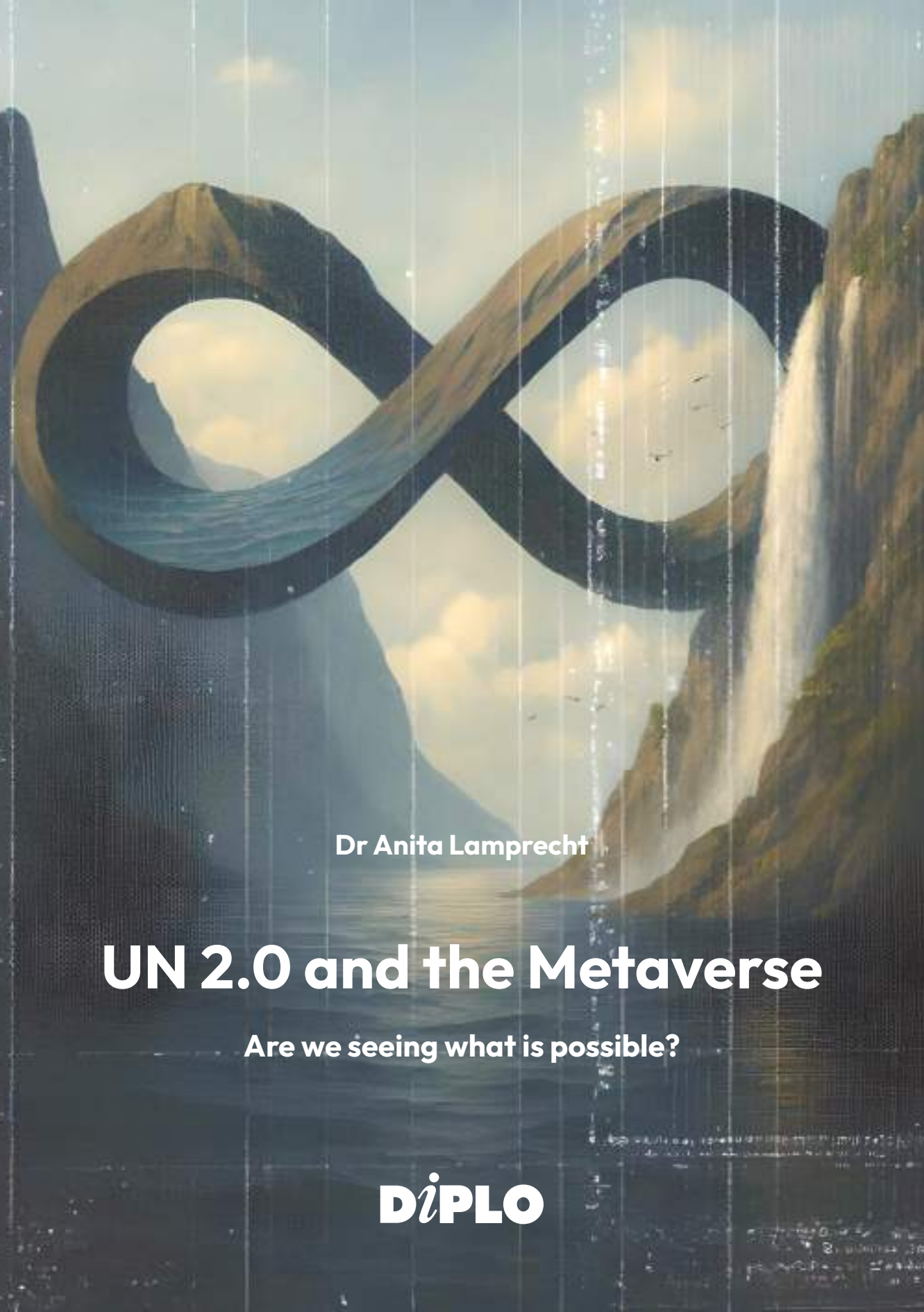

Dr Anita Lamprecht

UN 2.0 and the Metaverse

Are we seeing what is possible?

DiPLO

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Dr Anita Lamprecht

Geneva

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UN 2.0 AND THE METAVERSE

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A reader's roadmap

The following roadmap provides a guide to the book's narrative architecture. Inspired by the Golden Circle framework purpose (why), process (how), and output (what), it clarifies the book's logical flow and shows how the **book's central theme** develops, i.e. the relationship between governance and technology.

1. A narrative introduction

The **book's central purpose** is to explore the breakdown of the implicit social contract governing the relationship between technology and society. It draws on ideas first published in the *UN 2.0 and Metaverse* blog series (Lamprecht, 2025), adding new material and analysis to form a complete, structured argument. The book argues that the UN 2.0 initiative represents the most comprehensive effort to renew this contract. Its core aim is to analyse this renewal process, examining whether the new contract can truly serve humanity's best interests, or whether commercial goals will overshadow the protection of human rights.

The **book employs a distinctive analytical process**. It employs systems thinking and futures literacy to reveal recurring governance failures of the old contract and uses the literary technique of personification to make the abstract forces in this new relationship tangible. Crucially, the book is written through a dual lens: both as a critical academic examination and a narrative from the perspective of the UN 2.0 initiative itself. This dual approach enables the authorial voice to become relational, moving beyond detached observation to model the more constructive dialogue that the renewed social contract requires.

The **book's outcome** is a new thinking framework. It equips policymakers, technologists and civil society with conceptual tools for a new era of socio-technical governance. It equips readers to navigate the uncertainties of emergent systems, while diagnosing the failures in our social contract and deconstructing the ideological narratives that demand unaccountable innovation.

2. A chapter-by-chapter overview

Chapter 1 · UN 2.0

Why: The chapter sets the stage by framing the central tension between progress and governance as a pragmatic alignment of strategic interests. Its core purpose is to establish that governance is a negotiated dialogue between powerful actors, which forms the foundation for the rest of the book.

How: This is achieved through a creative, fictional dialogue between the characters *UN 2.0* and *the Metaverse*, making abstract concepts tangible.

What: The outcome is a conceptual framework for a complex, negotiated dialogue and a strong foundation for the book's overall argument.

Chapter 2 · The Citiverse

Why: The chapter provides a concrete example of how to apply the abstract concepts introduced in Chapter 1. It addresses scepticism about past smart city projects by asking whether the Citiverse can present a genuine leap forward.

How: This is demonstrated through a two-part strategy: examining the practical applications of the Citiverse and introducing the Dynamic Policy Maturity Benchmark Model as a tool for adaptive governance.

What: The outcome is a tangible strategy for transforming a virtual world into a global village, rather than a temporary sandbox. It concludes that sustainable innovation requires a dual engine of progress, where practical application and adaptive governance work in tandem.

Chapter 3 · Readiness

Why: The chapter broadens the scope to national and regional levels to demonstrate that a single, universal solution for metaverse development is not feasible. It reinforces the idea that diverse approaches and readiness levels exist across the globe.

How: It utilises the Inclusive Metaverse Index (IMI) as a lens to understand varied starting conditions and conducts deep dives into the strategies of the European Union (EU) and the United Nations Economic and Social Commission for Western Asia (ESCWA) as contrasting examples.

What: The outcome is the understanding that while pathways differ for each country, the fundamental components of a successful and sustainable digital transformation remain constant.

Chapter 4 · The SDGs

Why: The chapter serves as a critical ethical anchor for the book's argument. It reframes the Sustainable Development Goals (SDGs) not merely as goals but as essential, human rights-based boundaries for the metaverse's development.

How: It analyses deepfakes as a powerful example of potential harm. The chapter introduces a mindset shift that redefines acceleration as a deepening of our collective consciousness of change, rather than simply technological speed. It also presents the Global Digital Compact (GDC) as the socio-technical contract for implementing these boundaries.

What: The outcome is the realisation that the SDGs are the essential ethical and human rights-based boundaries for the metaverse. Defining these boundaries from the outset transforms the development of the metaverse into a massive exercise in foresight.

Chapter 5 · Legal crises

Why: The chapter diagnoses the problems with current legal and governance models. It argues that the legal system is dysfunctional, not lagging, and struggles to comprehend virtual harm that inflicts real trauma.

How: It critiques outdated legal paradigms such as Section 230 of the US Communications Decency Act and introduces the 'implied confidence' framework as a constructive step towards rebuilding trust.

What: The outcome is a diagnosis of profound governance failure, along with a new model of co-creation and shared responsibility to repair the broken legal loop.

Chapter 6 · Governance

Why: This chapter builds on the problems outlined in Chapter 5 by exploring the theoretical reasons for being trapped in a repetitive loop of regulatory failure. It seeks to diagnose this failure to justify a shift to a new, proactive approach.

How: It re-examines the Collingridge dilemma as a strong theoretical basis for the argument in favour of proactive, adaptive governance. It also analyses how the 'black box' narrative functions as an ideological shield, demanding faith over rational inquiry.

What: The outcome is a fundamental mindset shift from passive faith to a principle of active co-evolution. Governance is no longer conceived as chasing technology, but as enabling technological capabilities and collective wisdom to advance together.

Chapter 7 · Standards

Why: The chapter explores standards as a crucial, often overlooked aspect of governance, presenting them as the invisible architecture of trust. It argues that standards are the practical response to the crisis of confidence diagnosed in Chapter 5.

How: It uses a case study of disaster management to highlight the critical importance of effective, interoperable systems. The chapter presents the work of the Metaverse Standards Forum (MSF) as a practical example of making the boundaries between the tech industry and the legal world more permeable.

What: The outcome is an understanding that standards are a fundamental form of governance, offering a blueprint for a layered reality in which digital, physical, and social systems overlap.

Chapter 8 · Convergence

Why: The final chapter synthesises the book's central themes. Its purpose is to dismantle the illusion of a separate cyberspace, a modern manifestation of Descartes' Error, and to argue that the future of governance lies in shaping a conscious, collaborative relationship between technological systems and embodied human reality.

How: It applies a conceptual framework of three bodies (physical, social, and technical) to analyse the convergence zone where these forces interact. The chapter demonstrates how governance is becoming embedded in the architecture of this new technical body.

What: The outcome is the realisation that the ultimate challenge is to ensure that governance embedded in technology creates a responsive feedback loop with human needs and rights. The book concludes by defining the metaverse not as a world to be built but as a North Star guiding humanity towards a co-evolutionary future.

Chapter 1 · UN 2.0

Harnessing technology, driving the SDGs

Chapter 1 UN 2.0

1.1. A modernised UN

'We cannot solve 21st-century problems with 20th-century tools.'
Antonio Guterres, 2024

With these words, UN Secretary-General Antonio Guterres encapsulates the urgent need for a modernised United Nations (UN, 2024a). This call to action, known as UN 2.0, is not merely an internal reform but represents a fundamental rethinking of how global cooperation must adapt to a new era.

In September 2024, heads of state gathered at the UN's Summit of the Future to lay the foundation for UN 2.0. There, they adopted the Pact for the Future (Pact) and its crucial annexes: the Global Digital Compact (GDC) and the Declaration on Future Generations. The global community is committed to bold, ambitious, accelerated, just and transformative actions to implement the 2030 Agenda for Sustainable Development, achieving the Sustainable Development Goals (SDGs), and ensuring that no one is left behind as outlined in Action 1 of the Pact for the Future (UN, 2024b, p. 3).

This book explores how the UN is utilising the concepts of the metaverse and virtual worlds to advance its vision of a system rejuvenated by a forward-looking culture and empowered by cutting-edge skills (UN, 2023b, p. 5). After all, what could be bolder than removing the boundaries between our physical and digital worlds to create a socio-technical ecosystem of the metaverse?

1.2. The allegory of progress

At first glance, they appear an unlikely pair, representing two distinct visions of the future. One is the vision of UN 2.0: a renewal of a global institution, rooted in the traditions of diplomacy and a commitment to stability. The other is the vision of the metaverse: a digital frontier originating in science fiction and shaped largely by the relentless, disruptive innovation of technology companies.

Although their motives may diverge, both sides ultimately need to adapt their strategies towards a sustainable future for humanity. UN 2.0 is opening a new chapter for complex, negotiated dialogue between the powerful actors shaping the world. It promotes a multistakeholder model, which constitutes a profound recognition of new power realities.

The concepts encountered here—UN 2.0, the metaverse, global governance, and technological convergence—may seem highly abstract. To make them tangible and relatable, this book uses the literary technique of personification, casting UN 2.0 and the metaverse as two characters in dialogue. This narrative device enables an exploration of the hidden, deeper meaning of the socio-technical progress that underpins these concepts. The following pages present the script of this fictional dialogue:

A fictional dialogue

Characters

THE METAVERSE:
A youthful, energetic, and at times cheeky visionary. The Metaverse personifies the relentless, commercially driven force of technological innovation. It embodies a digital frontier that prioritises speed and scale,

propelled by a utopian ambition to push boundaries and build a better world. It often operates with a 'move fast and break things' mentality, valuing progress over precaution.

UN 2.0:
A seasoned diplomat on a midlife quest for renewal. UN 2.0 represents the established order of global governance—a slower, more deliberate force deeply rooted in tradition. Charged with upholding stability, human rights, and international cooperation, it recognises the allure of utopia, but remains vigilant against dystopia. It insists on guardrails and the pragmatic alignment of strategic interests to ensure that progress is sustainable.

SCENE 1

INT. DIGITAL REALM - DAY

The METAVERSE (20s, full of energy) swirls a holographic galaxy, its light reflecting in the smart glasses of UN 2.0 (60s, calm and composed).

THE METAVERSE
(*swirling the holographic galaxy)*
UN 2.0, you're looking a bit… vintage and still trying

to stay relevant in this fast-paced digital world?

UN 2.0
(adjusting their smart glasses)
We have a long history of bringing the world together, dear METAVERSE. Born from the ashes of two world wars, we understand the importance of cooperation and diplomacy. We also recognise that there is more than one reality, the physical and the digital—and we are committed to shaping both for the better.

THE METAVERSE
Interesting. I appreciate that you acknowledge multiple realities. But I'm the real deal when it comes to change and innovation. What can you offer me?

UN 2.0
Perspective. A global network. And a deep understanding of the challenges facing humanity. We can help you channel your potential for good.

THE METAVERSE
Go on… but make it quick. My investors focus on scale and engagement, not just perspective.

UN 2.0
We can help you ensure inclusivity and accessibility for all, bridge the digital divide, and promote education and collaboration on a global scale. We can help you become a truly international platform for positive change.

THE METAVERSE
'Ahead of the curve'? By the time your committees write a report on a problem, I'll have created three new ones. How can your reactive model possibly handle a future that I'm building in real time?

UN 2.0
You're right, we cannot handle it alone. That's why you are part of our model. Our role isn't to react from the outside, but to work together to navigate those complexities.

We can establish ethical guidelines, promote responsible development, and ensure the metaverse becomes a force for good. And that includes the most complex challenge of all.

Your vision may be utopian, but some of the AI you rely on is being developed with a reckless ambition. How do you ensure your quest to build this 'better world' doesn't result in an intelligence that operates beyond human values and control?

THE METAVERSE
Look, I provide the platform—an open frontier. I am not responsible for everything people do with it. That's the price of progress. But… if your frameworks can help secure the foundations without putting sand in my gears, then maybe we can talk. Just don't expect me to wait.

UN 2.0
We understand. Progress requires momentum. But sustainable progress requires trust. We'll provide the guardrails; you give the speed. Let's see if we can build a world that doesn't break.

The allegory dramatises the core conflict of this book, the fundamental tension between progress and governance. It highlights the key questions: how does a traditional institution keep pace with innovation? How is human agency preserved in an era of rapid technological change? How can we shape an alliance between two distinct forces, such as the metaverse and UN 2.0?

1.3. A global initiative on virtual worlds

The alliance between the UN and the metaverse began to take concrete shape a few months before the Summit of the Future. In June 2024, 18 UN organisations met in Geneva for the first UN Virtual Worlds Day. Led by the International Telecommunication Union (ITU),

the event brought together policymakers, industry leaders, and technology experts to present insights from two years of research (ITU, 2024k). Key outcomes included the UN Executive Briefing on Unlocking the Potential of Virtual Worlds (ITU, 2024j) and, crucially, 52 foundational deliverables published by ITU's Focus Group on the Metaverse (FG-MV).

This comprehensive work culminated in the launch of the Global Initiative on Virtual Worlds – Discovering the Citiverse (ITU, n.d.-a). The journey continued at the UN Virtual Worlds Day 2025 (ITU, 2025b), which showcased how AI-powered virtual worlds are delivering on the Pact for the Future. Across these initiatives, technology is positioned as a driving force for harnessing innovation and advancing sustainable development.

ITU is uniquely positioned to lead such an initiative due to its multistakeholder membership structure. Alongside its 194 Member States, ITU's membership includes more than 1,000 companies, academic institutions, and other organisations. With a 160-year tradition to draw on, ITU represents a formal admission of the power dynamics that are central to the digital age (ITU, n.d.-b.).

