pointed to the need for technology to not only respect human dignity, but also serve as an inclusive vehicle for human progress.
- **Governing emerging technologies:** Shared collaborative platforms, evidence-based analysis, hard and soft governance, adaptative policy mechanisms and international collaboration were all said to be paramount in the context of emerging technologies.
- **The OECD Global Forum on Technology:** Looking ahead, the GFTech will continue facilitating inclusive, multi-stakeholder and values-based discussions on specific technology policy issues, responding to gaps in existing fora, to foresee and get ahead of long-term opportunities and risks presented by technology.

The closing session provided an opportunity to reflect on key themes and insights that emerged from the day's rich discussions. In a conversation with OECD Deputy-Secretary General Kerri-Ann Jones, the Chairs of the breakout sessions offered their key take-aways, laid the path ahead for the governance of emerging tech, and provided recommendations for the GFTech to deliver on its mandate.

The first speaker began his intervention by stressing that innovation and technology are to be valued for their potential in improving livelihoods and empowering communities. Throughout the inaugural event, panellists had emphasised that technology would be an essential lever to rise to the challenges of our time. Discussing the linkage between climate change and technology, a speaker contended that technology has a large share of responsibility in the current crisis, but will remain critical to address it.

Discussions also highlighted the dual nature of technology, which can deliver tremendous benefits and transform lives for the better, but also deepen divides and bolster oppression. Furthermore, they made clear that ensuring human-centric technological developments will not happen by itself. Panellists concurred that appealing to virtue does not suffice. Our common ambition, they argued, should rather be to align economic incentives with shared values.

Throughout the event, speakers emphasized the critical need for inclusiveness in this endeavour. They stressed it would be essential to bring in the insights and perspectives of all those impacted by technology to better anticipate and model different scenarios, but also agree on what innovation should strive to achieve for. As one speaker put it, a human rights-based approach to technology is indeed one that not only ensures that innovation respects human dignity through guardrails; it is also one that advances human progress in an inclusive fashion.

To enable this to happen, speakers made clear that shared collaborative platforms such as the GFTech and governance mechanisms – both “soft” and “hard” – would be paramount. We need evidence-based analysis, smart policies, policy guidelines and standards and international collaboration more than ever, emphasized a speaker, who called on the OECD to deliver valuable insights on emerging technologies and to continue serving as a global, honest broker for fair rules in the technology policy-making world. Another concurred by not only emphasizing that environmental challenges and technological advances represent a call to rethink public policy and research practices, but also remarking that the OECD is uniquely suited to equip policymakers for this work.

Technology offers tools to reshape the world, but it is ultimately shared values that will determine what that world comes to resemble. Throughout the event, discussions made clear that governance tools will need to be adaptive and should provide mechanisms to anticipate, address, and redress. They also highlighted that interdisciplinarity, stakeholder engagement, evidence-based analysis and cooperation across the board would all be required. While noted as a tall order, it was also recognised as the “raison d’être” of the OECD GFTech, which will continue to serve as a crucial venue for shaping our future at the tech frontier.