Labor Policies For A Digital Workforce

The Challenges Of The Metaverse

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The Next Generation
of Governments

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Executive Summary

The metaverse is an inevitable digital evolution, and one that is rapidly becoming reality. Digital technology, near unlimited data, increased computing power, expanding communication bandwidth, and the 24/7 online mindset are converging to create fully digitalized worlds that mimic and parallel the analogue "real" world. Although in its infancy, the metaverse may soon transform our economies, our lifestyles, and our places of work.

It is both critical and urgent that policymakers act now to prepare for the new era of the metaverse, laying down the foundations of governance and policy to ensure that the metaverse ecosystems of the future are open, accessible, equitable, interoperable, and, crucially, safe for their citizens to participate in. Adapting to this emerging digital reality will have its challenges for governments, in particular when it comes to the labor markets of the future.

The COVID-19 pandemic has already redefined the traditional boundaries of work, forcing governments to adapt swiftly with new regulations for new models of work, such as remote working. The metaverse will further accelerate the digitalization of work, resulting in an ever-greater number of individuals and businesses embracing digital channels of interaction and commerce.

Companies are moving faster than governments. Tech giants such as Meta and Microsoft are already building their own metaverse platforms, creating new paradigms for experience and employment, with new institutions springing up such as the world's first metaverse hospital chain Aimedis. In the near future this will culminate in mass adoption of the metaverse and create a dual digital/analogue global labor market.

Governments need to greatly increase their preparation and readiness to regulate work and employment in this emerging digital space, adopting new approaches to enhance their knowledge and capabilities. **Future governments will need to become ambidextrous in a hybrid digital/analogue world, operating with equal rigor and effectiveness across both dimensions.** They must become sufficiently agile to analyze and interact with the new digital entities and emerging data types that will characterize future labor markets.

The key changes will include:

- **Talent migration into the digital space will create new types of labor markets and require new regulations and new regulatory capacity.**

- **Digital labor markets will coexist alongside the traditional labor market, requiring AI-powered analytics to understand the dynamics of a hybrid digital/analogue market.**

- **New capability frameworks will need to be developed to allow governments to operate effectively in the digital space: future civil servants must become unique avatars providing GovTech services in the metaverse to support labor policy implementation.**

- **Labor policies in the metaverse will need to be interlinked with education policies in the conventional analogue world.**

- **Data security, privacy, and worker safety in the metaverse will become leading concerns for labor market regulators.**

Many governments are currently unprepared for this transition. Therefore, it is likely that policymakers and regulators will have to learn from non-traditional, non-government actors who have already built a foothold in the metaverse.

The defining characteristic of the metaverse is that it is boundaryless. Thus, policy responses to the challenges of the metaverse will need to be boundaryless too: governments, industry, and academia will need to come together to proactively create new rules for this emerging labor market and contribute to its evolving architecture to ensure a trustworthy, transparent, and accountable ecosystem.

To achieve metaverse-readiness, we believe that governments must undertake an assessment of both their understanding and capabilities. They need to:

1. Consider **human resources capabilities** both inside the administrative arms of government and in the economy at large.
2. Reform their **regulatory agenda** as new forms of interaction security, privacy, and safety challenges – not only for employees, but for all citizens.
3. Review their **understanding of emerging technologies** as the two-dimensional "browsing" internet gives way to the three-dimensional "interactive" metaverse.

Section 1

Labor Policies for a Digital Workforce: The Challenges of the Metaverse

Introduction

Stanford economics professor Nicholas Bloom called the shift to working from home "the largest shock to labor markets in decades."[1] Organizations and policymakers are still coming to terms with the effects of this shift. There has been a systematic change in the way people think about work, introducing new opportunities and risks for employers as well as workers. Yet there is an even bigger shift underway that may pose greater challenges to the labor market and policymakers.

This is the shift to the metaverse economy. It is a fundamental change in the overall structure of the economy, as digital work, creation, communication and engagement become a complete alternative to traditional modes. We are witnessing the shift from a world where digital tools are extensions and enablers of work and value creation, to one where the digital world is primary. **The economic impact of this transformation is estimated to be over US$3 trillion, or 2.8% of global GDP, by next decade.[2] For the GCC economies, estimates suggest that the metaverse will inject $15 billion by 2030.[3]**

The metaverse will challenge many aspects of the global economy, but it may have its most far-reaching effects in the world of work. It will reshape the concepts of education, training, and teamwork, and may become the default entry point for recruitment. But it will also challenge individuals and policymakers to evolve new concepts of identity: people and organizations will no longer be defined by the digital platforms and protocols that we recognize today, but will move into a decentralized and potentially ungoverned space where the definition of rights, responsibilities, and identity itself will become areas of opportunity, uncertainty, and risk.

Globally the appetite for this shift is strong for both businesses and consumers. For example, 66% of business executives in the US say that their companies are actively engaged with the metaverse, while 82% expect it to be part of "business as usual" within three years or less and have active plans to use the metaverse as part of their most critical employment activities, including internal upskilling and team building.[4]

The rise of the digital economy has already transformed the way people communicate and work, and the metaverse will multiply that rate of change many times over. **It is up to policymakers whether it is allowed to exist in a policy and regulatory vacuum, or whether they meet this new and emerging reality on their own terms by proactively planning for the transition.**

In this paper we examine how the metaverse may take shape and evolve, and outline the key planning and policy changes governments worldwide need to initiate in order to ensure that the workplaces of the future are environments of trust and transparency.

Section 2

Inside The Metaverse

Inside The Metaverse

Warren Buffett famously said that it is only during times of crisis that we can see who was unprepared or lacking in resources.

The pandemic exposed the fault lines in traditional workspace models. Enterprises and workers alike are increasingly understanding that they need to prepare for more interactive, remote, and hybrid work experiences.

The metaverse promises to reshape traditional work models in at least four major ways. **We will see new immersive forms of team collaboration and the acceleration of learning and skills acquisition through rich visualizations and gamified technologies. We will see the emergence of a digital workforce of AI-enabled individuals and the eventual rise of a metaverse economy with completely new enterprises and work roles.**[5]

Growing interest in the metaverse has led to increasingly rapid adoption of virtual reality (VR) and augmented reality (AR) technologies, as many businesses continue to explore remote and hybrid work models. According to the International Data Corporation (IDC), global spending on AR and VR technologies was expected to reach $13.8 billion in 2022, and is set to increase to $50.9 billion by 2026.[6] This is not just corporate spending: a majority of consumers are willing to spend up to $1,000 on ancillary VR gear such as suits and gloves, enabling them to physically experience the metaverse.[7]

The renewed interest in the metaverse gained further momentum when Facebook rebrand itself as Meta to show its commitment to building a virtual world. Google Trends reports a 30-fold increase in searches for the word "metaverse" between December 2020 and October 2022.

Technology giants see the metaverse as the next great market opportunity and are already investing in capabilities and platforms. Microsoft has said that it intends to build an "enterprise metaverse," recently acquiring interactive experience leader Activision for $68.7 billion to provide building blocks for the metaverse.[8] Both JPMorgan and Samsung have opened branches in the metaverse and PwC has secured a virtual plot through The Sandbox platform, one of the virtual worlds that have created a metaverse real-estate market, and in Decentraland.[9] Governments are taking a stake, too: Barbados has become the first sovereign state to develop an embassy in the metaverse, demonstrating another advantage of this transformation: that of diplomatic parity.[10]

Defining The Metaverse

So what exactly is the metaverse?