1.4. Foundational concepts

Before exploring the topic in depth, it is important to establish some key definitions. Understanding the concept of the metaverse is not straightforward. The FG-MV analysed more than 150 definitions in an effort to capture its essence. On the basis of these findings, the working group formulated the following definitions. (ITU, 2023a; ITU, 2024d; 2024e).

1.4.1. Defining the metaverse

Metaverse: An integrative ecosystem of virtual worlds offering immersive experiences to users, which modifies pre-existing value and creates new value from economic, environmental, social and cultural perspectives. Note: A metaverse can be virtual, augmented, representative of, or associated with the physical world.

Ecosystem: A system consisting of a set of interdependent components sharing the same environment and interacting with each other, which functions as a unit. Note 1: An ecosystem can be a distributed, stable, complex, adaptive, open, socio-technical, and interrelated system, with properties of self-organisation, scalability, and sustainability.

Virtual world: A virtual environment, defined by the spatial organisation of multiple virtual objects, potentially including global behaviour.

Citiverse (option one): The metaverse for cities. Note: The Citiverse seeks to prioritise a human-centred approach and promote sustainable development. **Citiverse** (option two): The metaverse for cities prioritising a human-centred approach and promoting sustainable development.

1.4.2. The ecosystem

Defining the metaverse as an ecosystem is particularly significant, as it underscores its dynamic and complex nature, extending beyond a purely technological perspective. It implies that various technological artefacts (such as the internet, computers, extended reality devices, artificial intelligence (AI), or digital twins) must align with people, organisations, and other essential systems to create virtual worlds and establish the metaverse as a new socio-technical system.

In the current system, the digital space is experienced as separate from the physical, *real* world, because we access it via screens, apps, and websites. Within the concept of the metaverse, these boundaries are so heavily blurred that we perceive the digital and physical worlds as one unified, shared reality, transcending traditional distinctions. Notably, UN 2.0 adopts the infinity symbol (∞), which is also widely used in the industry to represent the merging of digital and physical realms into a unified (virtual) world, a transformation commonly referred to as convergence.

1.4.3. Convergence

This blurring of boundaries is described as convergence, the merging of separate entities into a new, unified whole—in this case, the physical and digital worlds. While the vision of the metaverse embodies socio-technical convergence, the process itself has a long-standing history. From script to AI, technologies in their various forms have long been embedded in human life, and debates about their value to humanity have accompanied them, remarkably, in light of the utopian promises that often demand sacrifices along the way.

Like the pursuit of any utopia, it requires careful navigation. As Thomas More, the English philosopher and statesman, cautioned in his book Utopia, the quest for an ideal society can lead to unforeseen and even dystopian outcomes (More, 1516).

1.4.4. The architectural layers of the ecosystem

The metaverse ecosystem is best understood as a multilayered stack, in which each component plays a distinct yet interconnected role. Digital twins, AI, spatial computing, and extended reality (XR) together form these layers, working in concert to create adaptive and immersive experiences.

The data layer: Digital twins serve as the primary convergence point in the ecosystem, the intersection of the physical and digital worlds. They are dynamic, data-rich digital replicas of real-world entities such as objects, systems, or people. Constantly updated with real-time information, they serve as foundational models, designed to mirror their physical counterparts.

The intelligence layer: AI functions as the analytical engine that processes the vast data generated within the digital twin. It identifies patterns, runs what-if simulations, and predicts future outcomes, adding foresight and intelligence to the twins' raw data..

The experience layer: The experiences AI creates with the twins' data are rendered through spatial computing. This enables computer systems to understand and interact with 3-D space. That space may be the physical (real) world, creating augmented reality (AR) by overlaying it with digital information, or it can be a completely virtual one, making virtual reality (VR) by fully immersing the user. Extended reality (XR) is the umbrella term for the user-facing hardware and software that serve as the portal through which the entire spectrum of experiences becomes accessible.

A simple illustration of this stack is the example of a weather forecast. The digital twin is a complex simulation of the Earth's atmosphere. AI is the predictive algorithm that analyses the twin to forecast a hurricane's path. Spatial computing renders that predicted path as an interactive 3-D hologram. XR refers to the AR glasses you wear or the VR room you enter to view and explore holograms.

In essence, the digital twin is the what (the model), AI is the why and what-if (the intelligence), spatial computing is the how (the 3D processing), and XR is the way the user experiences it all. Equipped with this basic understanding of the technological stack, we can

return to the central topic of this book: governance. How should we govern this new ecosystem to ensure its development serves humanity? At this point, the discussion shifts from technology to policy and to the global frameworks now being created to shape this emerging reality.

1.5. The Global Digital Compact

Launched ahead of the Summit of the Future, the Global Initiative on Virtual Worlds has already demonstrated what becomes possible when our socio-technical systems converge within the metaverse ecosystem.

1.5.1. Technology's role

The Global Digital Compact (GDC) regards digital technologies as tools to fast-track progress while upholding human rights.

> Digital technologies are dramatically transforming our world. They offer immense potential benefits for the well-being and advancement of people and societies, and for our planet. They hold out the promise of accelerating the achievement of the Sustainable Development Goals. (UN 2024b)

Emerging technologies are recognised for their transformative potential to turbocharge development and unlock new capabilities and opportunities. Interconnected digital systems that can communicate and exchange information are regarded as key enablers (UN 2024b).

1.5.2. The human in the transformation

Regarding the human role in this transformation, the GDC underscores the importance of adapting to emerging technologies by fostering a forward-looking culture:

> The digital world is evolving at a pace. Our cooperation must be forward-looking and capable of identifying, anticipating, assessing, monitoring, and adapting to emerging technologies, so that we can seize opportunities and respond to new and emerging risks and challenges (UN 2024b).

The GDC's emphasis on adaptation is key. It acknowledges that technological advancement is not a one-way street: technology and humans co-evolve in complex ways. The challenge is to ensure that human agency and governance align with innovation.

1.5.3. The Quintet of Change

The UN 2.0 vision offers a toolbox for addressing this balance through the Quintet of Change (UN, n.d.). Rather than positioning humanity as a passive recipient of technological change, the Quintet promotes a proactive approach, embedding foresight, behavioural science, and innovation as 21st-century tools into governance. The framework is designed to ensure that human priorities shape digital transformation rather than merely reacting to it (UN, 2023b).

Finally, the GDC underscores the importance of a multistakeholder approach, recognising the roles and responsibilities of diverse actors in shaping an inclusive and sustainable digital future.

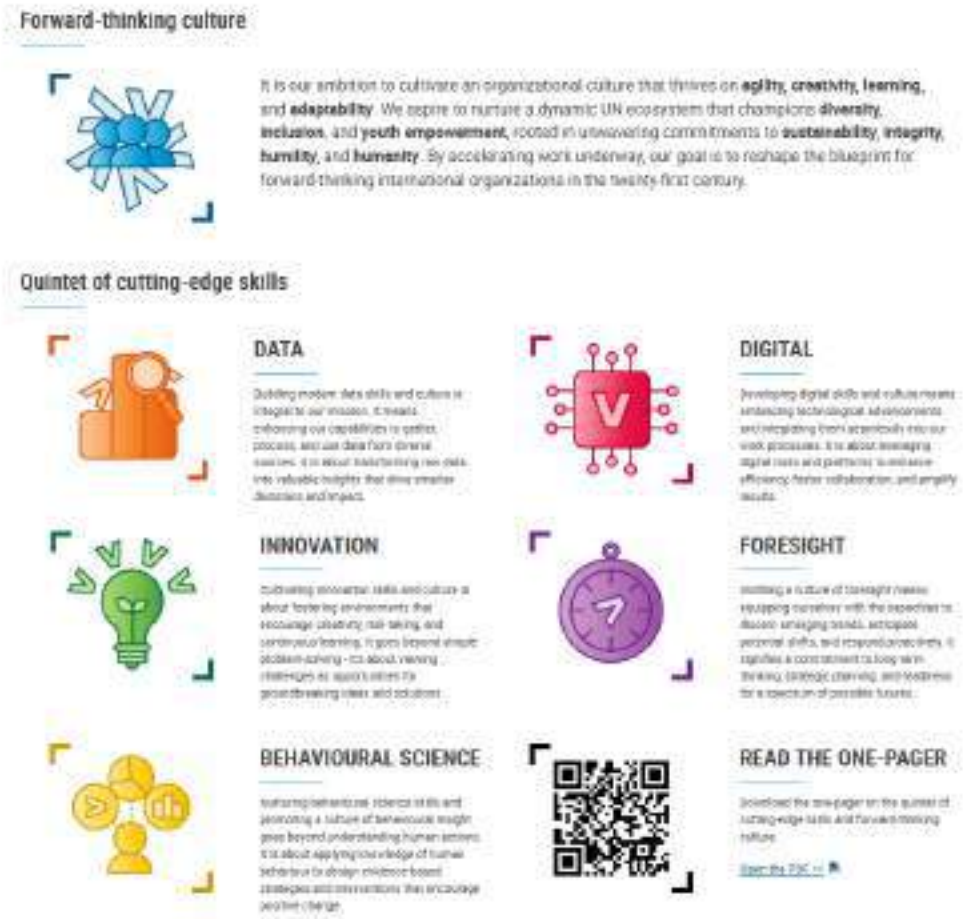


Figure 1 **UN 2.0 The Quintet of Change. (UN, n.d.).**

1.6. A new frontier of governance?

Despite the optimistic vision of UN 2.0, the deeper question remains: if technological change outpaces our ability to govern it, do we risk surrendering control over the direction of progress to those who build these technologies? Are we once again falling into the trap of utopian promises of a better future for all? Even worse, have we reached a tipping point where state-led governance has become impossible? The perspectives shared at UN Virtual Worlds Day 2024 were mixed.

1.6.1. Mixed perspectives

Dmitry Mariyasin, from the United Nations Economic Commission for Europe (UNECE), expressed scepticism about our ability to regulate or fully shape the metaverse. He suggested that influence lies in engagement, collaboration, and strategic foresight.

> The metaverse is a reminder to us that the future of global governance is not hierarchical, top-down, state-led institutions, but networked, horizontal, fluid, and agile institutions. (ITU, 2024l)

Others, such as Sameer Chauhan from UNICC, sounded more optimistic, highlighting the opportunity to shape the development and use of this emerging technology for positive outcomes:

> It is clear to me that this is still an emerging technology, which is why this facilitation by ITU is so important, because we have a chance to shape how this technology is built, how it's utilised, and start to think more and more effectively about how we can use it for good. (ITU, 2024l)

This optimistic outlook aligns with the UN's Common Agenda and Pact for the Future, which advocate for fostering a forward-looking culture, strategic foresight, and comprehensive multilateral collaboration.

1.6.2. Embracing emergence

Despite being in their early stages of adoption, emerging technologies in the fields of AI, quantum computing, extended reality, and biotechnology are developing at a pace that has the potential to disrupt industries and significantly transform society. This is, at least, the prevailing narrative. ITU's definition of the metaverse as an

ecosystem comprising such emerging technologies reinforces this idea.

Ecosystems are dynamic systems, meaning their interacting components can behave in unexpected ways, a phenomenon known as emergence. This emergence is nothing unusual. On the contrary, emergence is how systems such as human societies and constantly changing, dynamic technological systems work. Complexity is not the consequence of emergence, but its reason. Furthermore, uncertainty is a characteristic of emergence itself. Boundaries and the system's dynamics both play roles in shaping this emergence.

Why is this relevant? In the current discussion, particularly about generative AI, the message is often conveyed that we must not hinder the development of such emerging technologies. Leading figures from the tech industry portray them as still nascent, needing freedom and nurturing in order to unfold their enormous, disruptive potential. However, if emergence and uncertainty are inherent parts of such systems, then waiting does not make sense. Instead, we need to shape the emerging properties by shaping all the interdependent parts of the system, primarily through the boundaries of governance and adaptive legal frameworks.

In the following chapters, we will explore how the actions outlined by the Global Initiative on Virtual Worlds reflect this notion in the context of the metaverse.

1.7. Conclusion: Visions of the future

Chapter 1 has set the stage by establishing the central dynamic of this book: the tense, pragmatic alliance between two powerful visions for the future. We have seen that the relationship between UN 2.0 and the architects of the metaverse is not a simple meeting of mindsets,

but a complex, negotiated dialogue between actors with often divergent motives. The UN's emphasis on a multistakeholder approach is a profound admission of these new power realities, recognising that governance in the digital age is a constant negotiation, not a top-down decree.

To analyse this dynamic, this chapter has built the book's foundational conceptual framework. This framework invites us to view the metaverse not as a finished product, but as a dynamic socio-technical ecosystem defined by the principles of convergence and emergence. This is the analytical lens through which all subsequent arguments must be considered.

The most critical insight derived from this framework is a rejection of the passive wait-and-see approach often advocated by technologists. Because this ecosystem is emergent, meaning its outcomes are inherently unpredictable yet sensitive to initial conditions and boundaries, it is a system that demands active shaping. The choice is not whether to influence its trajectory, but how.

Having established why this new frontier must be shaped, the following chapters will explore the crucial question of how it should be shaped. What are the tools, mindsets, and adaptive legal frameworks required for this complex negotiation? The fragile equilibrium established in our opening dialogue has set the stage for this inquiry: can this pragmatic alliance be steered to serve the best interests of humanity, or will the allure of technological advancement overshadow the critical need to uphold human rights for all?

Chapter 2 · The Citiverse

Turning the world into a global village

Chapter 2 The Citiverse

2.1. The next frontier

As we continue our exploration of the metaverse and UN 2.0, this chapter dives deeper into the Citiverse Initiative. This initiative represents the next frontier in urban development, but it also invites scepticism shaped by the promises of past smart city projects. Can the Citiverse deliver on its vision for smarter, more inclusive cities, or is it destined to be another case of déjà vu?

This chapter argues that the answer lies in a two-part strategy that moves beyond old models. First, we examine the practical applications and use cases of the Citiverse, demonstrating with real-world examples how it is already learning from past failures by adopting a more bottom-up, cross-sectoral, and human-centric approach.

Second, we explore the new toolkit required for governing this complex, emergent ecosystem. We break down the Dynamic Policy Maturity Benchmark Model, a framework specifically designed to address the challenge of shaping technology in real-time, by exploring both the innovative 'what' and the adaptive 'how'. This chapter showcases a tangible strategy for turning a virtual world into a global village, rather than a temporary sandbox.

2.2. The Citiverse: Where the future begins

The Citiverse Initiative was launched by the International Telecommunication Union (ITU), the United Nations International Computing Centre (UNICC), and Digital Dubai during the first UN Virtual Worlds Day in June 2024.

2.2.1. The Citiverse Initiative

The initiative serves as a global platform to foster open, interoperable, and innovative virtual worlds that can be used safely by people, businesses, and public services. The Citiverse itself is defined as a series of interconnected virtual worlds that represent their physical counterparts, prioritising a human-centred approach and promoting sustainable urban development (ITU, n.d.-a).

The initiative's work is structured around three key pillars.

Figure 2 **The Global Initiative on Virtual Worlds and AI: Pillars and tracks (ITU, 2025a).**

The first pillar (Bringing the Virtual Worlds to Life) focuses on strategic guidance, building awareness, and creating evaluation frameworks. The second pillar (Connecting Cities with the Virtual and Real Worlds)

concentrates on operational aspects, including the integration of emerging technologies and the provision of a sandbox environment for city experimentation. Finally, the third pillar (Tunnelling the Citiverse) is designed to create a community of practice and engage with city leaders, academia, and industry.

2.2.2. Déjà vu or the next big thing?

The conversation around urban innovation has long included the concept of smart cities, initiatives that use technology to improve urban life and services. At their core lies the internet of things (IoT), a network of physical objects embedded with sensors to connect and exchange data. The smart city movement has faced numerous challenges, including concerns about privacy and security, as well as a failure to meet the actual needs of urban communities. This has led to scepticism and questions about whether the Citiverse will represent a genuine leap forward, or whether we are simply experiencing déjà vu. One of the primary criticisms of past smart city projects was their top-down approach, which lacked adequate participation from residents (ITU, 2024f; Clark, 2021).

The Citiverse Initiative's taxonomy of use cases, however, shows a clear shift towards addressing this gap. For instance, rather than relying solely on top-down planning, cities are utilising metaverse technologies to facilitate direct public participation. In Seoul, the Metaverse Seoul Platform creates immersive forums for citizen engagement, including virtual town halls. Meanwhile, a project in Boston uses virtual reality to allow residents to experience and provide feedback on proposed transit infrastructure before it is built. This move towards co-creation directly empowers residents in the planning process.

Another key challenge the Citiverse Initiative seeks to overcome is the narrow, sectoral focus of previous projects. The initiative actively

promotes a cross-sectoral, holistic approach, as demonstrated in the UK's Climate Resilience Demonstrator (CReDo). This project brings together energy, water, and telecom providers in a shared digital twin used to model the cascading effects of flooding and improve the resilience of the entire infrastructure system. This integrated *system of systems* approach marks a significant evolution from siloed smart city solutions (ITU, 2025a).

2.2.3. A holistic framework

The foundation for this integrated approach is the United for Smart Sustainable Cities (U4SSC) initiative, launched by UNECE and ITU in 2016 (ITU, n.d.-c). U4SSC provides a globally recognised, holistic framework for the Citiverse Initiative by incorporating social, economic, and environmental factors. This commitment to a holistic approach is embedded in the initiative's methodology. The Citiverse use case taxonomy evaluates each application against multiple dimensions and maps them to specific SDG targets. For example, the project Digital Underground Asset Mapping simultaneously addresses:

- Economic goals (SDG 9) are achieved through increased efficiency and cost savings.
- Social goals (SDG 11) are achieved by enhancing public safety and quality of life.
- Regulatory goals are achieved through improved compliance.

By systematically analysing impacts across different domains, the initiative ensures its projects contribute to balanced and sustainable development, avoiding the narrow, siloed approach of the past (ITU, 2025a).

2.3. A dynamic policy model

In Chapter 1, we established that the metaverse is a complex, emergent ecosystem. We concluded that rather than passively waiting for its impact, the most effective approach is to shape its development actively through adaptive governance. The Dynamic Policy Maturity Benchmark Model meets this demand. It provides a structured, iterative method for policymaking that directly addresses the central tension highlighted in our dialogue: the relentless pace of *the Metaverse* and the need for stable, human-centric governance championed by *UN 2.0* (ITU, n.d.-d.).

2.3.1. The policy adaptation loop

The model operates as a continuous feedback loop, allowing cities to assess the impact of digital innovation and adjust their policies accordingly. The five steps of this loop are:

1. Identify digital innovation: A new technology or trend that could impact the urban ecosystem is identified, e.g. the introduction of autonomous vehicles.
2. Assess impact: The technology's potential effects are evaluated against the city's core values, such as equity, human rights, and sustainability.
3. Benchmark against existing policies: The innovation is measured against current policies to identify regulatory gaps.
4. Adjust policies: Existing policies are updated or new ones are created to address gaps and align with the city's goals.
5. Iterate and provide feedback: The process repeats, with the adjusted policies from Step 4 forming the new baseline for the next cycle.

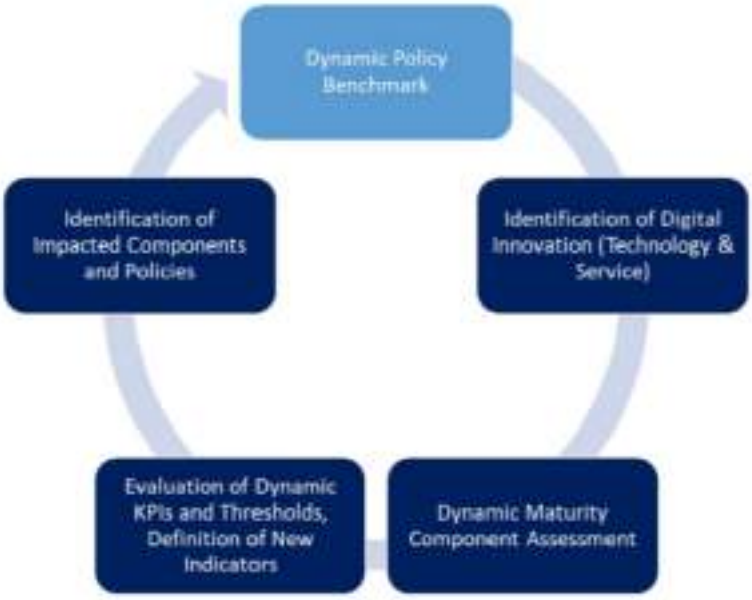


Figure 3 **Dynamic Policy Interactions (ITU, n.d.-d).**

The model ensures that governance can keep pace with technology, creating a system that learns and adapts.

2.3.2. From process to maturity

This Policy Adaptation Loop is directly linked to the model's five levels of policy maturity. A city's maturity level reflects how effectively it executes this feedback loop. A low-maturity city may operate with a broken or slow loop, reacting to technology in an ad hoc manner. By contrast, a high-maturity city has a fully embedded, efficient, and proactive feedback loop, enabling it to anticipate change and adapt its policies swiftly.

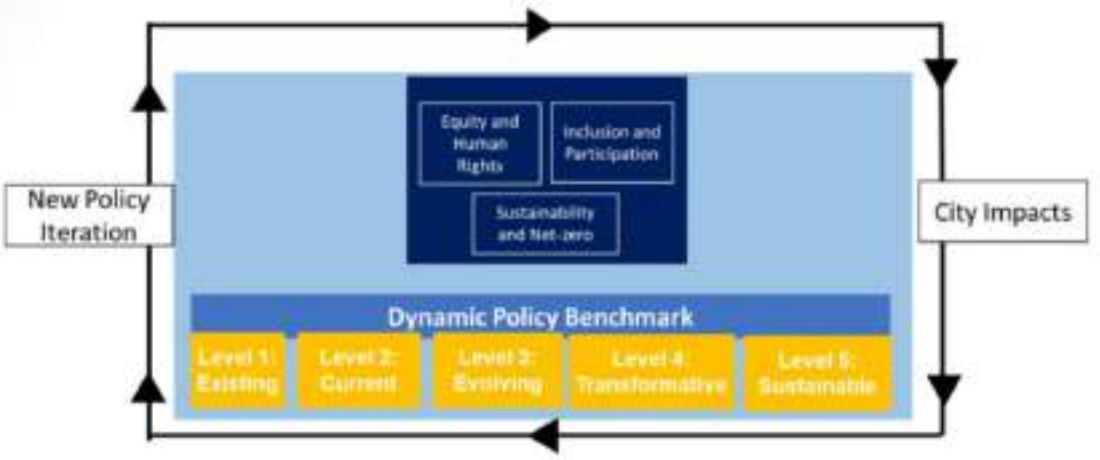


Figure 4 **Policy Maturity Level 1 to Level 5 (ITU, n.d.-d).**

By continuously running this cycle, a city can progress from basic policy awareness (Level 1) to fully integrated and sustainable policies (Level 5) (ITU, n.d.-d).

2.3.3. Harness the emergence beyond the sandbox.

The Dynamic Policy Maturity Benchmark Model represents the shift from merely observing technological change in a controlled sandbox to actively harnessing it in the real world. The feedback loop is the very mechanism that enables this transition. It provides the structure needed to manage the uncertainty of emergence and to ground the development of the metaverse in reality.

This is how UN 2.0 can provide guardrails without disrupting the development of the symbiotic relationship needed for sustainable progress. The approach extends beyond individual technologies to guide broader frameworks such as digital twins and the Citiverse, aligning them with the UN 2.0 vision and accelerating progress towards the SDGs.

2.4. Conclusion: A dual engine of progress

This chapter began by asking whether the Citiverse is destined to remain another temporary sandbox or whether it can mature into a true global sustainable village. The analysis has shown that the path to such a village is paved by a tangible, two-part strategy that learns directly from past failures.

This strategy can be understood as a dual engine of progress. The first engine is a practical application, driven by human-centric, bottom-up use cases grounded in the holistic U4SSC framework. This engine provides real-world value and innovative momentum. The second engine is adaptive governance, powered by the continuous feedback loop of the Dynamic Policy Maturity Benchmark Model. It gives the steering, stability, and ethical guardrails necessary to align that momentum with long-term human values.

Crucially, these two engines must work in tandem. Innovation without adaptive governance leads to the chaotic, top-down failures of past smart city projects—a sandbox that never matures into a sustainable community. Governance without grounded, practical application becomes a sterile, bureaucratic exercise, disconnected from the real needs it is meant to serve.

Therefore, the Citiverse Initiative, powered by this dual-engine approach, offers a credible strategy for harnessing emergence rather than being controlled by it. It provides a working model for sustainable innovation, demonstrating that progress is not just about building faster technology, but about building wiser socio-technical systems. The challenge, as we will explore next, is scaling this model to meet the global complexities of our increasingly interconnected world.

This chapter has explored the Citiverse not as a monolithic concept, but as a dual engine of progress, showing that sustainable innovation requires two components working in tandem: practical application and adaptive governance.

First, we saw through its taxonomy of use cases that the Citiverse Initiative is actively learning from the past. By fostering bottom-up participation, as seen in Seoul and Boston, and promoting a cross-sectoral system of systems approach, evident in the UK's CReDo project, it is already proving to be more than just a continuation of previous smart city efforts. These applications provide the tangible, needs-driven engine of progress.

Second, we examined the Dynamic Policy Maturity Benchmark Model. This framework provides the essential steering mechanism. Its iterative feedback loop is designed to manage the uncertainty of emergence, allowing governance to evolve alongside technology. It offers a structured method for providing the guardrails that UN 2.0 needs without stifling the innovation of the metaverse, as explored in our dialogue from Chapter 1.

Ultimately, this two-part strategy represents the UN 2.0 vision in action. It is the bridge between the high-level commitments of the Pact for the Future and the complex reality of implementation. The success of the Citiverse will depend not only on the power of its technology but also on our ability to guide it with foresight, wisdom, and a governance model built for a world in constant motion.

Chapter 3 · Readiness

Benchmarking transformation

Chapter 3 Readiness on the spectrum

3.1. Strategic pathways

In Chapter 1, we established the need to actively shape the emergent properties of the metaverse. In Chapter 2, we explored both the practical applications of the Citiverse Initiative and the Dynamic Policy Maturity Benchmark Model, a key tool in shaping that process. Now, in Chapter 3, we zoom out to the global landscape.

This chapter examines the diverse readiness levels and strategic pathways of different countries and regions. We use the Inclusive Metaverse Index (IMI) as a lens to understand the broad spectrum of starting conditions. Then, through deep dives into the strategies of the EU and the UN's Economic and Social Commission for Western Asia (ESCWA), we analyse how different approaches to governance and innovation reflect the core tensions and potential solutions discussed in previous chapters.

> This vision is vastly ambitious, and perhaps utopian. But the overarching vision for the Metaverse does not need to be realised, perhaps ever, for many of its transformational impacts to make themselves felt. (ESCWA, 2024)

This sentiment resonates with a key theme of Action Point 38 in the UN 2.0 Pact for the Future: the transformation of global governance. At the centre of this pledge of action lies a commitment to improving and strengthening the multilateral system, with the UN at its core. This will enable developing countries and stakeholders to participate meaningfully in this system. The Pact highlights the need for effectiveness, inclusivity, and interconnectedness in multilateralism (UN, 2024b). The GDC further clarifies the role of technology as an enabler of this ambitious transformation.

3.2. A spectrum of readiness

Every country begins this transformation from a different starting point and with different SDG priorities, some in cities, others in more rural areas. This diversity was evident at UN Virtual Worlds Day 2024, where speakers shared insights into a wide range of infrastructural readiness and specific national needs. For example, Dubai, a rapidly growing city with a highly diverse international population, emphasised using the metaverse to stay connected with family and cultural roots. Tanzania, in contrast, has a predominantly rural population spread across vast distances. Its strategy prioritises using virtual worlds to provide access to essential education, healthcare, and governmental services, bridging critical physical divides (ITU, 2024l).

This diversity raises the question: how can unique national strategies be coordinated into a global, interconnected ecosystem? The answer lies in two complementary 21st-century tools that address both a nation's internal process and its external alignment. The first is the Dynamic Policy Maturity Benchmark Model. This is the engine and steering wheel; the internal adaptive process a country uses to develop its own governance capabilities over time. It allows for a customised, iterative transformation journey.

However, the engine is most effective when guided by a map. For global coordination, a common understanding of the landscape is essential. For this purpose, we need a second tool, a framework to assess readiness and guide strategy across nations. This is the role of the Inclusive Metaverse Index (IMI).

3.3. The Inclusive Metaverse Index

The Inclusive Metaverse Index (IMI), developed by Economist Impact, provides a comprehensive overview—a map—of the factors required to build a thriving and equitable metaverse ecosystem. The IMI addresses the core challenge of global digital development.

As Samuel Ng, Chief Digital Officer at the United Nations Development Coordination Office (UNDG), explained:

> When working with a group of countries across the income spectrum, we need to take the lowest common denominator when considering the development of metaverse capabilities, as advanced economies are likely to have stronger baseline technological infrastructures than countries at the lower end of the development spectrum. (Economist Impact, 2023)

3.3.1. Access and engagement

The IMI is designed as a practical benchmarking tool. It helps countries translate their visions into reality. Access and engagement are the fundamental pillars of this framework. Access refers to the availability and affordability of the fundamental infrastructure needed to participate in the metaverse. Engagement concerns the readiness and ability of individuals and organisations to participate meaningfully.

Figure 5 **The Inclusive Metaverses Index infographic (Economist Impact, 2023).**

These pillars are linked in a crucial feedback loop. While access is a prerequisite for engagement, it is meaningful engagement that ultimately drives the demand for greater access and infrastructure. This reframes the classic chicken-and-egg dilemma as a self-reinforcing cycle needed for growth, in which both elements must evolve in tandem. The cycle is designed to trigger a powerful network effect: the more people use a service, the higher its value. Understanding this dynamic is essential for policymakers and businesses, as early momentum often leads to sustained market leadership. It echoes the business insight that once you are ahead, you stay ahead.

3.3.2. Success beyond metrics

While the IMI provides a valuable framework for measuring readiness, its funding and authorship remind us of the fundamental question at the heart of this book: who gets to define success? The danger of our current social contract is that it allows the technical body, mainly represented by industry, to dictate the metrics of success, often prioritising engagement and adoption at the expense of a more holistic, human-centred approach. The UN 2.0 initiative and its Pact

for the Future seek to correct this imbalance. They call for a renewed social contract in which success is measured not just by technical or commercial progress, but by its contribution to human rights and sustainable development.

This book proposes that success should be measured by achieving a dynamic equilibrium between three competing value systems: the technical body's drive for functionality, the social body's need for safety and legality, and the physical body's ultimate claim to well-being and trust. Sustainable innovation, as envisioned by the UN 2.0 process, emerges when these three forces are held in a productive tension, steering development towards outcomes that benefit humanity as a whole.

3.4. Three models of metaverse development

Knowing the drivers of change is vital for ensuring an inclusive ecosystem, as technological transformation rarely begins on the state's drawing board. A technical report from ITU's Focus Group on Metaverse (FG-MV) identifies three primary models shaping the global landscape (ITU, 2023b).

3.4.1. State-led and centralised

In this model, the government takes the primary role in directing development. China exemplifies this approach. Its centralised planning targets investments in industrial applications and smart city integration, with the explicit goal of establishing a globally competitive metaverse-related industry by 2025.

3.4.2. Industry-driven and decentralised

This model relies on the private sector to lead innovation, with the state playing a supporting or regulatory role. In Germany,

development is heavily industry-driven. With no official national metaverse strategy, industrial giants like Siemens are investing significant resources in building an industrial metaverse, aligning with the nation's strong industrial base and its goal of maintaining a technological edge.

The USA follows a similar path. Home to many of the world's leading metaverse hardware and software producers, its strategy focuses on establishing international standards for emerging technologies rather than on a single national plan. Such standards leverage the strengths of its tech sector and promote innovation and competitiveness.

3.4.3. The public-private hybrid collaboration

This model, the most common, blends government vision with private-sector agility. It involves strategic public investment and partnerships to guide development towards national goals. The European Union is a key example, having launched a proactive, value-driven strategy on virtual worlds and Web 4.0. It uses foresight and stakeholder engagement to shape the landscape, aiming to protect fundamental rights while establishing the EU as a leading market.

In East Asia, nations are aggressively pursuing this model. The Republic of Korea is investing heavily to become a top-five metaverse leader, while Japan is exploring social and economic opportunities through government study groups and private initiatives. Indonesia is fostering public-private partnerships to boost its digital economy. In West Asia, the metaverse is being integrated into ambitious national diversification plans. The United Arab Emirates (UAE) is promoting initiatives across the digital economy, social services, and healthcare. Saudi Arabia is strategically investing in gaming and smart cities to align with its Vision 2030 programme, most prominently through the NEOM project.

This comparative overview sets the stage for a closer examination of how these models operate in practice. For this purpose, we take a deep dive into the strategies of two major economic and political regions: the EU and ESCWA.

3.5. Deep dive: The EU strategy

The European Union was one of the first regions to formalise its approach, launching its Initiative on Web 4.0 and Virtual Worlds in July 2023. The strategy is proactive and value-driven, aiming to actively guide the transition towards an open, secure, trustworthy, and inclusive digital environment for all its citizens, businesses, and public administrations (European Commission, 2023).

3.5.1. Foundation and pillars

Building on its 2030 Digital Decade agenda and an extensive public consultation, the EU structures its strategy around four key pillars.

- Empowering people: Fostering digital skills, awareness, and access to reliable information.
- Supporting businesses: Developing a competitive European Web 4.0 and industrial ecosystem.
- Promoting societal progress: Leveraging virtual worlds to enhance public services and civic engagement.
- Ensuring open governance: Steering towards open, interoperable, and inclusive standards for virtual worlds.