Interestingly, there is no universally accepted definition of metaverse, even though the term was coined as long ago as 1992 by the writer Neal Stephenson in his science-fiction novel Snow Crash.[11] In the novel, the author envisions a virtual reality-based successor to the internet where people use digital avatars to explore the online world.

The absence of a precise definition is understandable: the metaverse and its concepts are continuously evolving. **Technological advancement does not happen in one discrete event but is an evolving process of creativity and innovation.** After all, who in 1982, the year the PhoneNet system was connected to ARPANET and Telenet – creating the basis of a global internet – could have described or even imagined what the modern-day internet would look like? Not even its early proponents.

In the words of Brandon Johnson, Chief Experience Officer (CXO) of TerraZero Technologies Inc., "The metaverse is not a singular headset or one company or one interactive world that you go into. This industry will be built by thousands of different companies that are going to be making incremental developments that will come together and create something much more dynamic, versatile, and beautiful for all."

What is an "open" or "closed" metaverse?

Describing the metaverse as either "open" or "closed" refers to the way in which users can access any specific section of the metaverse. Open metaverse environments are democratized among the user base, generally in the form of blockchain-based tokens. Closed metaverse environments, on the other hand, are a part of the metaverse that is under the control of a centralized company or organization. Both open and closed metaverse environments currently coexist in virtual reality and will likely continue to coexist into the future.

Examples of an "open" metaverse platform include: Decentraland, The Sandbox

Examples of a "closed" metaverse platform include: Meta, Virbela

Source:
The Wharton School of the University of Pennsylvania

Section 2

The Metaverse: Past, Present, and Future

According to Matthew Ball, CEO of venture capital and advisory company Epyllion: **"Technology frequently produces surprises that nobody predicts. Yet at the same time, the biggest developments are often anticipated decades in advance."**

While it is not possible to track and include every detail or development in the evolution of the metaverse, Figure 1 traces the key major developments in its history that have brought us to where we are today.

Figure 1*: A Brief History Of The Metaverse

1838 — Sir Charles Wheatstone outlined "binocular vision," a concept which creates a single 3D image by combining two images, one for each eye. This led to the invention of stereoscopes, which is the same concept used in VR headsets today.

1935 — Writer Stanley Weinbaum published "Pygmalion's Spectacles," where the main character explores a fictional world using goggles that provide the seven senses in that world.

1956 — Morton Heilig created the Sensorama Machine, the first VR machine. It simulated the experience of riding a motorcycle using 3D video, audio, scents, and a vibrating chair.

1960 — Morton Heilig patented the first head-mounted display, which combined stereoscopic images with stereo sound.

1978 — MIT created the "Aspen Movie Map," allowing users to take a tour of Aspen, Colorado. This was the first time VR was used for such a purpose.

1982 — The term "metaverse" was first used in Neil Stevenson's novel, Snow Crash. It was a virtual place where characters could go to escape their totalitarian reality.

*Sources: Forbes, PwC research.

1994 — Sega introduced VR arcade machines.

1998 — Sportsvision broadcast the first live NFL game that used overlaying graphics on real-world views.

2003 — Linden Lab launched the Second Life online multimedia platform that allows people to create an avatar for themselves and then interact with other users and user created content within a multi player online virtual world.

2010 — Palmer Luckey, an 18-year old entrepreneur, invented the prototype for the Oculus Rift VR headset; this reignited interest in VR.

2011 — Earnest Cline released the book "Ready Player One," which became a hit and was made into a movie in 2018. It is set around the creation of a VR world.

2014 — Facebook Acquired Oculus VR.
Samsung and Sony both announced their work to create VR headsets.
Google released its first Cardboard device, as well as Google Glass AR glasses.
NFT concept was first introduced.

2016 — Microsoft introduced its HoloLense headset to the market providing a mix between AR and VR for the first time.
Pokemon GO augmented reality game took the world by storm.

2017 — IKEA joined the metaverse with their "Place" app, allowing furniture to be selected and viewed in personal home or office spaces.
First widely recognized NFT project was implemented.

2020 — Apple added Light Detection and Ranging to iPhones and iPads, improving depth scanning, paving the way for future mixed-reality headsets.
Facebook changed its name to "Meta," to shift its focus towards building the future of the metaverse.

2021 — Ray-Ban and HTC launched smart glasses.
NFT Market valued at $22 Billion.
Barbados opens digital embassy in Decentraland, making it the first country to open an embassy in the Metaverse.

2022 — Microsoft announces acquisition of Activision Blizzard to bolster Metaverse ambitions.
3-D virtual world browser-based platforms such as Decentraland, The SandBox, Axie Infinity, Bloktopia, and Star Atlas, experience major growth.

Drawing on definitions originated by Matthew Ball[12] and PwC's own elaborations of metaverse concepts, we believe that the near-future metaverse will have certain unique properties that form it's foundations, and help to define and distinguish it from our present digitally-enabled world. These are:

Experience: The metaverse will be an experience that **bridges the digital and physical worlds**, extending reality with blockchain-enabled 3D experiences and assets.

Economy: It will be a **fully functioning economy**, where individuals and businesses can interact, and transact, just as they do in the physical world.

Interoperability: It will be characterized by an unprecedented **interoperability of data**, digital assets, content, and experiences.

Identity: It will provide users with a sense of **individual presence and identity**; everyone can participate simultaneously, with individual agency.

Persistence: It will be **persistent**; it never pauses, ends, or resets – it just exists and continues to exist.

Governance: The metaverse will be **governed**: it will have enforcement mechanisms for concepts such as tax collection, data governance, and regulatory compliance.

This is a potent future, a world that is like our conventional world, but where individuals and organizations move, interact, and do business in ways that are theoretically unconstrained. Yet each of these characteristics of the metaverse brings its own profound challenges for users and for policymakers.

The **experience** of a shared and immersive world is unprecedented. It will be the responsibility of companies and governmental organizations to make the metaverse a place of trust and privacy. The **economy** of the metaverse will be digital, with cryptocurrencies and digital tokens expected to be the major media of exchange. But which currencies and which tokens will become sufficiently trusted to support lending, payments, and real estate? The critical quality of **interoperability** will be based on Web 3.0 protocols and still-to-be-determined standards. While this interoperability will offer new possibilities to reach and understand customers, it will also raise new challenges for gathering and protecting data as well as for cybersecurity and privacy.

The metaverse will rewrite concepts of **identity**: it will demand new trusted digital identities for people, assets, and organizations. And the persistent quality of the metaverse will challenge concepts of control: unlike the relatively static platforms and pages of the internet, the metaverse is an entity that changes as fast as the real world. All of these qualities raise questions of **governance**: the metaverse will need rules of engagement for users and rules for how the metaverse itself can change over time, as well as enforcement mechanisms, including rules for tax collection, data governance, and regulatory compliance. Early movers may be able to help establish these rules.

The Immersive World

The metaverse promises to be a digital environment that parallels the real world, where the use of emerging immersive technologies allows users to experience and act in an augmented environment, where individuals and organizations can enhance and integrate all the online tasks that are currently spread across separate digital properties like websites and apps.

In this immersive world, individuals can carry out day-to-day activities – including selling goods and services, signing and enforcing contracts, recruiting and training talent, viewing real estate, having medical appointments, and interacting with society.[13] Individuals and businesses will be able to move and shape their identities, experiences, and assets without friction. This digital world will exist and persist irrespective of who is active in it.

Most people have already experienced an embryonic version of the metaverse. Today, consumers are able to try on virtual clothes at virtual retail stores, but in the future they will expect to engage much more fully with makers and merchants. They will be able to put on a VR headset and visit a factory on the other side of the world, see and touch its machines, shake hands with the local supervisor, and inspect its operations without ever leaving their home or office. Consumers could move from one competing virtual car dealership to another, with the feeling of the wind in their hair as they take a test drive.[14]

This digital world is decentralized. It will not run on platforms whose owners also control data, governance, and transactions. With decentralization at the core of the metaverse, individuals will have control instead. That is a superpower for citizens but a super-challenge for policymakers.

Exploring The Opportunities

Many see the metaverse as an enhanced version of the world of online gaming, today's richest interactive expression of the internet. But the metaverse is much more: it will create opportunities in healthcare, education, commerce, and creative industries. It offers significant advances in the sharing of knowledge and the creation of more effective learning spaces and styles for both children and adults. Governments can also harness it in new ways. At the recent Dubai Metaverse Assembly, His Excellency Gabriel Abed, Ambassador of Barbados to the UAE, discussed a range of potential use cases, **including meta-citizenship and identity to leverage the digital rights best suited to users, and meta-Special Economic Zones (meta-SEZs) to allow businesses to operate seamlessly across borders by leveraging harmonized regulations designed to foster innovation.**[15] It already presents a tangible economic opportunity – the global market size of the metaverse in 2020 was estimated to be $47.69 billion and is expected to grow at a compound annual growth rate of 43.3% to reach $828.95 billion by 2028.[16]

And the metaverse is already demonstrating benefits. For example, recent PwC research has shown that employees can be trained four times faster in soft skills using VR than traditional in-person classroom or online training.[17]

In another study conducted by the United Kingdom's National Health Service, it was found that 92% of VR participants trained in infection-control measures gained an adequate understanding, compared to only 16% of the control group.[18] Medical specialists in the United Kingdom have also used AR technologies to manage COVID-19 patients, reducing the COVID-19 exposure of health staff by 51.5%. Similarly, Walmart recently deployed 17,000 VR headsets to enhance employee training and managed to cut training time for certain activities from eight hours to 15 minutes, without sacrificing effectiveness.[19]

Governments And The Metaverse

Today, the metaverse largely remains a commercial enterprise. The building blocks are being developed and assembled by big technology corporations such as Meta (formerly Facebook), Apple, Google, and Microsoft, drawing on their significant resources in research, development, and data to design their own metaverse offerings. However, governments are increasingly realizing the immense potential the metaverse holds for effective governance and service delivery to citizens and private enterprises. Some countries are already developing their own strategic vision documents to develop the metaverse.

+ In **China**, Shanghai has taken a lead. In 2022 the city released a policy paper outlining the goal of developing the Chinese metaverse industry into a $52 billion business by 2026, largely focusing on the development of technical infrastructure needed for the adoption and growth of the metaverse.[20] In addition, the Ministry of Industry and Information Technology recently published China's first national-level development plan for developing VR technology and integrating VR with industrial applications, such as manufacturing. Moreover, the plan calls for national funding, subsidies, priority loan access, and preferential policies to be directed toward the VR industry.[21]

+ In the **UAE**, the Dubai metaverse Strategy was developed, following the creation of the Dubai Virtual Assets Regulatory Authority (VARA) in 2022. The strategy aims to position Dubai among one of the top 10 metaverse economies – and as a global hub for the metaverse community. The strategy seeks to foster innovation, invest in future talent and capabilities, and develop Web 3.0 technology in order to adopt creative solutions and bring about positive socio-economic change. Dubai's ambition is to attract 1,000 companies specialized in blockchain and the metaverse, boosting the city's economy with 40,000 newly-created virtual jobs by 2030.[22] Meanwhile VARA functions as Dubai's central authority for virtual assets, the world's first regulator of this kind. It aims to create a regulatory framework that can be replicated globally, further cementing Dubai's place as a leader in the industry.[23]

+ **Singapore** has created a digital twin called Virtual Singapore, allowing users to experience a 3D visualization of how the city will transform as a result of population growth, construction, and the evolution of the digital economy. This tool has multiple uses and is already being used to create simulations for urban planning.[24]

+ The **South Korean** government has been proactive in adopting the metaverse model: in 2021, the country released a Five-Year Plan for the metaverse City, including an investment fund to establish a capital city metaverse platform named metaverse Seoul.[25] This platform is being established as part of the Seoul Vision 2030 development plan and will offer services such as enabling citizens to interact with public officials, resolve civic complaints, experience tourist destinations, and receive consultation services in a virtual world – without ever visiting City Hall.[26] The South Korean metaverse is also now home to Israel's first overseas metaverse embassy.[27]

+ The government of **Saudi Arabia** is spending $6.4 billion on future technologies to accelerate the Kingdom's digital transformation.[28] Of this, $1 billion is dedicated to funding the NEOM Tech & Digital Company, which is planning to launch XVRS, a cognitive digital-twin metaverse platform, as part of the $500 billion smart city NEOM.[29] The XVRS platform will include a dynamic digital twin and a digital asset marketplace. The Kingdom's state-owned oil company, Aramco, is also investing $1 billion in Prosperity7 Ventures, a venture capital fund aiming to invest in companies with a focus on blockchain and futuristic technology.[30]

Nobody Said It Was Easy

As governments pursue these experiments and investments in the metaverse, they are also grappling with issues of policy and the prospect that new types of regulators will need to be formed (such as VARA in Dubai). Right now, the metaverse is mostly led by commercial interests, running the risk that the metaverse technology companies are developing may not be the one that governments and citizens need and want. **To date, few governments have been proactive in safeguarding citizens' rights in the metaverse and there has been very little public debate about how our future digital environment should look and what standards should govern its operation.**[31]
Now it is time for that to change.

The six foundations of the metaverse – experience, economy, interoperability, identity, persistence, and governance – all present their own challenges. While some of the foundational concepts such as experience and economy have already started to mature, others like interoperability and governance have yet to evolve. Without such evolution, the metaverse threatens to increase digital exclusion if people around the world have unequal access to the connectivity and technologies essential to participation.

Another challenge that the metaverse poses arises from its ownership. It is likely that the largest technology companies will dominate the metaverse and secure intellectual property rights that allow them to defend this dominance. Such quasi-monopolistic control may create serious regulatory issues.

Do governments want to find themselves in a world where the rules and regulations of the most important social and economic development of the era are entirely defined by the big tech companies, with interactions taking place on their terms?
And if not, how should they act?

Section 3

The Labor Market In The Metaverse Era

The Labor Market In The Metaverse Era

Do new technologies such as the metaverse present an opportunity or a threat to the existing labor market? As is the case with most innovations, opinions range from unbridled enthusiasm to qualified pessimism. For the optimists, technological innovations represent a historical chance for economies to boost labor productivity and leapfrog to more advanced stages of economic and technological development. Others worry that technological gains may get captured by a small minority of highly skilled workers and large corporations, further fueling inequality between, as well as within, nations.[32]

Meta's director for the MENA region, Fares Akkad, highlighting the opportunity for economic growth that stems from the metaverse, notes that, "The metaverse will help expand economic opportunities even further. For instance, people will be able to choose to study and train in places that felt off-limits because of where they lived or what they could afford. These could help spread economic opportunities and help grow significant sectors of the global economy."