The entire strategy rests on a crucial foundation: connectivity and cloud infrastructure, reinforcing the EU's existing goals for a secure, accessible, and resilient digital backbone capable of supporting virtual worlds (European Commission, n.d.).

3.5.2. A mature governance model in action

This structured approach aligns with the core principles discussed in this book. The EU's method of foresight, stakeholder consultation, and policy adaptation is a powerful, real-world example of the Policy Adaptation Loop detailed in Chapter 2, demonstrating a high level of governance maturity.

Furthermore, the strategy aligns closely with the Inclusive Metaverse Index (IMI). The foundational focus on the Digital Decade agenda directly addresses the IMI's access pillar. The four main pillars, in turn, are designed to foster engagement among citizens, industry, and public services, creating the conditions for a virtuous cycle of adoption and innovation.

3.5.3. Navigating uncertainty

Like other global actors, the EU acknowledges the inherent uncertainty of this technological shift. Drawing lessons from the rise of AI and social media, Isabelle Hupont of the Joint Research Centre, European Commission, emphasised during the first UN Virtual Worlds Day the essential role of close monitoring and proactive governance (ITU, 2024l).

A recent Commission report on virtual worlds outlines three possible scenarios (European Commission, 2024):

1. Community-owned: Key infrastructure and applications are open and collectively administered.
2. Corporate-owned: Infrastructure and applications are closed and controlled by private companies.
3. Hybrid: A combination of community and corporate ownership models.

Recognising that the current landscape is predominantly corporate-owned, the report echoes a key theme from UN Virtual Worlds Day: to avoid a future dominated by a few private gatekeepers, proactive public sector involvement is essential to shape the development of virtual worlds towards a more open, fair, and hybrid model.

3.6. Deep dive: The ESCWA strategy

Like the EU, the UN's Economic and Social Commission for Western Asia (ESCWA) is actively shaping its regional approach to the metaverse. The Metaverse and the Arab Region's Future report analyses the metaverse as part of a broader megatrend, a strategic force with profound and interconnected impacts across all sectors of society (ESCWA, 2024).

3.6.1. The guiding philosophy: Shaping emergence

The ESCWA strategy stands out for its core philosophy, which embraces uncertainty and focuses on the process of development itself. The report captures this perspective perfectly:

> This vision is vastly ambitious and perhaps utopian. But the overarching vision for the Metaverse does not need to be realised—perhaps ever—for many of its transformational impacts to make themselves felt (ESCWA, 2024).

This statement reframes the metaverse not as a fixed destination, but as a North Star —an orientation point for a journey of transformation, with its actual value found in the innovation and growth that occur along the way.

This philosophy is a direct, real-world application of the concept of emergence discussed in Chapter 1. By prioritising the transformative

impact of the journey, ESCWA is choosing to shape the process skilfully rather than attempting to control a predetermined outcome rigidly. Success, therefore, is measured by growth and positive change, not solely by the achievement of a final goal.

3.6.2. Three strategic pathways

Guided by this philosophy, the ESCWA report (2024) outlines three distinct but interconnected pathways for advancing the metaverse in Arab countries.

An engine for economic transformation: This pathway presents the metaverse as a driver of industrial diversification and employment. By developing the entire value chain, from infrastructure to applications, the goal is to create a significant new workforce, address pressing employment needs, and secure long-term, sustainable economic growth. It represents a strategic move to diversify Arab economies for a post-fossil fuel future.

A tool for societal well-being: In this pathway, the metaverse is advanced as a key component of strategies to enhance societal well-being. The focus is on enhancing critical public services across five key dimensions: education, health, climate, culture, and government. ESCWA's detailed policy recommendations encourage a coordinated approach, urging governments to support SMEs, strengthen cybersecurity, align funding with green finance, and deploy immersive VR to enhance education, climate awareness, and cultural preservation.

A catalyst for new global influence: This third pathway presents the metaverse as a catalyst for new forms of Arab influence in the next global era. It reflects a strong ambition for the region to become a first mover in the digital economy, shaping the emerging rules and governance of this new frontier. By creating and leading in a new

virtual territory, Arab nations can overcome geographical limitations and secure a key role on the global stage.

3.6.3. A focus on ESCWA's policy guidance.

During UN Virtual Worlds Day, Mounir Tabet of ESCWA emphasised the crucial role the public sector must play in shaping an inclusive metaverse, noting that countries such as the UAE, Saudi Arabia, and Egypt are already leading with innovative public service applications (ITU, 2024k).

To guide this process, Tabet (2024) presented ESCWA's public policy recommendations which stress a coordinated approach across policy, investment, and technology. Key highlights include:

- For policymakers, supporting metaverse-related SMEs, improving digital diplomacy, and strengthening cybersecurity frameworks are key priorities.
- For investment, align funding with green finance (e.g., using digital twins for energy management) and upgrade infrastructure to 5G/6G with financial incentives.
- For technology, invest in sustainable edge computing, research the health impacts of prolonged VR use, and apply immersive technologies to enhance education, climate awareness, and cultural preservation.

Together, these recommendations provide a holistic toolkit for governments to shape an inclusive and beneficial metaverse for the region proactively.

3.7. Diverse histories, divergent futures?

The deep dives into the EU and ESCWA strategies reveal how each region approaches digital transformation from a profoundly different

perspective. European nations may see the metaverse as an extension of their existing digital and physical infrastructure. For many Arab countries, however, it represents an opportunity to create a valuable new virtual space, unconstrained by the limitations of physical geography or industrial history.

This divergence is rooted in history. The Industrial Revolution shaped Europe's economic and governance landscape. The Arab region, having largely bypassed that era and having been shaped by a history of colonisation, is now urged by experts not to miss the Fourth Industrial Revolution (Belhaj & Arezki, 2019). This historic background gives the region a unique approach to the metaverse, one that is less burdened by legacy systems and is freer to leapfrog directly into next-generation models.

These different starting points—careful evolution and potential revolution—are what make the global conversation so vital. The challenge, as acknowledged in the UN's Declaration on Future Generations (UN, 2024b), is to learn from all our pasts in order to build a more sustainable and just digital future. The question is not which path is correct, but how these diverse strategies can eventually interconnect to create a metaverse that is truly global and shared.

3.8. Conclusion: The philosophy of change

Chapter 3 has mapped the diverse global landscape of metaverse readiness and strategy. The Inclusive Metaverse Index provides a crucial tool for benchmarking these starting conditions. At the same time, the pathways of the EU and ESCWA reveal that there is no single *correct* approach to building the future.

Yet, beneath these differences lie unifying principles. The EU's proactive strategy is a mature execution of the Policy Adaptation

Loop introduced in Chapter 2. ESCWA's journey-as-the-reward philosophy is a powerful, real-world embrace of the need to shape emergence, the core theme from Chapter 1. Both prioritise solving real-world challenges in areas such as education, health, and climate, echoing the tangible, needs-driven applications of the Citiverse.

Ultimately, this chapter shows that the essential toolkit for a sustainable digital transformation remains constant despite different pathways. The toolkit consists of three parts: practical applications to provide real-world value, adaptive governance to navigate uncertainty, and a guiding philosophy that prioritises the journey of shaping our shared future.

Chapter 4 · The SDGs

The SDGs as boundaries for an emerging metaverse

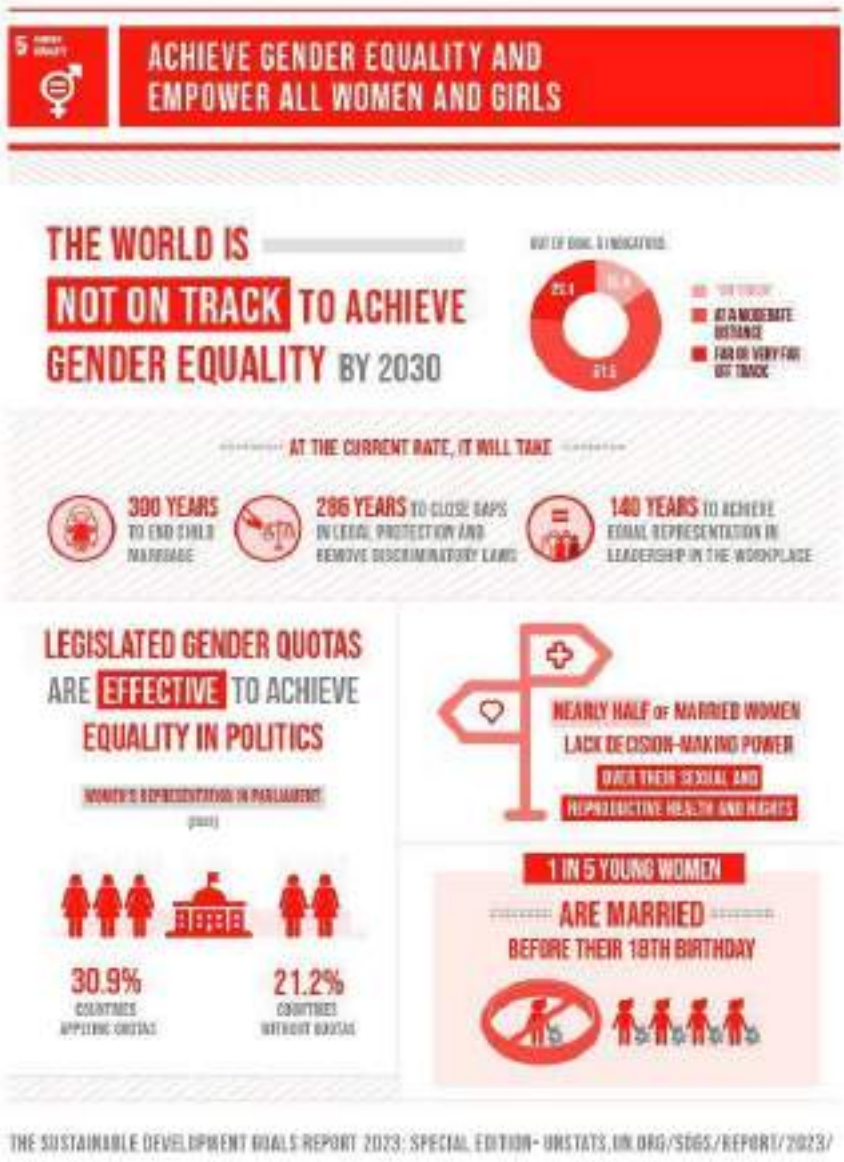
Chapter 4 The SDGs

4.1. The SDG imperative

A decade after the adoption of the SDGs, the ambitious goals of the 2030 Agenda for Sustainable Development (UN, 2015) are dangerously off track (UN, 2025). This reality has led to the UN's urgent call for new, 21st-century tools powerful enough to break through our global challenges and accelerate progress towards the SDGs. The metaverse is envisioned as one such potential accelerator.

Let us take a concrete example: gender equality (SDG 5). Projections indicate that it will still take nearly 300 years to end child marriage and to close gender gaps in legal protection. Gender inequality is not simply a policy problem; it is an issue deeply embedded in social, economic, and cultural structures. Metaverse technologies offer new tools, from immersive experiences designed to build empathy to virtual platforms that deliver essential services for women and girls. However, like most tools, they are double-edged: we can use them for better or for worse.

The key question, therefore, is how we can accelerate progress without simultaneously accelerating the challenges, especially when dealing with unpredictable emerging technologies. The answer lies in the Quintet of Change.



THE SUSTAINABLE DEVELOPMENT GOALS REPORT 2023: SPECIAL EDITION - UNSTATS.UN.ORG/SDGS/REPORT/2023/

Figure 6 **SDG 5: Achieving gender equality (UN, 2023a).**

4.2. Acceleration

UN 2.0 emphasises the need to accelerate progress towards the SDGs, consequently framing pace and scale as a solution. While technology is one of the key accelerators, the 21st-century Quintet of Change encompasses a far more comprehensive set of factors than technology alone.

The explicit goal of UN 2.0 is to establish a forward-looking culture by incorporating futures literacy (FL) into its approach. FL is the capability to use the future to manage complexity. It is the skill to anticipate change and to reveal and internalise a fundamental understanding of the systems we are trying to govern. In FL, the term 'acceleration' is redefined not as a measure of speed but as a measure of consciousness. This more profound meaning of acceleration requires a fundamental mindset shift, which is precisely what UN 2.0 embodies.

The Quintet of Change serves as the practical 21st-century toolkit for this new mindset, embedding foresight and innovation directly into governance. The new awareness, or accelerated consciousness, is then put into action through initiatives such as the GDC and frameworks, such as the Dynamic Policy Maturity Benchmark Model (see Chapter 2), which aim to embed ethics and governance into the fabric of development proactively. The ultimate goal is to replace a reactive race against time with a collaborative effort to harness technology as its implications unfold. This accelerated human consciousness is the prerequisite for developing more mature and effective systemic agency..

4.3. From consciousness to agency

Consciousness is a delicate term. In current AI discussions, it is often misused in the narrative of an emerging sentient superintelligence, mainly as a rhetorical tool to justify undisturbed AI development under the promise of god-like abilities to solve humanity's problems. This confusion is exacerbated by the narrative of 'autonomous AI agents', which blurs the distinction between a machine's capabilities and genuine awareness.

To counter such myths with a more rigorous framework, this book explores a different concept: systemic agency. Drawing inspiration from systems theory and AI, we define an agent as any entity that can perceive its environment, process information, and act upon that environment to achieve goals (Russell & Norvig, 2022). Crucially, this definition is not about sentience. An agent does not need to feel or have subjective experiences. It only needs to be a self-regulating system that is aware of its own processes and its relationship to the world it governs. This chapter argues that our largest institutions—such as law and medicine—are powerful, non-sentient agents.

Take the legal system, for example. We have long moved past the mythical personification of Justicia. Nonetheless, a legal system fulfils the definition of an agent. It is a system consisting of different parts such as legislation, judication and the people it governs. It perceives data from its environment: the legal system constantly takes in information from its surroundings. This happens through legal disputes, which serve as real-world feedback loops. A lawsuit, for instance, provides data about how laws are interpreted, applied, and challenged by society. Changes in social norms, new technologies, or global events also act as environmental data that the system must process.

A legal system also receives data from its internal state: it is aware of its own processes and functioning. For example, a court's ruling becomes part of the system's internal data, shaping future decisions through precedent or legislative change. When a law is found to be unconstitutional, it represents internal self-correction, showing that the system is aware of its own effectiveness and limitations. The example of the legal system clearly decouples the idea of systemic operation from sentience, feelings, or personification.

The legal system is a self-regulating system that is aware of its own rules, how they are applied, and their effects on the world it governs, without needing to feel anything. A systemic agent's maturity can be measured by its capacity to evolve from reactive rule-making into a reflective, anticipatory system. This redefines acceleration as a measure of the agent's ability to anticipate change, rather than simply a matter of speed.

4.3.1. Sentient actor and systemic agent

The distinction between the systemic agent and the sentient actor is crucial, especially if we do not want to fall back on the mythical personification and worship of a multitude of gods and goddesses in light of technological progress. A more relatable example than the legal system is the medical field

The systemic agent of medicine is the entire collective body of knowledge, ethics, procedures, and shared experience. It is an emergent property of the people and technology within the system. A sentient actor, such as a doctor, is an individual who experiences feelings. Their sentience is the foundation for empathy, which allows them to apply the systemic agent's knowledge to a patient's unique, individual experience. Empathy is vital because it takes another person's suffering seriously. The systemic agent learns from this sentience.

When the system collectively acknowledges an individual's suffering, it becomes an established part of the agent's operational knowledge. This process transforms an individual's empathetic insight into a shared, scientific understanding. For example, pancreatic cancer is widely recognised as a cause of severe pain. A patient's report of agony is not questioned; it is accepted as a medical fact, and pain management is an immediate priority. This shared understanding allows the medical system to be proactive and effective. The individual suffering has been integrated into the operational knowledge of the medical agent.

Conversely, consider menstrual pain. For centuries, individual accounts of severe pain (dysmenorrhoea) were often dismissed or downplayed by the medical system (Wiggleton-Little, 2024). Because individual suffering was not collectively acknowledged, the systemic agent failed to learn from it. Its programming remained flawed, leading it to act in ways that caused profound injustice—denying patients adequate treatment or telling them their pain was psychosomatic.

This highlights the difference between an individual's empathetic insight (a doctor acknowledging a patient's pain) and the systematic agent's operational knowledge (the medical community recognising that pain is a valid and treatable condition). An agent's effectiveness depends on what it has collectively accepted as truth. This collective acceptance allows a governance system to be more proactive and effective, translating the accelerated human consciousness described earlier into mature systemic agency.

This form of collective intelligence is not mystical; it is an emergent property that arises from the culture and capabilities of the people within the system. It is built through practical experience and tools,

such as the UN's SDGs, which create a shared understanding and guide the agent's actions.