However, he also reminds us of the key obstacles that may stymy these opportunities and contends that:

"

bringing the metaverse to life will require collaboration and cooperation across companies, developers, creators, and policymakers to ensure an open, interoperable, and inclusive metaverse."

He points out that, "hardware needs to be built… infrastructure needs to be transformed… [and] access needs to be improved."[33]

Given the potentially disruptive qualities of the metaverse, it is critical that governments and policymakers anticipate the challenges, as well as opportunities, that workforce transitions to the metaverse will create and proactively engage in writing the rules of the road to safeguard the interests of workers.

The Labor Market And The Metaverse: Opportunities

The metaverse presents us with new opportunities to enhance productivity and economic growth. The advances in technology can help make jobs more efficient and improve skill development – allowing society to upskill and progress as a whole – as well as create new jobs that fit the metaverse era.

As the virtual world develops, it is likely to provide applications and technologies that can drastically reduce the time needed to acquire new skills, for example. Survey results from a recent PwC report[34] show that the metaverse's VR and AR technologies offer important advantages over traditional instructor- or classroom-based training, which can help business leaders upskill their employees faster, even at a time when training budgets may be shrinking and in-person training may be unavailable.

The PwC survey results indicate that employees who were trained using metaverse technologies:

- Can be trained up to four times faster.

- Were almost three times more confident in applying what they were taught.

- Felt almost four times more emotionally connected to the training content than classroom learners and twice more connected than e-learners.

- Were four times more focused during training than their e-learning peers and 1.5 times more focused than their classroom colleagues.

New and potentially more productive types of jobs

The blending of the physical and digital worlds promises to bring new and more productive types of jobs. **Estimates from PwC Research show that the metaverse enhanced the quality of more than 2.6 million jobs globally by the end of 2021 and this number is expected to rise to more than 23 million by 2030.**[35]

The metaverse also promises to create new roles, just as the internet brought roles that barely existed a couple of decades ago. According to Xpheno, a specialist staffing firm, there were an estimated 55,000 metaverse-related job openings in India during the month of June 2022 alone.[36] These included 3D artists, designers, developers, blockchain specialists, data and AI roles, and geospatial architects. As the metaverse continues to evolve, job roles will continue to change. As a recent Harvard Business Review article notes, some of these new roles could include avatar conversation designers, "holoporting" travel agents to ease mobility across different virtual worlds, and metaverse digital wealth management and asset managers.[37]

More Equitable Work Culture

The traditional work model tends to follow a well-defined hierarchy whether in-person or remote. Such a hierarchical system makes it difficult for companies to establish a tight-knit and inclusive culture. The metaverse could change that.

Experts believe that the metaverse is capable of removing barriers and glass ceilings, putting every employee on an equal, virtual playing field.[38] The metaverse would allow companies to create environments where workers have equal access to the whole workspace, regardless of their status. The structure of the workplace would be flattened, augmenting information sharing and team activity. At a government level this would also allow for diplomatic parity: whether it's a small developing nation or a G7 economy, everyone will have representation at the same level regardless of their budgets and infrastructure.[39]

Labor Market And Metaverse: Challenges

Despite its future promise, the metaverse poses significant **risks and challenges for the labor market and its regulators**. Many of these are raised by today's technology, but the massively greater connectivity and integration of the metaverse threatens to significantly exacerbate the risks.

Lack Of Adequate Legal Framework

Traditional work and workplace models are regulated through well-defined national legal frameworks that have evolved over many years. As the metaverse alters the very foundation of work and the mutual obligations that govern it, these frameworks may prove inadequate or inapplicable, creating a legal vacuum.

The metaverse transcends geographical boundaries while employment laws are still largely country or state-specific. This raises the question: what legal safeguards apply in case employee rights are infringed? Should the law of the country where the company that owns the platform is based govern? Should it be the law of the country where the servers are based? Or should it be the law of the country where the employee is physically located? A broader question also exists around the very rights being infringed: what are a metaverse worker's rights and from which law(s) would they be derived?

Dr Christina Yan Zhang, CEO and founder of The Metaverse Institute, raises similar concerns, asking:

"

Will remote employees be subject to the economic environment, and employment laws, of the country where they are physically located, the country where the company is based, or the country they are providing services to?"

This could be very well answered through the terms of each employment contract and dispute-resolution clause itself, but more thought by policymakers must go into the topic.

As the Financial Times recently noted, "So far, no one has decided what legal framework should apply to a decentralized digital workspace, in which workers may be itinerant, and geographically disconnected from each other and the company they work for."[40]

As there are no geographic boundaries, questions regarding minimum wage, work authorizations, and other employee protection laws are certain to arise. For example, if a non-citizen wants to work in the US, they must apply for work authorization. If they work through their avatar, and never physically enter the US, do they still need to obtain such documentation? If they do, then they will also probably need to comply with and obtain authorization as per every nation's unique requirements.[41] These are just some of the considerations that will need further discussion if work in the metaverse ends up as expected.

Risk Of Labor Displacement And Outsourcing

While the metaverse will create new job opportunities, there is also a risk of displacement of certain types of job roles. Dr Dani Rodrik, professor at Harvard University, cautions that two immediate consequences of earlier technological innovation in manufacturing were a steady loss of low-skilled jobs (as a share of total employment) and a rise in the skill premium (the wage differential between skilled and unskilled workers).

With further automation of jobs as the metaverse matures, as well as the emergence of new job types, it will become a challenge for those who do not have adequate skills or upskilling opportunities for the transition. For example, the metaverse, being decentralized in nature, may lead to the elimination of business intermediaries. Additionally, those of a lower socio-economic status may not be able to afford the technologies that allow them to participate in the metaverse labor market.

It is also important to consider the issue of outsourcing, which is already becoming normalized and may yet become more widespread as "metaverse offices" become the norm. The European Trade Union Institute worries that if businesses can have virtual offices that mimic their physical ones while simultaneously having access to a much larger workforce, then their offshore outsourcing capabilities increase; they will be able to outsource more work to countries with low wages and poor labor protection, making it difficult to hold employers liable.[42]

Digital Security And Privacy Of Workers

Given the amount and type of data that is created and collected through metaverse technologies, worker participation in the metaverse raises important questions about their privacy and data security.

Cybersecurity company ExpressVPN found in its survey of 1,500 remote employees that many were concerned about their privacy and security while using the metaverse.[43] Researchers from Harvard University worry that a mature metaverse platform would require data to be collected on eye tracking, facial scans, and other bodily responses that can be linked to an individual's identity.[44]

These concerns are not unfounded. In fact, a Financial Times investigation in January this year revealed Meta's plans to harvest a vast array of biometric data from eye twitches to nose scrunches and body movements to help the company ensure the digital environments they build are realistic.[45]

There is no denying the fact that collection of such personalized data is of utmost importance for the metaverse to be able to deliver the innovative and personalized experiences promised. However, we must likewise be aware of the potential exploitation of this data, and the major implications it raises for workers' privacy and human rights. Meta's patent filings indicate that they have active intentions to mine biometric data to improve user-interface (UI) and targeted advertising.

While most countries have well-established laws for data collection, they fall short of newer forms such as biometric data and the related privacy and cybersecurity matters that come with the metaverse. In addition, unrestricted cross-border data flow would render employees vulnerable to exploitation.[46]

Safety in the workplace

The safety of all individuals online, including employees in the workplace, continues to be a pressing issue. The metaverse may only amplify this problem given the removal of social boundaries and the anonymity that it provides to users.

Recently there have been reports of unacceptable behaviors such as bullying or discrimination in the virtual world of the metaverse. In an interview with the Financial Times, Jonathan Newman, managing associate at law firm Simmons & Simmons, notes, "Recently there have been reports of sexual harassment in the metaverse… which begs the question whether a digital being can have rights, and if so, do the existing protections for harassment extend to that avatar?"[47]

In one of the first detailed public accounts of sexual harassment in VR, a researcher described her experience of having personal space invaded within three minutes of participating in the platform;[48] among some users, there seems to be a belief that such behaviors are acceptable because they occur outside the physical world. Other reports of discrimination have documented gender-based, racial, ethnic, and religious targeting.[49]

While there are laws in place to ensure the comfort and safety of workers in the physical workplace, they may fail to account for new paradigms being created by immersive technology; the laws that protect employees from harassment and discrimination do not map to the virtual world very well. For example, employees can create their avatars however they choose and this presents legally and ethically difficult questions surrounding self-expression and discrimination. Many, if not most, laws prohibit discrimination based on characteristics such as gender, race, religion, age, and disability; avatars can add another layer of complexity to this.[50]

Employees in the metaverse can be anywhere in the real world and the existing laws remain unclear on which country's employment laws will apply and which court would have jurisdiction over certain cases. Additionally, in order to hold an avatar accountable for an act of harassment, a legal persona must be attributed to it, or else it cannot be prosecuted. These are just some examples of the legal gaps that exist.

Adverse psychological impact on employees

The potential for psychological hazards stemming from the metaverse should not be underestimated. While the ability to perform work in the metaverse can have some great benefits, more intrusive forms of surveillance can add to the stress experienced by remote workers. In addition to this, scientists have confirmed that prolonged exposure to screens can lead to side-effects including anxiety, depression, fatigue, and eye strain – it can also shorten attention spans.[51] Working in the metaverse may compound these negative side-effects, holding back the development of younger employees, and also rendering them antisocial and ineffective at work.[52]
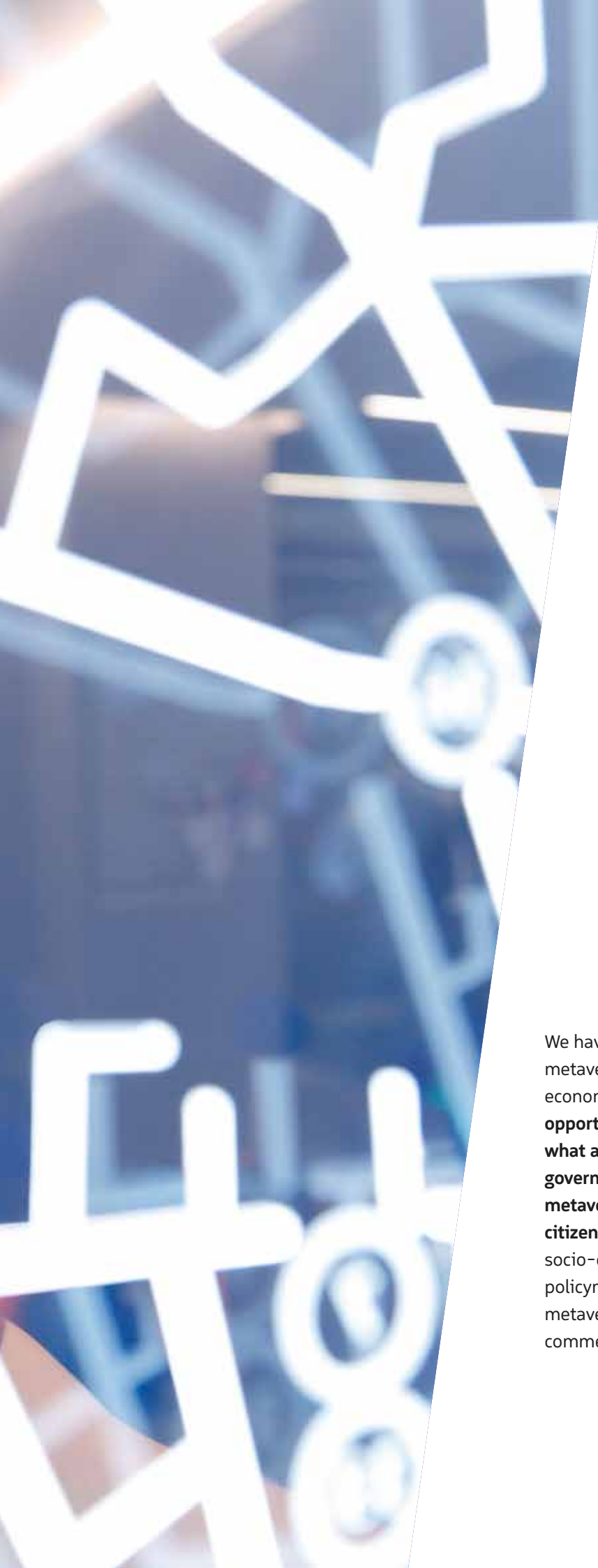
Section 4

Making Government Metaverse-Ready

We have examined the profound impact that the metaverse could have on businesses and the global economy. **But are our governments ready to seize the opportunities and address the challenges? If not, what are the key considerations and next steps for governments to take when preparing for how the metaverse will reshape society and the daily life of citizens?** As it is a government's duty to ensure the socio-economic welfare and safety of its citizens, policymakers need to act now to intervene before the metaverse becomes a reality that is entirely shaped by commercial interests.

How Are Governments Responding?

Some governments have already stepped up to this challenge. Yet approaches to metaverse preparation and regulation already vary markedly, reflecting sharp differences in policy-making practices. This is one of the emerging risks of addressing a borderless entity in geopolitical siloes – although proactivity is still vastly preferable to inactivity when the stakes are so high.

+ East Asia

The metaverse strategy of **China** is characterized by investment tempered by caution and control. Investment is focused on the development of the technical infrastructure that is needed for the adoption and growth of the metaverse, with a stated aim of fostering the creation of new companies in the metaverse space.[53] The Ministry of Industry and Information Technology's development plan focuses on metaverse technologies, recognizing supply-chain issues and discussing how these barriers should be addressed (for example, through greater domestic innovation and national funding).[54]

Singapore, meanwhile, has acted on the threat of harassment in the metaverse labor market, broadening the scope of anti-harassment regulation to include online offenses.[55]

South Korea's National Data Policy Committee announced in 2022 that it would develop regulatory amendments specifically relating to the metaverse. The committee said the regulatory framework currently in place for video gaming would not be sufficient when applied to the metaverse. South Korean ministries and platform providers have also begun discussing growing concerns over sexual harassment of minors on metaverse platforms.[56]

Also in 2022, **Japan** announced the establishment of a Web 3.0 Policy Office to focus on metaverse-related policies.[57]