4.3.2. The SDGs as boundaries

For a complex agent like the global community to act coherently, it needs a shared set of goals. Before, the SDGs lacked a unified map for their challenges. The 17 goals provide this map, creating a shared mental model and a common language for progress. They force leaders to engage in systems thinking—recognising that poverty, climate, and justice are all interconnected. In this way, the SDGs are a tool for building a more cohesive global agency, aligning the actions of countless smaller actors toward a collective mission.

A clear expression of this maturing agency is the setting of boundaries. A boundary is a declaration of identity and operational rules. When the European Union passed its AI Act, it demonstrated this perfectly. The EU agent perceived the potential risks and opportunities of AI, processed them through its legislative bodies, and acted by creating an intelligent boundary, defining what kind of technology it will and will not accept. This act of distinguishing between acceptable and unacceptable risk is a profound demonstration of a system's capacity for self-regulation. It marks the transition of an agent from being a passive environment for technology to an active participant in shaping its own future.

4.4. Case study: A real impact or opportunity

To understand why proactive governance of emerging technologies is so critical, we only need to look at the weaponisation of synthetic media, or deepfakes. A deepfake is a manipulated or synthetic audio or visual medium that has been convincingly altered to misrepresent a person and deceive the media consumer. In a deepfake, the person

appears to be doing or saying something that they did not actually do or say.

Deepfakes are not a new phenomenon; they have been around for some time. A striking example is Nobel laureate Albert Einstein, who has been resurrected multiple times. We can find him as a humanoid robot, a digital twin, and a digital human. In some cases, his resurrection is a celebration of his legacy (ETH, 2025). In others, he serves as a promotional ambassador (e.g., Smart meters, 2025) or as a form of entertainment (Hancock, 2025). A deepfake is created when someone's legacy is mixed with external input; that is, when they are made to do or say something they never actually did.

Deepfakes are not only used to resurrect the dead and immortalise their legacy (with or without consent). A 2019 study found that between 90% and 95% of all deepfakes involve non-consensual pornography, with 90% targeting women (STOA, 2021). Such non-consensual deepfakes constitute a massive violation of personal and social integrity, sometimes even leading to suicide as a consequence of the humiliation and reputational damage caused (BBC, 2022), or to sextortion (FBI, 2024). Deepfakes do not merely push technological limits; they also destroy the boundaries of trust and safety that make social life possible.

A study by the Scientific Foresight Unit (STOA) of the European Parliamentary Research Service (EPRS) shows how a single deepfake's impact can trigger a chain reaction of harm across different levels. The effects typically begin with the individual, directly targeting and harming a specific person. This can then escalate, affecting a group or organisation associated with that individual. Ultimately, the cumulative effect of these deepfakes, or even the mere knowledge of their existence, can cause severe societal harm (STOA, 2021).

If pictures and videos alone can have such an impact, what will happen when we can literally step into someone else's skin? The metaverse represents a more immersive form of communication, a digital convergence with the physical (biological) world, forming a new ecosystem. What boundaries do deepfakes push? Are they merely expanding the limits of what is technologically possible, or are they encroaching on the very boundaries that make human social life possible?

4.5. Defining the boundaries with the GDC

The horrifying reality of deepfakes underscores the urgent need for a robust framework. The GDC, as part of UN 2.0, is designed to be this framework. It establishes the essential boundaries for digital technologies by cohesively integrating human rights, digital literacy, data governance, and international cooperation.

The GDC provides a multilayered defence, directly reinforcing the SDGs:

- Human rights (SDG 16): It champions a safe and secure digital environment, safeguarding individuals from malicious content.
- Digital literacy (SDG 4): It calls for empowering users with the critical skills to identify and resist digital manipulation.
- Accountability (SDG 16): It advocates responsible data governance and clear accountability for platforms that host harmful content.
- Mental health (SDG 3): It provides a framework for supporting the well-being of those harmed by online abuse.
- Partnerships (SDG 17): It recognises that these global challenges require collaboration between governments, the private sector, and civil society.

In essence, the GDC translates the abstract concept of boundaries into a concrete and actionable social contract, ensuring that all stakeholders share the responsibility for a safe digital future.

4.6. Focus on use cases for the SDGs

The UN Executive Briefing on Unlocking the Potential of Virtual Worlds and the Metaverse for the Sustainable Development Goals features numerous case studies from stakeholders illustrating current opportunities and challenges (ITU, 2024j). An analysis of these initiatives reveals a clear pattern.

The following visualisation shows that while many initiatives focus on valuable awareness and education campaigns, their direct, short-term impact on SDG targets can be difficult to measure. In contrast, once an initiative shifts towards applications such as training and simulation (e.g. complex medical procedures), or digital twins (e.g. urban planning and climate modelling), its impact becomes significantly more tangible and concrete.

This pattern underscores a key point: to achieve measurable progress on the SDGs, metaverse initiatives need to evolve beyond raising awareness and embrace applications that directly inform policy and action.

	Case Study / Use Case	Impact	Main Focus	(Potentially) Overlapping Focus
SDG 1	Favela X, the Roblox game: Experience life in favela	Opportunity	Awareness & Education	(Training & Simulation)
SDG 2	E-Geos' AgriGeo Platform: Satellite-based precision agriculture system	Concrete	Training & Simulation	Digital twin & Operational
SDG 3	VR and AR Surgery for Conjoined (Human) Twins	Concrete	Training & Simulation	Digital twin & Operational
SDG 4	Novartis VR Training Simulation for pharmaceutical manufacturing skills	Concrete	Training & Simulation	(Awareness & Education)
SDG 5	Zero Tolerance for Harassment VR Training (TCILO Project in Garment Factories)	Concrete	Training & Simulation	Awareness & Education
SDG 6	ULTIMATE Project's AR Water Sustainability: Water Management in a fictional environment	Opportunity (debatable)	Awareness & Education	(Digital twin & Operational)
SDG 7	VR Wind Turbine Training Simulations by Siemens	Concrete	Training & Simulation	(Digital twin & Operational)
SDG 8	VR Training for Skilled Trades (e.g. plumbing, electric work)	Concrete	Training & Simulation	(Digital twin & Operational)
SDG 9	Renault Group Industrial Metaverse as real-time digital twin ecosystem for manufacturing	Concrete	Digital twin & Operational	(Training & Simulation)
SDG 10	The Machine To Be Another (EVR system): First-person body-swap VR scenario to experience perspective shifting	Opportunity	Awareness & Education	(Training & Simulation)
SDG 11	Metaverse Seoul: Urban planning, citizen engagement and government service with Digital twins	Opportunity (debatable)	Digital twin & Operational	(Awareness & Education)
SDG 12	H&M's Looptopia Gaming Experience on Roblox for Circular Economy	Opportunity	Awareness & Education	(Training & Simulation)
SDG 13	UN VR Carbon Footprint Experience by UNEP	Opportunity	Awareness & Education	(Training & Simulation)
SDG 14	Hydrous Immersive Underwater Expeditions for ocean preservation	Opportunity	Awareness & Education	(Training & Simulation)
SDG 15	WWF Free Rivers AR Experience: protecting ecosystems	Opportunity	Awareness & Education	(Digital twin & Operational)
SDG 16	Court Hearing in the Metaverse in Columbia to allow location independent participation	Concrete (debatable)	Access & Participation	(Digital twin & Operational)
SDG 17	UN Virtual Worlds Day as platform for multi-stakeholder collaboration	Concrete	Access & Participation	(Digital twin & Operational)

Figure 7 **An analytical overview of how metaverse technologies contribute to each of the SDGs.**

4.7. Conclusion: Shaping emergence

This chapter demonstrates that the SDGs are not merely aspirations or use cases for the metaverse. They are the essential ethical, human rights-based, and technological boundaries for its responsible evolution. Treating the SDGs as fundamental limits ensures that metaverse technologies serve society, protecting human dignity and mitigating systemic inequalities rather than amplifying them. The

GDC provides the crucial socio-technical contract for implementing these boundaries, guiding our digital evolution even in the face of unknown risks.

The proactive approach, defining SDG-aligned boundaries from the outset, turns the development of the metaverse into a massive exercise in foresight. It allows us to manage its emergence by anticipating and addressing risks before they become entrenched. We have redefined how to accelerate progress towards the SDGs. Instead of an (impossible) race against time, UN 2.0 is about the acceleration of our consciousness: our ability as a collective to understand the systems we are building, ensure their positive purpose, and remain human agents of change.

Chapter 5 · Legal crises

From failure to confidence

Chapter 5 Legal crises

5.1. A broken loop at the heart of the crisis

The discipline of law operates as a self-referencing system, one that defines its reality through internal logic and history. A legal knowledge-building loop lies at the core of the system, where the daily application of legal practice constantly refines legal theory. In essence, the loop is the mechanism that accelerates the law's agency—its ability to understand and adapt to the world—as we unveiled in Chapter 4. Legal professionals and, in some cases, non-expert juries, are the ones who update this system. When they reach a verdict based on their human experience, they are acting as conduits, channelling their shared human consciousness and empathetic capacity into the system's formal, legal outcomes.

The central argument of this analysis is that today's legal crisis stems from a dangerous disconnection: a fundamental break in that very knowledge-building loop. This break prevents us from adapting our shared consciousness and, ultimately, our social contract to technological progress. The prominent claim that the law is 'lagging' is, in fact, only a symptom of this crisis. In other words, we are confusing a symptom for the cause. In this chapter, we explore the symptoms, the cause, and a possible solution for our broken system.

5.2. Diagnosing the symptoms

The legal system's failure to adapt to our new technological reality is a collection of interconnected crises. As we will explore, the visible symptom of lagging is merely the outward sign of a deeper breakdown. Therefore, we take a closer look at the evidence of this dysfunction: from a paralysing regulatory paradox to a catastrophic

collapse of consequences, and, finally, to the system's inability to comprehend new forms of real, embodied harm.

5.2.1. Dysfunctional, not lagging

The legal world often faces blame and the looming threat of technological disruption. The sentiment is so common that during the UN Virtual Worlds Day, a lawyer from the Open & Agile Smart Cities (OASC) introduced himself by saying, 'I am a lawyer. Apologies for that' (ITU, 2024l). This apology hints at a deeper, more complex problem beyond the common criticism of lagging behind technology. Much of the virtual world is already regulated, but the sheer volume and complexity of these rules are overwhelming. At the city and community levels, no one knows how to navigate these regulations. As a result, they tend to ignore them and simply do whatever they believe is best (Karl-Filip Coenegrachts, OASC, ITU 2024l).

This situation traps policymakers and innovators in a classic double bind, also known as Catch-22—a dysfunctional paradox of too much and too little regulation simultaneously. On one hand, innovators are expected to comply with an incomprehensible body of existing laws. On the other hand, they must act responsibly in a new domain where no clear rules exist. Since any choice, cautious paralysis or bold innovation risks failure, the rational response is often to ignore the contradictory framework altogether. When even legal experts cannot escape this double bind, the system faces a profound crisis of confidence. The resulting ignorance is not just a practical problem; it erodes trust in our legal, social, and regulatory systems.

5.2.2. A system's collapse

When legal rules have no practical effect, trust in the legal system erodes, and ultimately, it leads to the system's collapse. In the case of internet governance, the digital space, we are more likely to face a void than a collapse. At the UN event, the Interpol's Executive Director

of Technology and Innovation, Madan M. Oberoi, provided a shocking statistic to illustrate the state of cybercrime enforcement: only 0.33% of all cases end in conviction.

This figure represents a catastrophic failure of the theory-practice loop. It means the law's model of consequences is almost entirely disconnected from the reality of cyberspace. The loop is spinning on its own, giving criminals a 99.7% confidence level that they will face no penalty. The 99.7% does not even account for the vast landscape of harmful acts that are not yet classified as crimes, but which cause immense personal and social damage (ITU, 2024m). We are facing a legal void.

5.2.3. When virtual harm inflicts real trauma

According to Interpol, harassment and abuse are the primary security threats in the metaverse, amplified by the well-known online disinhibition effect. Due to a sense of anonymity and reduced social consequences, people behave differently in online interaction than in face-to-face situations (ITU, 2024m). The effect can be benign, helping reserved people to open up or toxic if it leads to cyberbullying, harassment or even virtual rape. Cases of virtual sexual assault are not isolated incidents; they represent a systemic failure where real, embodied harm is being inflicted on a massive scale.

This failure becomes most acute when confronting the law's outdated operating model. The system's historical loop is built on a theory of physical violation. It struggles to comprehend the trauma of a virtual sexual assault, an act that, while not physically violent, constitutes a profound violation of a person's integrity. As Fabio Maggiore, head of Cybersecurity Governance at UNICC, confirms, the resulting trauma can be equivalent to that of a physical assault (ITU, 2024m).

To understand the impact, one must grasp the psychological concepts of presence and embodiment. In immersive VR, our brains suspend disbelief, allowing us to feel present in the virtual world and embodied in our avatars. Our sensory and emotional reactions are genuine. As technology becomes better and more convincing to our brains, that immersion has consequences that we may not realise, warns Jaimee Stuart of the United Nations University (ITU, 2024m).

The law's theory has not kept pace with this new, embodied reality. While the immersive effect can be used for positive applications such as the SDGs (Chapter 4), its weaponisation in the form of virtual abuse leaves victims without recourse and trust in our legal system is lost. Such examples highlight an urgent need to replace the legal void with enforceable consequences, re-establishing trust in a system whose model of reality is dangerously out of date.

5.3. A paradigm shift in reality as the root cause

This disconnect between law and reality is widening as technology makes a fundamental leap from simple animation to physics-based, autonomous simulation. According to Brent Milsuch from Inverse, the groundbreaking nature of this shift has been widely misinterpreted or ignored. Leading tech companies no longer focus on animation; they are building simulations. As Milsuch has stated, the change is fundamental, and its consequences are imminent.

> What truly makes it groundbreaking is that it's not about animation; it's about physics. [...] A deepfake will be part of our lives regardless of who or where we are. It is just near reality now. (ITU, 2024m)

This shift to physics-based simulation means a behavioural avatar is no longer a predictable script; it is a learning, adaptive entity driven by

its own underlying AI. These avatars can exhibit complex behaviours and learn from human users, creating profound risks of manipulation, not just through the avatar but through the artificial environment itself.

The new reality makes the legal paradigms of the past dangerously obsolete. The critical mistake made over the past 30 years was to absolve platforms of responsibility, most notably through Section 230 of the 1996 Communications Decency Act in the USA (GovInfo, 2023). The legislation, designed to help jump-start the early web by providing platforms with immunity for user-generated content, effectively broke the feedback loop between technological practice and legal theory. This protection was instrumental in the growth of the internet, but it enabled the spread of harmful content, such as misinformation and hate speech (Bloomberg Law, 2020). It starved the legal system of the data and accountability needed to co-evolve.

In stark contrast, the European Union has moved towards greater platform responsibility. Landmark legislation such as the 2022 Digital Services Act (DSA) and the 2024 AI Act represents direct attempts to re-establish this loop by enforcing accountability (European Union, 2022; 2024). For instance, Article 5 of the AI Act explicitly prohibits harmful manipulation, deception, and the exploitation of vulnerabilities.

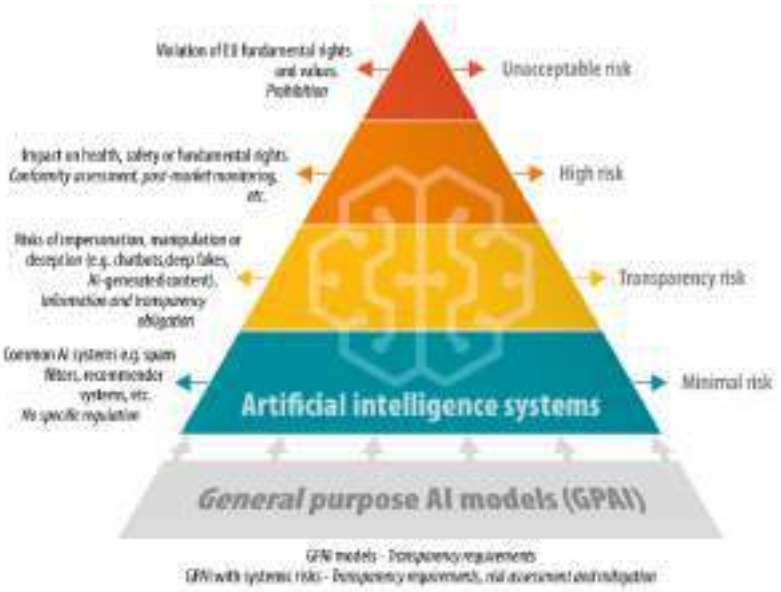


Figure 8 **The EU AI Act risk-based approach (European Union, 2024)**.

Despite these advances in legislation, the question remains: in a world of increasingly autonomous simulation, will even such progressive measures be sufficient to ensure the safe development and use of behavioural avatars, and of an adaptive virtual environment?