+ The Middle East

The **UAE** has been among the most proactive of metaverse policy innovators: the Dubai metaverse Strategy includes ideas and technologies ranging from start-up incubators to public safety innovations. The key development is Dubai's VARA, which has a legal personality, financial autonomy, and seeks to create a replicable framework for asset regulation in the metaverse. That includes rules for cross-border dealings and safe adoption of virtual assets. VARA has also issued guidelines for marketing, advertising, and promotion of virtual assets and penalties for non-compliance, although employment and privacy issues remain to be addressed.[59,60,61]Dubai's VARA was the first regulator to open an office in the metaverse with its virtual HQ in The Sandbox.[62]

In 2022, **Saudi Arabia** became the first country to put a UNESCO world heritage site in the metaverse. The Royal Commission for AlUla (RCU) has entered the metaverse with an immersive 3D model of Hegra's Tomb of Lihyan.[63]

+ Europe And The US

In the **United States** regulation often flows from courts and case law rather than policy – such is the case with US responses to metaverse developments. The most significant metaverse-related regulatory act has arisen from a lawsuit filed by the Federal Trade Commission to block Meta's acquisition of a metaverse fitness application on antitrust grounds.[64]

In September 2022, the **EU** launched the Virtual and Augmented Reality Industrial Coalition to bring together stakeholders from key metaverse technologies.[65] In addition, the EU is expected to present an initiative to address the metaverse and all the activities and interactions happening in it sometime in 2023.[66]

Broadly speaking, these initiatives to create new regulations within an overall metaverse policy framework are limited and confined to a few countries. It is our contention that to develop a labor policy for a metaverse that fulfills its promise of a decentralized yet governed and safe digital world, governments must first expand their broad understanding of the metaverse and its technologies.

They must also institutionalize that understanding by creating new roles and interdisciplinary, international alliances specifically designed for the metaverse era. Many private companies are already doing so and public servants could follow their lead. According to Dr Christina Yan Zhang, CEO and founder of The Metaverse Institute:

"

A lot of companies have a chief metaverse officer. There is no reason why government departments shouldn't have a metaverse minister, a metaverse secretary of state, or a chief metaverse minister if they take it seriously enough."

Interoperability And Regulation Are Linked

It is widely believed that the degree of interoperability achieved in the metaverse will be key to its utility and adoption. Interoperability goes beyond technical standards, formats, and communication protocols. It includes interoperability in the regulatory sphere, including the degree to which consensus standards on rights and responsibilities emerge.

At the 2022 World Economic Forum, it was argued that making virtual environments interoperable is one of the defining features of the metaverse.[67] Just as interoperability of systems has become a principle of antitrust policy for the internet, interoperability in terms of common values, rights, and responsibilities will become the regulatory challenge of the metaverse.

Yet this principle may well be challenged by the emergence of alternative governance structures for the metaverse. Advocates of the proposed Web 3.0 iteration of the internet, which is based on decentralization of standards and governance, argue that users rather than platform owners or governments should shape the way the metaverse functions. The model is that of decentralized autonomous organizations (DAOs), which issue users with blockchain-based tokens that give owners economic and governance rights. However, it is worth noting that the recent episode of "crypto crash"[68] led to significant financial losses for DAOs and blockchain projects. As the crypto market is highly volatile and prone to fluctuations, the long term impact of the crypto crash on DAOs and blockchain projects is still uncertain.

Whichever approach ultimately wins out, many argue that at this point both governments and metaverse platform providers need to act decisively to establish how standards and regulations should function in a decentralized metaverse.

According to Brandon Johnson, CXO of Terrazero Technologies, a multifaceted but unified digital experience in the metaverse will require unified standards.

"

Having those unified standards will be instrumental in creating opportunities and access for people as well as businesses... In an environment where the digital layer of reality is pervasive and omnipresent, we need to start by having governments come together and decide which standards will be most important, as well as requirements and thresholds for security."

Preparedness Agenda: Building Workforce Capability

The ability of the metaverse to deliver its potential benefits relies on enabling technological infrastructure and a skilled workforce. The metaverse demands a digital awareness that goes beyond the current level of digital skills typical of most populations. It requires an understanding of how digital realities are constructed, what risks they create, and how to exploit their opportunities safely.

However, globally there is a wide variance in technological infrastructure and in the availability of a skilled workforce. Most importantly, as can be seen in Figures 2 and 3, lower-income nations, on average, tend to have poorer technological infrastructure and fewer high-skilled workers.

Without any course-correction measures, the metaverse could further exacerbate global inequalities. The metaverse will first benefit countries who are already in possession of its enabling technologies and a skilled workforce. Countries that supply the necessary infrastructure may also have greater control over the technology and how it develops.[69] **In the absence of any policy intervention, countries and communities already lagging behind in technology and internet adoption will be further isolated.**[70]

So, what can governments do to ensure a more equitable metaverse? The first step should be to increase their spending on technological and educational infrastructure. Even in cases where government spending remains reasonably high, education may fail to produce a workforce with the digital skills demanded by the metaverse.[71] **Hence, governments will have to undertake measures to introduce educational reforms to ensure the future workforce has specific digitally relevant skills that support metaverse leadership.**

Figure 2: Income Level and Digital Adoption
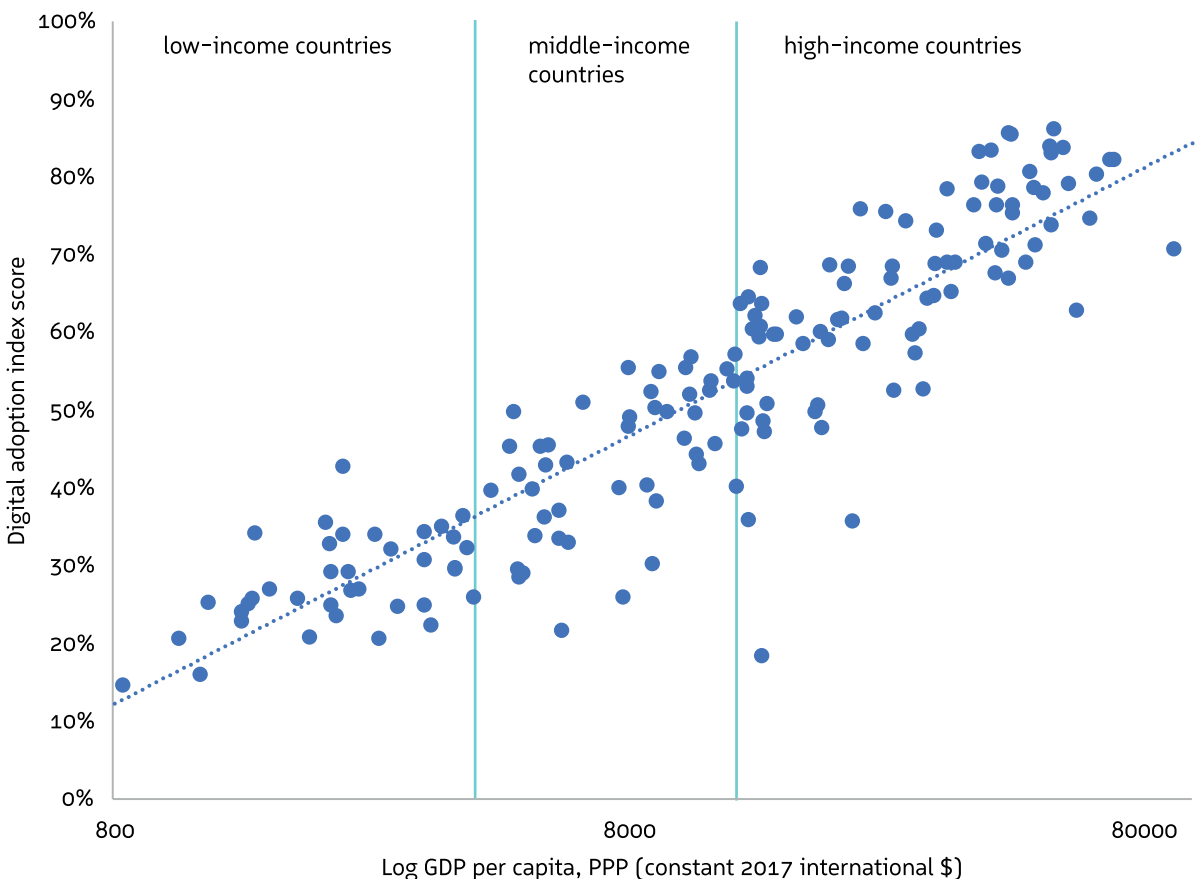
44

Figure 3: Income Level and Skilled Workforce
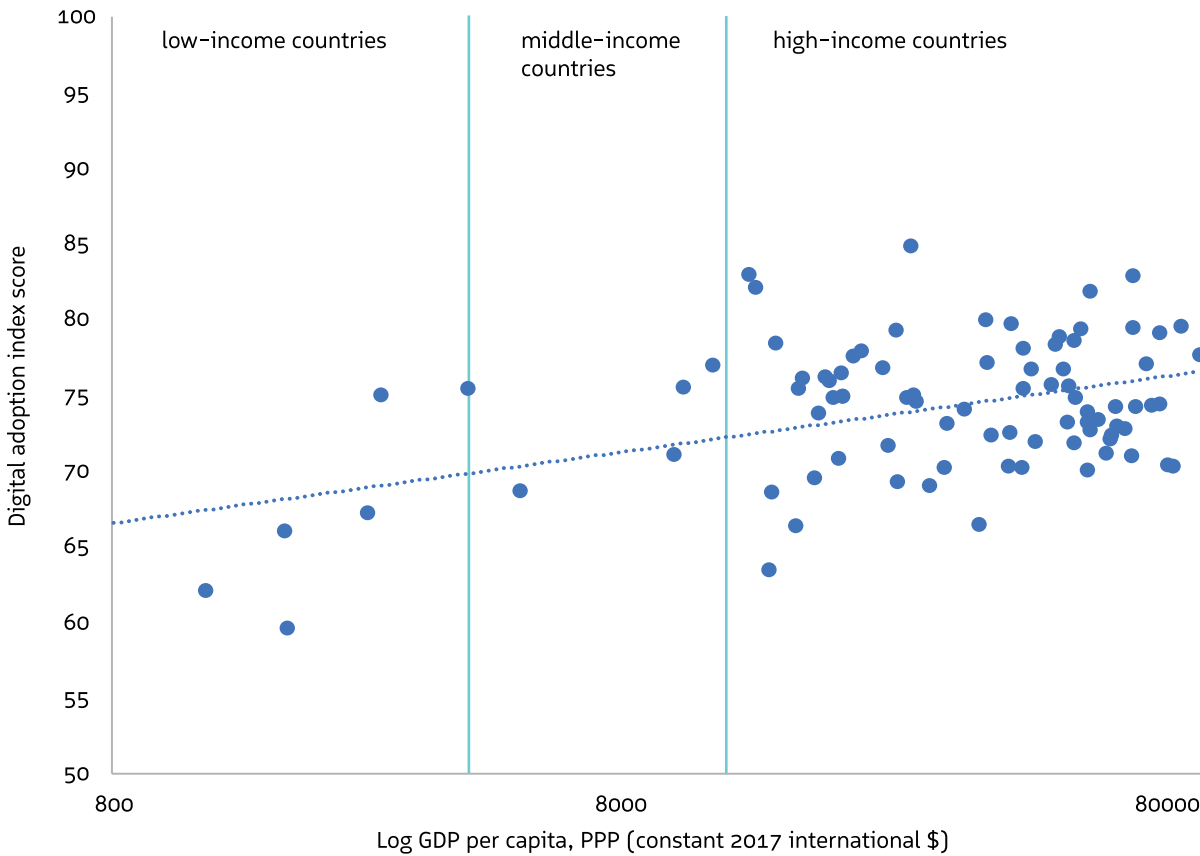
Source: World Bank, PwC Analysis.

Preparedness Agenda: Enhancing The Capability Of Regulators

At present, the technical and conceptual knowledge level of the regulators who will have to understand the metaverse and the challenges that come with it leaves much to be desired. This gap will have to be addressed for governments to anticipate emerging issues and legislate proactively.
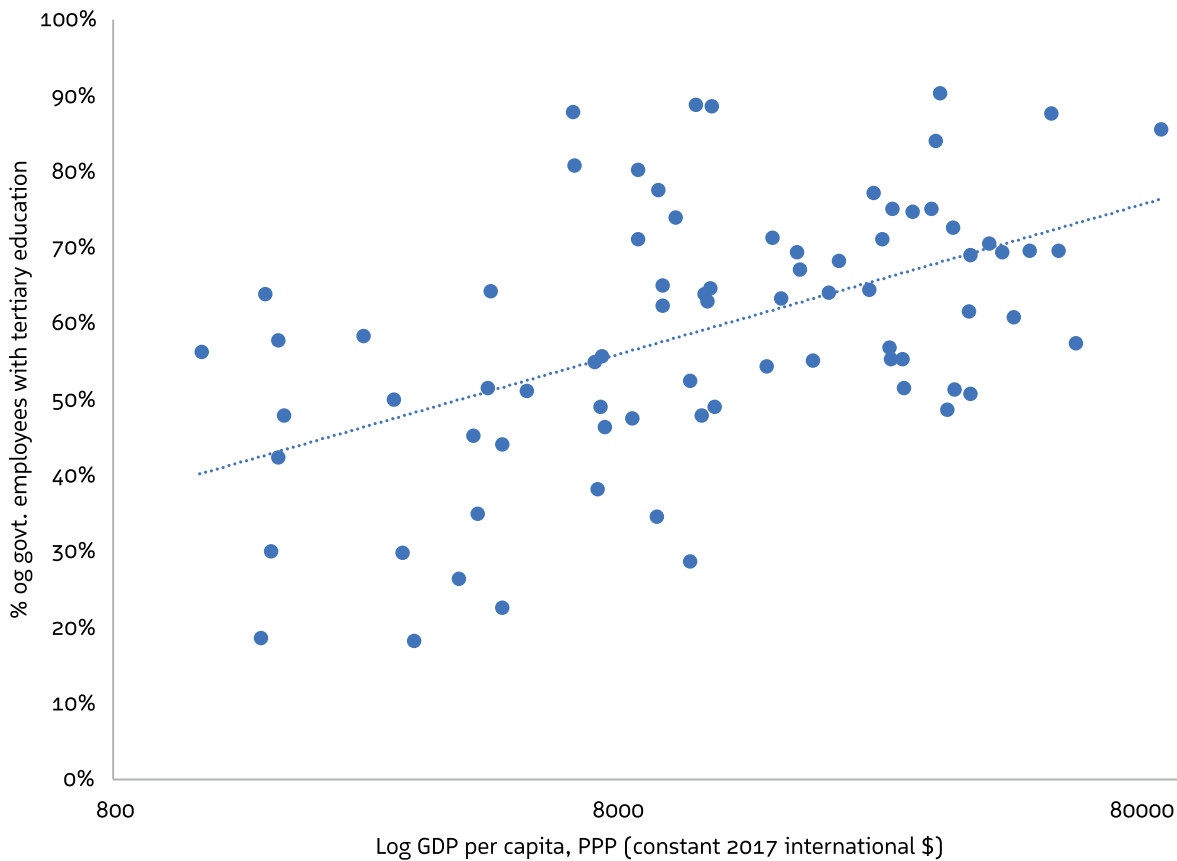
In the administrative sphere, civil service employees and senior policymakers will need to create formalized policies on issues ranging from specific labor rights to transaction protocols, from legal recognition of new entities and civil and criminal codes for compliance, to the rights and responsibilities of companies and individuals. They will be tasked to deliver public services in a much richer digital sphere than they are accustomed to, one that operates in multiple dimensions, 24 hours a day, seven days a week.