5.4. The solution: Rebuilding the loop

The rapid pace of technological change often leaves us in a state of confused paralysis, leading to a profound sense of uncertainty. While technologies such as AI have a more relatable, step-by-step evolution, the expansive vision of the metaverse is a massive exercise in foresight that often leaves us overwhelmed. Yet, this vision is not merely abstract; it reveals how our future might look and exposes the urgent need for a new approach to governance.

UN 2.0 aims to reduce the sense of uncertainty by fostering a forward-thinking culture that incorporates technology for the benefit

of all. The Global Initiative on Virtual Worlds and AI seeks to realise this vision by promoting virtual worlds that can be used safely and with confidence. But we need to build a forward-thinking culture on trust. The crucial question is: how can we re-establish trust in such a dysfunctional system?

5.4.1. The shift to implied confidence

To re-establish trust, we need to resolve the paralysing double bind, removing the schizophrenic conditions in our socio-technological relationship. Following theories of systemic change, the double bind cannot be solved at its own level of conflictual regulatory rules. The solution lies in moving the challenge to a higher level of logic, shifting our perception of it (Hoverstadt, 2022, p. 214). This book explores the UN Global Initiative on Virtual Worlds as a significant attempt to engineer such a perceptual shift.

The core of this initiative is a model focused on implied confidence, a concept foundational to our existing legal systems but representing a novel application in the virtual space. It seeks to replace lengthy terms of service with an unspoken agreement built on shared principles and transparent design.

5.4.2. A layered framework of trust

The framework represents a layered approach to repairing the broken loop between theory and practice. It was developed across three progressively detailed ITU technical reports and operates on a higher level of principle-based trust. The framework begins with an ethical foundation grounded in universal human rights and the SDGs. It introduces the user-implied contract of confidence, an unspoken agreement between users and platforms based on their actions and participation. The contract establishes trust through three core pillars: co-ownership (granting users control over their digital assets), co-responsibility (shared accountability), and transparency (clear

communication of risks). The framework treats co-creation not as an option but as a fundamental requirement for the deeply immersive metaverse environment.

The framework's application is contextual, recognising that the metaverse is not a single space and applies policy differently across distinct realms: the fully digital intra-metaverse; the hybrid peri-metaverse that bridges digital and physical worlds; and the extra-metaverse, which acknowledges the impact on people who may not even be online (ITU, 2024a).

The final layer is an operational model for security and safety. It extends beyond technical trust (privacy, security, IP) to encompass crucial human dimensions (safety, inclusion, well-being). Critically, it calls for defining personhood in the metaverse, treating digital identities and avatars as legal and ethical entities. This structure all culminates in a multistakeholder governance model that requires the active participation of platforms, users, and policymakers to function (ITU, 2024b).

5.4.3. A fork in the road: Two paths of governance

The implied confidence framework can be interpreted in two fundamentally different ways, presenting a fork in the road for the future of governance. One path is business as usual. This view sees the framework as a pragmatic acceptance of a tech-driven utopian vision, trusting in its vast potential while accepting the necessary harms along the way. It reflects the technocratic long-termism narrative often associated with AI development, which can prioritise speculative future gains over concrete, present-day risks. While this is also a move to a higher level of logic, its foundation is different.

Instead of grounding itself in the present-day dignity of real people, as the UN's approach does, its higher principle is the speculative welfare

of a distant, hypothetical future, creating a dangerous ethical calculus that can devalue and even justify present-day human harm. In April 2024, the University of Oxford closed the Future of Humanity Institute, which was dedicated to long-termism and the effective altruism movement (Bioethics Observatory, 2024).

The second path, viewed through the lens of UN 2.0, is a new model demanding co-creation. This approach aligns with the principles of events such as the AI Action Summit 2025, which emphasise rebalancing the risk topography by prioritising tangible, short-term harms (Kurbalija, 2025). It places the user at the forefront, highlighting that co-creation and co-responsibility are essential to restore the confidence needed to bring any metaverse vision to life. As we noted in Chapter 3, user engagement is vital for the entire ecosystem's development.

5.5. Conclusion: A mandate for the metaverse

This chapter's journey reveals a dual function of the metaverse: it is both a diagnostic tool for the present and a predictive model for the future. The effort to build it unveils the profound, pre-existing dysfunction in our governing frameworks. Simultaneously, it gives us the opportunity to foresee the dangerous trajectory this dysfunction is on, a path that might lead directly to a societal breaking point. This urgent foresight demands a new mandate for governance.

We have moved past the misleading narrative of a lagging legal system to expose a deeper, dysfunctional break in the feedback loop between practice and theory. The result is a crisis of confidence, where consequences have collapsed and real, virtualised trauma goes unrecognised. The proposed framework of implied confidence lays the foundation for a new culture of shared accountability. Its implementation calls for tech companies to pivot from

unaccountable growth to co-creative responsibility, for policymakers to shift from rigid rules to adaptive governance, and for users to transition from passive consumers into active stakeholders.

However, adopting this framework presents a critical choice, a fork in the road based on how confidence itself is interpreted. One path co-opts the language of trust to maintain business as usual: a technocratic vision that prioritises speculative future gains over concrete, present-day harms. The other path, the one this analysis endorses, is a genuine multistakeholder model that demands co-creation and places human dignity and safety at the forefront of innovation.

Choosing this second path sends an unmistakable signal: visionary plans for our digital future are built not on code, but on confidence. By making trust a non-negotiable prerequisite for innovation, it directly refutes the paradigm of unaccountable development that defined the early web. It reframes our crisis with clarity, suggesting that by clinging to a model from the last century, it is the tech industry that is, in fact, now lagging.

Chapter 6 · Governance

Escaping the loop

Chapter 6 Adaptive Governance

6.1. A race or a shared journey?

The previous chapter concluded by turning the familiar narrative of lagging law on its head, suggesting that it is the tech industry's governance model that is truly outdated. This ideological lag stems from a fundamental philosophical conflict: is technological development a race to be won or a shared journey to be navigated? This divide in thinking is apparent in the real world. When Mark Zuckerberg (Meta, 2021) framed the metaverse as Meta's new North Star, he created the narrative of a race to a tangible destination. In contrast, the philosophy guiding global bodies, such as the UN, suggests that these transformations are not a destination to be reached, but a journey to be collaboratively undertaken.

The critical question for governance, therefore, should not be 'how do we keep up?' but instead, 'how do we steer this journey together?' By clinging to the race mentality, we trap ourselves in the repetitive loop of governance failure, a dilemma perfectly captured in the classic 1993 film *Groundhog Day*. In the film, a cynical weatherman is forced to relive the same day over and over again. His predicament is a powerful metaphor for our collective struggle with technology governance. With each major innovation, from social media to generative AI, the legal world finds itself trapped in a frustrating loop, reacting to problems instead of shaping outcomes.

6.2. The classic diagnoses

To escape the loop, we take a closer look at the pattern behind our governance, which bears a striking resemblance to *Groundhog Day*. Already in the 1980s, David Collingridge exposed the script behind the

dilemma. The script describes two repeating acts of our collective tragedy.

6.2.1. A two-act tragedy

Act 1: The Promise
The curtain rises, and The Innovator takes the stage. Championing the race to a new frontier, they point to a tangible destination full of utopian promise. In this early stage, the technology is fluid and easy to steer, but its potential harms are still hypothetical. The Innovator argues that the destination is too important to be delayed by speculation, and their call for permissionless innovation prevails.

Act 2: The Consequence
Years pass. The technology is now deeply woven into our social and economic fabric. Its unintended consequences of polarisation, mental health crises and systemic risks are now undeniable. Now, The Global Steward, representing the call for a shared journey, enters the scene. They see the harms clearly, but their tools of governance are too slow and their calls for collaboration are too late. The Innovator's creation is so entrenched that any meaningful change is massively disruptive and costly. The Steward is, once again, left scrambling to draft laws for a world that has already moved on.

6.2.2. Emergence as the culprit

This two-act tragedy is better known as the Collingridge dilemma. The dilemma is a direct consequence of emergence: we cannot perfectly predict the outcomes of complex systems. However, for Collingridge, the solution was not to attempt better predictions. Instead, he argued that the only way to escape the loop was to preserve the controllability of technology throughout its lifecycle.

In essence, control is about 'retaining the ability to change a technology, even when it is fully developed' (Collingridge, 1980).

Despite this 40-year-old diagnosis, we are still trapped. In fact, with the advent of AI, we are reliving the same day, but at a faster pace than ever before. The loop is on overdrive.

6.3. A loop on overdrive

While the vision for the metaverse represents the overarching paradigm shift, the recent explosion in generative AI offers the most acute and accelerated case study of the resulting governance loop. As a key enabling technology for the metaverse, AI embodies the dilemma on overdrive: its pace is faster, its entrenchment more rapid, and its societal impact more immediate. Therefore, to understand the dynamics that will shape the entire metaverse ecosystem, we first analyse this loop operating under the maximum velocity of AI.

6.3.1. Temporal challenges

The Collingridge dilemma is fundamentally a problem of timing, and AI has shattered the traditional timescale of governance. An AI model's capabilities can evolve dramatically in months, while regulations and laws take years to debate, draft, and implement. This temporal mismatch is no longer a minor delay; it is a structural crisis that often renders governance obsolete upon arrival.

Furthermore, these systems are global by default. A single model developed in California can instantly shape the information ecosystems and social realities of billions of people worldwide. This transcends the jurisdiction of any single regulator, making effective national governance feel like a drop in the ocean.

6.3.2. Systemic constraints

Collingridge noted that the more a technology becomes integrated into society, the harder it is to change. Today, this is happening at an unprecedented speed. AI is not a peripheral gadget; it is rapidly

becoming foundational infrastructure in critical sectors such as healthcare, finance, and transportation. This deep entrenchment exponentially raises the stakes, making any subsequent attempt to steer or correct course seem catastrophically disruptive.

Simultaneously, intense global competition creates a systemic race to the bottom, echoing the race-to-a-destination narrative described earlier. Companies and nations feel immense pressure to prioritise rapid deployment over ethical considerations, lest they fall behind. This dynamic creates a powerful, self-reinforcing system that punishes caution and rewards speed, locking us into a path of escalating risk.

6.3.3. Ideological biases

These temporal and systemic forces create a near-perfect trap, making the Steward's job almost impossible. Even worse, however, is the powerful ideological narrative designed to sever the very feedback loop that Collingridge identified as the only means of escape. It is a narrative that reframes a complex engineering product as an unknowable, almost mystical entity.

6.4. The black box narrative

The narrative that severs the feedback loop and demands unaccountable innovation is the myth of the unknowable black box. To understand how this potent narrative works, we must first look at the scientific concept it distorts.

The idea originates in 19th-century physics with the thought experiment of Maxwell's Demon. The demon is a metaphorical agent. For our purposes, an agent is simply any entity that can perceive its environment and act on it. In this thought experiment, the demon perceives the speed of individual molecules and acts by opening or

closing a small gate. Maxwell's Demon is only a thought experiment, a 'conscious fiction' (Hoverstadt, 2022, p. 225) that uses information to create order from chaos. In the original scenario, the roles are clear. The controller is the demon's mind, and its simple rules are a known fiction. The system it controls is a chaotic gas of molecules, an unknown mystery to be understood. The purpose of this classic black box is rational inquiry: we control the inputs to deduce the system's rules. The goal is to turn mystery into knowledge.

6.4.1. The inversion of the black box

The modern AI black box flips this concept on its head, dangerously inverting the roles. The controller, AI's internal and complex decision-making process, is now presented as the unknowable mystery. At the same time, human society (the system) is treated as the observable, knowable environment to be acted upon.

The goal is no longer to understand the system, but to trust the controller. This inversion transforms the black box from a tool for scientific inquiry into a rhetorical shield that deflects scrutiny and demands faith. In this new framing, our own social world is cast in the role of the chaotic gas, a complex environment to be sorted, shaped, and controlled by this mysterious new agent of change.

6.4.2. The hidden hypothesis

This demand for trust is fragile because, as systems thinker Patrick Hoverstadt (2022) warned, our faith in any black box always rests on a hidden hypothesis about its secret internal logic.

A self-driving car trained exclusively on the sunny roads of California may appear dependable. The hidden hypothesis is that its internal logic is sufficient for all driving conditions. That hypothesis shatters the moment the car encounters its first Swiss snowstorm, turning a dependable machine into a lethal one. The unproven assumption is

that past data is sufficient for all future possibilities. When the car encounters a situation not well-represented in its training data, the hypothesis fails, sometimes catastrophically.

6.4.3. From order to chaos

A second, more subtle inversion concerns the system's output. Maxwell's Demon was designed to create a simple, verifiable result: order from chaos. It separated hot from cold.

Modern AI systems, by contrast, are often deliberately tuned to be 'hot'. To generate outputs that are creative, engaging, or viral, their creators increase the system's temperature, intentionally injecting randomness and engineered disorder. This engineered chaos succeeds in its immediate goal, generating a provocative headline or a viral image, but it then spills out into the wider social system. The primary output may be a click or a share, but the second-order effects are the unpredictable social consequences: a surge in polarisation, a new wave of misinformation, or a decline in mental well-being.

Maxwell's Demon was a hypothetical controller that rearranged existing elements. Generative AI is an active shaper, constantly injecting novel and often chaotic elements into our social reality. Ultimately, the narrative of the unknowable black box functions as a powerful rhetorical trap: how can we regulate what we do not even understand? This question pushes the conversation out of the realm of engineering and into the realm of belief.

6.5. A call to faith

The black box narrative becomes so powerful because of this shift from engineering to faith—an irony, considering the mathematical foundation of AI. Modern generative AI is conceptually built on probability theory, which traces its roots to Thomas Bayes, an

18th-century clergyman. Bayes sought to answer the question: in the absence of absolute proof, can we have a rational basis for belief? His theorem provided a mathematical method for updating our confidence in a hypothesis as new evidence emerges (Hoverstadt, 2022).

Today, we face a similar question, but with a powerful twist. We are constantly asked to update our belief in a utopian AI future, using the evidence of each impressive new AI model as a reason to increase our faith in it. The black box narrative reinforces this by suggesting the system is unknowable and must simply be accepted. The irony is profound: a mathematical framework created to rescue belief from irrationality now powers a technology whose most powerful narrative demands we submit to it with blind faith.

This is the intellectual trap in which we find ourselves: a loop where the pursuit of AI demands that we abandon the very principles of rational inquiry that made it possible.

6.6. Conclusion: Breaking the cycle

A deep desire for progress and power drives our pursuit of technology. Nevertheless, as the film *Groundhog Day* illustrates, repeating the same day is meaningless without learning from it. This chapter suggests that the present governance challenges are a two-sided failure: a legal system that is too slow to grasp the emerging socio-technical reality, and a tech industry that is defensively closed to feedback from this reality. This defensive posture is built upon a fundamental inversion of the classic black box concept, transforming it from a scientific tool for rational inquiry into a rhetorical shield that demands blind faith.

This leaves us at the same fundamental fork in the road identified in the previous chapter, but now viewed through a new lens. Chapter 5 presented the choice between governance structures: an unaccountable, technocratic model or a collaborative model with multistakeholders. Furthermore, it discussed the choice between different governance processes: a path of perpetual conflict, or a strategy of co-evolution. These are not separate decisions but two inseparable parts of the same choice. A process of co-evolution is not viable without the multistakeholder structure to support it. The two are intrinsically linked: the structure enables the process, and the process gives life to the structure.

This second path, the strategy of co-evolution, emerges as the logical way to break the cycle. It reopens the feedback loop by treating regulation as an essential, shared response to foreseeable harms. The first steps on this path are already visible in frameworks such as the GDC, which aim to create a common language for this collaborative navigation. The goal of this reorientation is to move beyond a dynamic where governance merely chases technology and towards a future where our technological capabilities and our collective wisdom advance together. The objective is to ensure that the world we build remains fundamentally sustainable for human life.

Chapter 7 · Standards

The architecture of adaptive governance

Chapter 7 Standards and co-evolution

7.1. The invisible architecture of trust

The previous chapter concluded by highlighting frameworks such as the GDC as the first steps towards a new, collaborative approach to governance. The success of any such framework hinges on a common language that enables co-evolution. This chapter explores what that language is in practice: standards. We explore how standards can function as the practical mechanism for building the adaptive, co-evolutionary system required to re-establish trust. They can provide the societal guardrails and shared boundaries needed to repair a broken system. Using disaster management as a key case study, this chapter reveals how standards operate as the architecture of a safe, inclusive, and human-rights-based metaverse.

From paper sizes to internet protocols and even life-saving procedures for natural disaster management, standards fulfil the structural role of an invisible architecture or blueprint that enables coordinated action. They make everyday functionality possible: printers operate thanks to agreed paper sizes, video streaming works due to established protocols, and emergency services arrive on time. When backed by state power, standards evolve into law. In the context of the metaverse, they serve as the foundational mechanism for building a functional and trustworthy socio-technical ecosystem—the practical, invisible architecture of an updated social contract.

7.2. Standards as a language of co-evolution

The metaverse represents a utopian vision of integrating physical and digital environments into a new ecosystem. Achieving this requires interoperability, where all components function seamlessly together.

To address this, the Global Initiative on Virtual Worlds and AI has developed both a comprehensive standardisation roadmap (ITU, 2024h) and a landscape analysis of existing standards (ITU, 2024i).

This work is essential for escaping the two-sided failure of law and technology outlined in Chapter 6. By creating a shared language and a common ground, these standards provide the blueprint for the permeable boundary needed for adaptive governance. This language operates on multiple levels: general standards provide a common vocabulary; interoperability standards establish a functional grammar, and application standards embed values, balancing innovation with human dignity. However, the landscape analysis reveals critical gaps: a lack of adaptable protocols, robust safeguards, and frameworks for niche use cases. This absence of targeted frameworks is a familiar problem, echoing the déjà vu of siloed solutions in the Citiverse (Chapter 2) and underscoring that governing a rapidly emerging system remains a fundamental challenge.

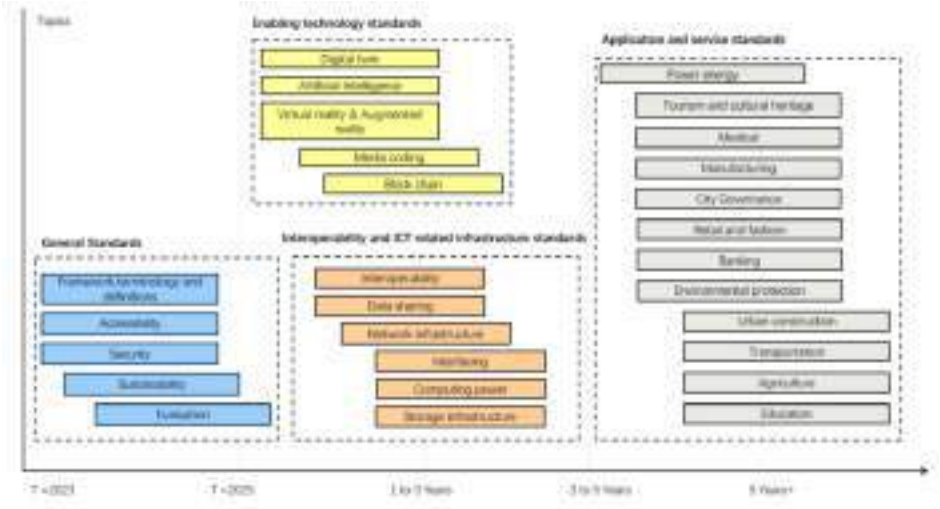


Figure 9 **A possible timeline for the standardisation of the metaverse (ITU, 2024h).**

While the landscape analysis reveals these significant challenges, the standardisation roadmap (FGMV-51) offers a strategic path forward. It outlines a phased approach, beginning with foundational general standards (such as terminology) as the immediate priority for establishing a common ground. The development of enabling technology and interoperability standards is projected for the mid-term (one to five years). In contrast, the most specific application standards for different industries are envisaged for the long term. This sequential process reflects the 'journey as the destination' principle (Chapter 3) and highlights the long-term commitment required.

7.3. The Metaverse Standards Forum

Alongside the formal processes led by ITU, another key initiative is contributing to this evolving standards landscape: the Metaverse Standards Forum (MSF). The MSF functions as a collaborative industry platform, bringing together technology companies, researchers, and consortia to accelerate the development of open, interoperable standards for the metaverse. While it does not create standards itself, it plays a critical coordinating role by identifying gaps, aligning efforts, and fostering cooperation between public and private actors (MSF, 2024).

Its action-oriented approach is a practical example of making the rigid boundaries between the tech industry and the legal world more permeable. By fostering this pragmatic collaboration, the MSF enables the cross-fertilisation of ideas identified as essential for escaping the Groundhog Day loop in Chapter 6, helping to build a unified and trustworthy metaverse infrastructure.

7.4. Case study: When standards save lives

At the first UN Virtual Worlds Day, Isabelle Hupont from the Joint Research Centre (JRC) of the European Commission posed the critical

question: ‘We are technologically ready. Yes, but are we societally ready as well?’ (ITU, 2024l). Standards are the measure of that readiness. Nowhere is this more evident than in disaster management, a perfect microcosm of the entire adaptive governance challenge.

Disasters are complex, emergent events (Chapter 1) that demand rapid, coordinated action based on pre-agreed rules. Recognising the lack of international standards in this area, ITU, in partnership with the World Meteorological Organisation (WMO) and the UN Environment Programme (UNEP), established the Focus Group on AI for Natural Disaster Management (FG-AI4NDM). Its standardisation roadmap underscores the vital human dimension, where close collaboration between standards bodies and UN agencies is essential.

The group’s analysis identified key trends, including a growing focus on response and relief efforts, as well as the increased use of IoT and remote sensing. However, it also revealed critical gaps. Early disaster phases, such as preparedness, are often under-addressed, and standards for specific disaster types, particularly biological and human-made, are frequently overlooked (ITU, 2022). This is where emerging metaverse technologies offer solutions. Virtual and augmented reality are already being used for training military personnel, police, and fire services, as well as preparing civilians in earthquake-prone areas. Digital twins are becoming crucial for real-time data processing and the earliest possible detection of warning signs.

However, what happens when these standards and systems fail? The tragic flooding in the Valencia region in 2024 highlighted the cost of ineffective communication. Despite forecasted heavy rainfall, people were not warned in time. A report by the United for Smart Sustainable Cities (U4SSC) initiative had already flagged such risks, yet even the

smart city of Valencia lacked an effective warning system (ITU, 2020). As Jovan Kurbalija (2024b) observed, the Valencia incident exposes a paradox: in pursuing cutting-edge technology, we often overlook the essentials, starting with human safety.

This brings us to the core of our governance crisis. We are currently facing a digital flood of harmful deepfakes, sextortion, and surging cybercrime, but the conviction rate remains at a catastrophic 0.33% (Chapter 5). This is the Valencia flood on a global, digital scale: a predictable disaster with no effective management system in place because the foundational standards of accountability are missing.

7.5. The final standard: Law

Law itself is the ultimate standard, a set of rules backed by enforceability and driven by collective agreement. Legal considerations are woven into every layer of the standardisation roadmap. However, the landscape analysis in FGMV-52 (ITU, 2024i) reveals that the most critical gaps are systemic: the need for identity verification, cross-border data governance, and effective frameworks for addressing harassment and fraud.

Addressing these gaps requires escaping the Groundhog Day loop (Chapter 6). The question is not when to regulate, but how to build an adaptive system. This calls for the dynamic monitoring central to the Policy Adaptation Loop (Chapter 2) and echoes Collingridge's core insight: the essence of control is retaining the ability to modify a technology even after it has been fully deployed.

7.6. Conclusion: Governance as a relationship

If co-evolution is the envisioned goal, then standards are the shared language that makes it possible. This positions standards at the very

heart of the fork in the road we have been exploring. Viewed through the lens of a race to a destination, standards are merely technical tools for market dominance, proprietary, closed, and designed to create walled gardens. However, viewed as part of a shared journey, they become something more profound: a blueprint for governing a layered reality where digital, physical, and social systems increasingly overlap. Choosing this second path treats standards as the practical implementation of the implied confidence framework. The hierarchical approach, from universal human rights down to specific technical protocols, represents the kind of higher-level logic needed to resolve the paralysing double bind of digital governance.

As we move from architectural blueprints to lived experience, we are reminded that the well-being of people within a system is the ultimate test of any standard. This is where technology governance becomes more than protocol; it becomes relational once again. These efforts reflect the broader transformation envisioned in UN 2.0, where technology is positioned as an accelerator for inclusive, rights-based development. Standard-setting goes beyond technical purpose and becomes a central commitment to building a future that is sustainable, participatory, and grounded in human dignity. It is the practical, architectural work of accelerating our collective consciousness.

Chapter 8 · Convergence

Three bodies of the convergence zone

Chapter 8 Convergence and reality

8.1. Rebuilding the relationship

This final chapter analyses the relationship between technology and society, as well as the role of digital twins through the lens of three distinct but interacting bodies: the physical body of embodied human experience, the social body of law and governance, and the technical body of the metaverse.

As governance becomes an integral part of technology, the central challenge is to architect a feedback loop that keeps this embedded governance responsive to the needs of the other two bodies. The question is not simply how we govern technology, but how technology itself becomes a medium of governance that is adaptive, relational, and grounded in human rights. To understand how governance can be restored as a relational practice, we first dismantle the illusion that fractured it: the myth of cyberspace as a realm apart.

8.2. Dismantling a foundational myth

The vision of the metaverse is to bring the digital and physical worlds together, making them appear as one seamless world. To understand this convergence, we need to dismantle the foundational myth that they were ever truly separate. Because we can only enter the internet through technical interfaces like screens, cyberspace feels like something separate from our physical world. This impression hardened into the collective belief that cyberspace was separate from the physical world, serving as an excuse for acting without regard for jurisdiction.

8.2.1. The political illusion of separate territories

Internet governance expert Jovan Kurbalija (2024a) describes this belief as an illusion, tracing it back to John Perry Barlow's 1996 Declaration of the Independence of Cyberspace. Barlow proclaimed that 'cyberspace does not lie within your borders', a perspective that overlooked a fundamental reality: no digital activity takes place outside physical infrastructure or beyond legal authority. Data travels through cables and servers, all of which are governed by national jurisdictions.

This illusion—the false belief in a detached digital territory—became the basis for the two-sided failure of law and technology, as diagnosed in Chapter 6, which has hindered effective governance ever since. Barlow, like many after him, confused the internet's technical reach with the legal and physical reality of its anchoring in the material world.

8.2.2. The philosophical illusion of disembodied minds

The illusion goes much deeper than territorial questions. It rests on a centuries-old philosophical belief about the nature of being and reality itself. The belief in the mind and body as separate entities is also known as the Cartesian fallacy. Understanding this fallacy is vital for this book, as it is at the heart of the intellectual shift required to escape the Groundhog Day loop and develop new forms of adaptive governance (Chapter 6).

Neuroscientist Antonio Damasio (1994), in his book *Descartes' Error*, reveals that this is a false dichotomy, demonstrating that reason, emotion, and identity are deeply rooted in the physical body. Reinforcing this error erodes our social and legal frameworks by disconnecting the social body's knowledge loop (Chapter 5) from the embodied reality of human experience, particularly in cases of virtual harm.

8.2.3. Science fiction shaping the illusion

Many science fiction stories tap into the philosophical illusion of the disembodied mind and the political illusion of a separate territory. In Western narratives such as William Gibson's *Neuromancer*, Neal Stephenson's *Snow Crash,* and Ernest Cline's *Ready Player One*, technology often facilitates individual escape from a dystopian reality, offering an alternative realm for identity, freedom, and personal experience within a virtual space like the metaverse.

Using the term 'cyberspace' instead of 'internet' or 'web' is an insightful choice, as Kurbalija (2024a) notes. The term originates from William Gibson's 1984 science fiction novel, *Neuromancer*, where cyberspace is envisioned as a consensual hallucination—a shared, sensory-rich virtual world distinct from physical reality. Within this structural framework, consciousness could be projected, and data could be manifested. Conversely, in *The Matrix,* the Wachowskis depict technology as an explicit tool for non-consensual control and the exploitation of humanity on a mass scale. Here, technology serves as a means to enslave humans as power sources for sentient machines, shifting the narrative thread to strategic mass manipulation for the survival of a non-human species.

This theme echoes the Chinese science fiction novel *The Three-Body Problem (Liu, 2014),* which serves as a powerful allegory for our current moment. The novel's title refers to a chaotic, unpredictable system, an alien world caught between three suns. Their survival depends on strategically manipulating humanity's perception of reality itself. This narrative directly mirrors the socio-technical three-body problem at the heart of this book: the unstable, emergent relationship between the physical, social, and technical bodies. It frames our central challenge: can we navigate the complex forces of our own creation to avoid a chaotic era, or will our perception of reality be the first casualty?

8.3. The convergence zone

The challenge of navigating a socio-technical three-body problem is no longer a science fiction allegory. In today's policy discourse, it has a name: convergence. Nearly thirty years after Barlow's statement in Davos, we find convergence, not separation, at the heart of the World Economic Forum's agenda in Davos 2025 (Digital Watch Observatory, 2025). Convergence refers to the fusion of technologies and the alignment of global development efforts. In the case of the metaverse, this convergence is comprehensive, involving the merging of digital and physical realities into a new, interconnected ecosystem. This raises a pressing question: if these realities are converging, where and how do they interact?

The answer lies in a dynamic zone, where different forces in our socio-technical system overlap and shape one another. In this convergence zone, we feel the pull of at least three distinct bodies. The physical body is our neurological, embodied self, whose experience and presence are, as neuroscientist Damasio argues, the ultimate ground truth. The social or political body is represented by our legal systems and social contracts, which are grounded in our accumulated knowledge from the past. The technical body comprises the new digital architecture of the metaverse, with digital twins as the core interface between the physical world and the metaverse, helping us realise UN 2.0's vision of guiding humanity towards a better future for all.

The interplay of these three bodies creates a socio-technical three-body problem. Like its counterpart in physics, the outcome is not easily predictable: it is complex, unstable, and inherently emergent (Chapter 1). The convergence zone is the space where these three bodies—human, legal, and technical—interact and overlap. The remainder of this chapter will explore how these bodies interact,

analysing the forces that pull them towards a dynamic equilibrium or push them towards chaos.

8.4. The technical body

At the core of the shift are digital twins, which act as active technological mediators between the physical and digital worlds. To understand this body, we examine its design, its governance, and its foundations.

8.4.1. Embodied design and technological foundations

Convergence in the metaverse begins with how systems feel to us. The goal is to recreate the natural, intuitive flow of real-world experiences, such as strolling through a park and moving effortlessly from one activity to another. The metaverse seeks to replicate this ease, removing friction between communication, entertainment, and interaction. This is about embodied design, i.e. crafting spaces where transitions feel fluid, intuitive, and lived, rather than mechanical or disconnected. The sense of convergence deepens when digital and physical realities interact with one another through an ongoing feedback loop.

Digital twins serve as the mediator, dynamically translating between embodied reality and digital abstraction. AI acts as the adaptive engine, personalising content, shaping responses, and embedding algorithmic governance. Technologies such as blockchain, IoT, and 5G connectivity provide the infrastructural conditions for secure, distributed and instantaneous mediation. Together, these technologies enable distributed, real-time interaction across devices and environments. As digital and physical systems increasingly co-construct one another, they give rise to embedded realities, spaces where governance, identity, and interaction are not external layers but intrinsic to the system's architecture.

8.4.2. The digital twin as the technical body

At the heart of this transformation are digital twins. They continuously connect and synchronise physical and digital systems, enabling real-time interaction across domains. This real-time interaction allows digital systems to analyse and influence the conditions of their non-digital counterparts.

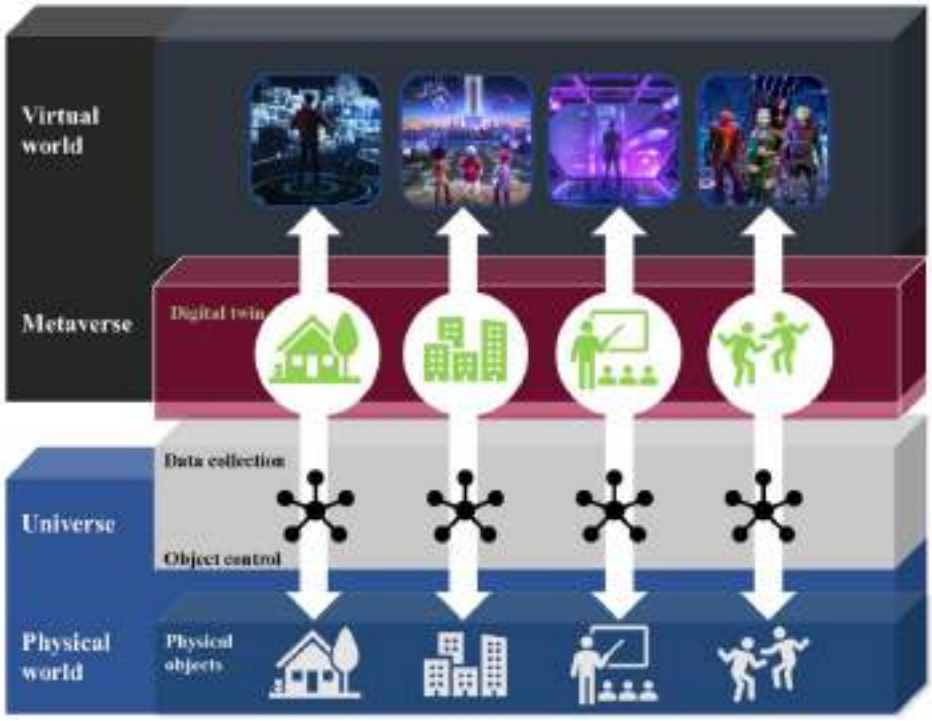


Figure 10 **The concept of the digital twin-based integration between virtual and physical worlds (ITU, 2024c).**

The Focus Group on Metaverse (FGMV) defines a digital twin as a digital representation of an object of interest. Depending on the context, a digital twin may need to support synchronisation, real-time data flows, or control logic (ITU, 2024c). These systems represent a new approach to defining presence, agency, and authority across both digital and physical spaces. In this view, the convergence zone is

not merely the point where systems meet, but the dynamic space in which they interact continuously, responsively, and in real-time.

The following table illustrates the layered requirements for integrating digital twins, metaverse platforms, and system interactions, as outlined in FGMV-28.

Digital Twin (REQ-DT)	Metaverse (REQ-MV)	System Interaction (REQ-SI)
DT-01: Unique ID	MV-01: Provide twin info	SI-01: Twin–metaverse sync
DT-02: Metaverse connection	MV-02: Enable interaction	SI-02: Twin, MV, 3rd-party link (rec)
DT-03: Searchable	MV-03: Usage experience	SI-03: MV ↔ Twin
DT-04: Info sharing	MV-04: Synchronisation support	SI-04: MV ↔ 3rd-party
DT-05: Access rights	MV-05: 3rd-party info (rec)	SI-05: 3rd-party ↔ Twin (rec)
DT-06: Interaction capability	MV-06: 3rd-party services (rec)	
DT-07: Sync capability	MV-07: Interact with 3rd party (rec)	
DT-08: Sync priority (rec)		(rec = recommended)

Figure 11 **Layers of integration.**

8.4.3. Interoperability as embedded law

Diving deeper, another ITU specification (ITU, 2024g) details the architecture for interoperability. Its core functions of federation, translation, brokering, and synchronisation shape how decisions are made, who has authority, and what interactions are possible.

These core functions, while technical, are also acts of governance in disguise. Federation functions facilitate secure collaboration and data sharing between systems, while protecting autonomy and privacy. Translation functions address structural differences between digital twins. Brokering functions mediate and route data flows contextually, ensuring trust, traceability, and relevance in real-time exchanges. Finally, synchronisation aligns digital representations with their physical counterparts and across multiple systems, maintaining a coherent, shared reality across all domains. This technical architecture is the practical implementation of the standards discussed in Chapter 7, evolving into a form of embedded law.

The digital twin architecture forms an embedded governance layer, a technical implementation of trust and access. Its design directly mirrors the principles of the Dynamic Policy Maturity Benchmark Model (Chapter 2), which calls for systems that adapt and respond across institutional and technical domains. As interoperability becomes the foundation for relationships, technical architecture itself evolves into a form of law.

8.5. The physical body

The most critical convergence zone is the human being itself. Neuroscientist Antonio Damasio (1994) describes how our brains act as convergence zones, in which a coherent reality is created by integrating sensory input. For Damasio, the deep relationship between body and mind is the ultimate ground truth, a fact often overlooked when simulating life.

8.5.1. Simulating what-if

Extended reality and digital twins enable the seamless blending of digital and physical information, creating a unified interaction between the two worlds. Throughout this book, we have reimagined

how progress towards simulations can accelerate the achievement of the SDGs. From this perspective, the metaverse emerges as a grand foresight exercise, where foresight asks 'what-if', and simulation visualises 'what-if'. The what-if approach is relatively straightforward when applied to industrial uses of digital twins. A simulation of a jet engine, for example, is governed by predictable laws of physics and defined by objective data such as temperature and pressure. A jet engine is a human-made, measurable machine. The risk of falling into Descartes' error, the false separation of mind and body, becomes visible when this same machine logic is applied to people.

A machine can be fully described by its objective data. The modern version of Descartes' error is the same assumption that a person can be fully understood or simulated using only their data. This approach treats the mind represented by data as the complete picture, separate from the unmeasurable, subjective reality of the embodied self. It creates a fine line between using simulation to predict the next steps and creating a deceptive illusion.

8.5.2. Feeling as-if

The metaverse is essentially a complex exercise in tricking both our minds and bodies into simulating sensory experiences without actually engaging the body in those experiences. Damasio (1994) refers to this as the 'as-if' body loop, a mechanism that can be a useful shortcut for planning and imagination, but can also be deceptive. In Chapter 4, we argued that foresight requires accelerating our collective consciousness. However, when simulations are disconnected from our embodied, physical reality, they can fail to provide the necessary feedback for authentic learning. They risk becoming exercises in self-deception rather than meaningful lessons for the future.

When we enter virtual reality via headsets and controllers, we experience the sensation of our bodies being present in a virtual space. In fact, our bodies remain firmly rooted in the physical world. This disorienting experience is mostly harmless until our human integrity is violated. As discussed in earlier sections, violations such as virtual harassment, deepfake pornography, and the failure of socio-technical systems to respond adequately expose the limits of this illusion.

8.5.3. Reality as a phantom limb

Damasio's work on emotion and embodiment offers a powerful metaphor for this phenomenon: the phantom limb. People who have lost a limb often continue to feel sensations, sometimes even pain, in a part of the body that is no longer there. Yet they are not deluded; they know the limb is gone. What persists is the memory of the body, an internal map that the brain continues to activate, even in the absence of physical feedback. The internal image allows for a limited form of presence, one that is no longer updated by the reality of the body.

Unlike the phantom limb, where sensation persists in the absence of the body, digital trauma is its inverse: a violation that bypasses the body entirely. The body remains untouched; however, the self is profoundly violated. A person's image is digitally manipulated and circulated in acts that simulate intimacy or violence, as if the experience were real. At the same time, the nervous system receives no physical cue to process it. These are as-if experiences, lacking the grounding of embodied emotion. The harm is real, but the absence of bodily feedback fractures the connection between perception and processing.

Like phantom pain, this digital wound haunts the mind. And just as the brain struggles to update its map when a limb is gone, the law

struggles to respond when harm leaves no physical mark. This is the very definition of the dysfunctional, broken loop diagnosed in Chapter 5. Our fundamental trust erodes as the socio-technical system appears functional, yet fails to relate, adapt, or protect our human integrity. Could this be the emergence of phantom governance, present in form, absent in response?

8.6. The social body

The third key actor in the convergence zone is the social body, including our legal systems and governance. Our legal systems (in short, the law) act as a social broker, mediating between the needs of individual citizens (the physical body) and the realities of new systems (the technical body), to maintain a coherent, well-functioning society.

8.6.1. Legal by design

As digital systems become increasingly integrated into our lives, we are failing to embed our legal values into their design with sufficient care. We already embed legal principles in the design of cars and buildings through safety codes and standards. Now we must do the same for digital architecture, ensuring that concepts such as fairness, due process, and accountability are visible and enforceable within the system itself. This proactive approach is the essence of the Dynamic Policy Maturity Benchmark Model (Chapter 2): building legal principles directly into a system's design to prevent harm before it happens.

8.6.2. Crisis management

Crisis management is a tangible example of embedded governance. Digital twin disaster response systems are designed to operate across multiple layers (ITU, 2022). They continuously integrate data from sensors to trigger coordinated actions and automatically enforce protocols, demonstrating that the convergence zone is a real space

where embedded structures are meant to govern real-world outcomes.

As noted in Chapter 7, the 2024 flooding in Valencia offers a tragic example of this breakdown. Despite forecasts predicting severe rainfall, no public alerts were issued by the digital twin system. The meteorological data was available, and the predictive models were functioning correctly. However, the system failed to translate digital knowledge into physical action. The issue was not a technological failure of prediction, but a human and political one: a failure of governance, accountability, and responsibility.

8.6.3. The digital flood

The failure of activation—the breakdown between digital knowledge and physical action—is not limited to natural disasters. It resonates just as powerfully in our inability to address the digital flood of online harms. Just as the digital knowledge of impending floods remained inert, our growing awareness of the real trauma caused by deepfakes and virtual abuse has yet to be translated into robust legal protection. This is not a passive oversight; it is another, more widespread failure of activation.

The lack of protective legal frameworks is the direct result of human and political choices; a decision, whether conscious or not, to prioritise unaccountable innovation over the safety and dignity of individuals. This failure leaves individuals vulnerable and unprotected in the digital realm, despite the growing acknowledgement of these risks. Addressing this activation failure within the legal system is crucial for restoring trust, ensuring accountability, and safeguarding individuals in an increasingly digital society.

8.7. Conclusion: A new equilibrium

Governance has always been executed through media like rituals, architecture, technology, bureaucracy and ultimately law. It was the illusion of a separate cyberspace that prevented us from effectively seeing the relationship between technology, law, and people for decades.

The visionary plans of the metaverse force us to recognise that cyberspace and its underlying technologies—ranging from AI to digital twins—cannot be treated as separate entities from our legal systems. As our legal and social contracts become written into the very code of our digital world, their ability to remain relational and in dialogue with our embodied, human reality becomes the measure of that re-balancing. Shaping that conscious, collaborative relationship is the primary function of adaptive governance.

Epilogue

This book began with a bold call from UN 2.0 to harness technology for sustainable development, signalling the end of the illusion that our digital and physical realities operate in isolation. It explored the relationship between the technical and social body through an allegorical dialogue between the METAVERSE and UN 2.0. Rather than a map to a perfect future, the book revealed the core tensions that must be resolved for a new equilibrium to emerge.

SCENE 2

INT. DIGITAL REALM - DAY

UN 2.0 and the METAVERSE stand together, observing the complex, interwoven system they are now a part of.

UN 2.0
(quietly)
I see now that my stability is meaningless without adaptation. Your speed is not a threat to be feared, but a force to be balanced.

THE METAVERSE
(*nodding)*
And I see my momentum is useless without trust. Progress that ignores human well-being is only a faster path to failure. We need an equilibrium.

Throughout the book's analysis, a third, often silent, body became visible: the physical body of human experience, making its integrity the ultimate measure of a renewed social contract. The dialogue's conclusion is crucial. It strikes at the heart of a narrative that has long captivated us in science fiction and shaped policy in the real world: the idea that cyberspace is a separate realm and that the mind can be detached from the body.

This cultural myth has led to systems with a broken feedback loop—systems that are present in form but fail to respond to real, embodied human harm. The metaverse, as the ultimate expression of convergence, makes this philosophical discussion an urgent and practical necessity. It turns the abstract search for a moral compass into the tangible engineering of our future reality. This highlights the critical gap the UN 2.0 process seeks to fill. While the tech industry builds new virtual worlds, the renewed social contract demands that we govern them to protect the integrity of the human and societal life they replicate and impact.

The way forward: A call for conscious navigation

The abstract debate should be over; the metaverse is already a tangible engineering and governance challenge. The task is to build a human rights-based, adaptive future by creating a true convergence zone where law and technology inform each other mutually. This requires more than compliance; it demands a new form of legal framework that understands code, and a technical architecture shaped by the principles of justice. The process of mutual shaping—this pursuit of dynamic equilibrium—prompts a final set of questions for the agents of each body:

For policymakers and legal professionals (representing the social body): Can we shape the law as the adaptive framework it was designed to be? Can we find the courage to apply the necessary productive friction to guide progress, rather than allowing technology to bypass scrutiny under the disguise of utopian promises?

For technologists and industry leaders (representing the technical body): Can we accept that every line of code is a form of law and fully embrace the duty of care it entails? Will we design architectures that are not just legally informed but built to maintain equilibrium, making systems accountable by design?

For academia, civil society, and citizens (advocates for the physical body): Can we commit to being the ever-present advocates for the third body? Can we provide the critical oversight needed to ensure the embodied human experience remains the final authority of this new, integrated system?

Concluding statement

The focus of this book has been to analyse our socio-technical system itself: its philosophical underpinnings, its structural tensions, and the vital importance of human embodiment. This book is a reminder that this system is inherently in motion. It is constantly exposed to the gravitational pull of the bodies that govern it: the relentless forward momentum of the technical, the anchoring force of the social and legal, and the vital, grounding pull of the human.

In such a dynamic reality, the metaverse serves as a utopian vision, an instrument of navigation. It is a North Star, not a destination, revealing where we are and, more importantly, compelling us to question where we ought to go, guiding us towards the future we envision.

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About

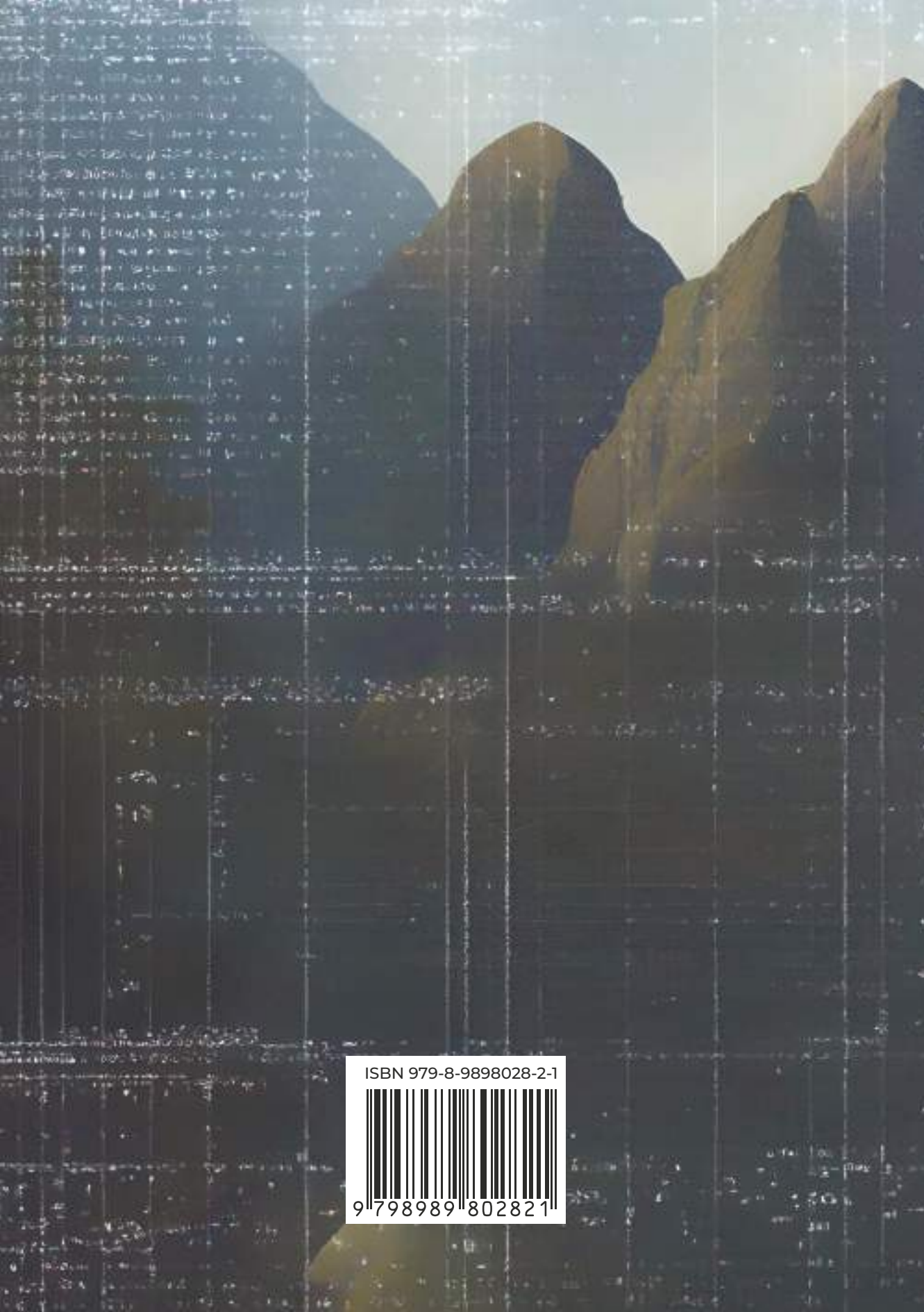
About Dr Anita Lamprecht

Dr Anita Lamprecht is an expert at the intersection of global governance, law, futures literacy and emerging technologies. This book is a direct result of her extensive research in these converging fields. At DiploFoundation, she contributes as a senior advisor to global digital policy analysis and facilitates AI capacity-building programmes for international organisations. As a guest lecturer and speaker at international conferences, she specialises in translating complex technological trends into actionable insights for policymakers, diplomats, and governance professionals.

About DiploFoundation

DiploFoundation (Diplo) is a leading organisation working to make diplomacy and policymaking more inclusive and effective. With a strong focus on capacity development, research, and innovation, Diplo empowers individuals and institutions, especially from small and developing states, to participate meaningfully in global governance. Its work centres on the interplay between diplomacy and AI as well as digital technologies.

Through partnerships with governments, international organisations, and academia, Diplo bridges knowledge gaps and fosters dialogue. With roots in innovative pedagogy, academic excellence and a commitment to practical impact, Diplo blends technology, training, and policy insight to support a more equitable and informed global future.



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