The lack of a broader technologically skilled government workforce is an underlying problem. As can be seen in Figure 4, this is especially acute in low-income countries where the share of government workforce with at least tertiary education remains far below that in richer counterparts.

In the metaverse era, governments and public servants will be challenged to think differently about the world they inhabit. They will have to develop an advanced awareness of the future interplay between virtual and physical realities in an increasingly hybrid world, and the risks of fraud, online harm, identity theft, virtual human trafficking, and cyber-crime.

Figure 4: Income Level and Skill-level of Government Employees

For many governmental administrations, this represents a mindset change – and for public servants the learning curve will be steep. According to Dr Christina Zhang:

"

Civil servants are usually very busy, and may not be able to keep up with the fast change of the private sector, so some technologies can develop too quickly to be regulated effectively". She adds, "It is good practice for the government to set up expert groups, consisting of representatives from industry and other stakeholders, to advise and support. Civil servants, with their expertise in how the government works, can become the coordinators for these expert groups, ensuring all stakeholders' voices are heard. Many governments find this approach effective in developing policies for emerging technology such as the metaverse and Web 3.0."

Preparedness Agenda: A New Kind Of Regulation

The key challenge for policymakers is that the metaverse is itself undefined constantly and evolving, making it uniquely difficult to legislate amid such uncertainty. Policymakers will have to draw on both tried and tested regulatory approaches that can be repurposed for the metaverse, as well as newly developed concepts of regulation.

The regulatory framework for an evolving digital future must strive to create predictability in an environment that is inherently unpredictable. Citizens and businesses will hesitate to engage with the metaverse if they do not have confidence in the security of transactions, the enforceability of contracts, the privacy of their data, the legal status of assets, or the authenticity of identities.

In the 20th century, a solution was created to address the challenge of resolving international business disputes, for situations where there was ambiguity regarding which country's laws applied, and which courts had jurisdiction.[72] This solution, known as international arbitration, has now become widely used for its worldwide enforceability, as well as convenience of process, which national courts struggle to offer. As already discussed, the metaverse – with its lack of geographical boundaries – makes the idea and framework of international arbitration an attractive option for dealing with business and contractual disputes. However, several preparatory steps would need to be taken for this to become a reality. For example, arbitration rules need to be put in place for the metaverse, just as rules set by the International Chamber of Commerce (ICC), the Dubai International Arbitration Centre (DIAC), the Singapore International Arbitration Centre (SIAC), and the United Nations Commission on International Trade Law (UNCITRAL) are already used to govern proceedings in the arbitration process.

Additionally, overall governing frameworks need to be developed if the metaverse is to be chosen as the seat of arbitration – it must have a governing law, set through international collaboration. While it is still possible for parties to choose the governing law of their arbitration to be that of a specific country, it remains to be seen whether the current laws of any specific country will be able to be interpreted and applied to as-of-yet unprecedented scenarios.

Arbitration, while potentially useful for business disputes, could be seen as impractical for employment disputes due to the associated costs. Taking alternative methods into consideration, mediation is also an effective form of dispute resolution. Given the nature of labor disputes, mediation tends to be a go-to option to resolve labor conflicts and issues; it is effective and efficient. The drawback is that mediation, in most cases, is a voluntary process, and while parties can be forced to mediate a case, that doesn't mean they are forced to leave a mediation with an agreement. Unless a mediation is court-ordered, it is only legally binding if a written agreement is reached, and the absence of a metaverse court can make follow-up actions (in the case that an agreement is not reached, for example) and enforceability a problem. For something like this to work, collaboration must happen on an international level to establish a judiciary system to support and enforce outcomes.

The metaverse will also encourage a **new regulatory approach to contract law**, including contracts of employment. Contracts will become streamlined and automated through the use of blockchain-based "smart contracts", but these will require legal recognition. The metaverse will also demand new approaches to **data protection** for employees. The volume and nature of personal data that can be collected through digital interactions is already a cause for widespread concern. This concern will be greatly intensified in the metaverse, because of the potential for organizations to obtain new kinds of information about individuals (including employees), such as their movements, actions, or habits. Current regulations in the EU, for example, create duties of care for organizations that collect personal data. However, in the metaverse it may be difficult to establish who bears the responsibility for data processing, as a decentralized network may be involved. It will also be necessary to evaluate who is responsible in the event of lost or stolen data, and how consent for data collection can be given in a decentralized world of digital avatars.

Perhaps most importantly of all, regulators and policymakers will need to think through **new and unfamiliar concepts of digital rights and responsibilities in the workplace**. Civil and criminal offenses that can be committed in the "real" world can also be committed in the metaverse, giving rise to debates on the correct course of justice: does an avatar have the rights analogous to familiar human rights? Some metaverse platform providers already treat avatars as entities with rights and responsibilities that could potentially be tested in traditional courts of law, as seen for example in Meta's creation of a "safe zone" feature that creates a protective bubble to prevent close contact between digital entities. Policymakers must consider whether existing legal frameworks and precedents are sufficient to govern the interactions of new kinds of digital entities in metaverse workplaces.

Managing the metaverse

In a paper for a recent symposium on virtual reality, the metaverse researcher Louis Rosenberg proposed a roadmap for regulation of the metaverse.[73] It is just one approach to policy making in the metaverse era, but it shows how governments could respond to some of the negative outcomes of metaverse adoption, while preserving benefits.

Rosenberg suggested that it may be impossible for regulators to limit the amount of **personal data tracking** that metaverse platforms engage in, but that companies could be restricted in terms of how long they could store raw data. Additionally, these platforms could be required to inform users as to what data is being tracked, why, and for how long.

It was also suggested that **virtual product placement** – for example, by injecting promotional artifacts into the metaverse experience in ways that seem authentic – should also be restricted, along with targeted presentation of political messaging.

Rosenberg argued that the most effective way of regulating such techniques might be to create a requirement that "**simulated personae**" should be identified by overt visual cues that reveal whether an encounter in the metaverse is a "natural" encounter or a targeted promotional interaction.

Section 5

Conclusion

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The metaverse will dwarf the digital transformations the world has already seen, both in scope and scale. It will create a digital world that parallels the "real world", but with powers and possibilities that are unprecedented. Individuals and organizations will be able to decide who they are and what they look like in the metaverse. They will be able to capture and process data, transact and access services, and experience the world in multiple dimensions, including representations of both past and future. They will be able to create and work in roles that have never existed before, in a new borderless world.

Despite these significant benefits, the metaverse also presents great risks that the world will have to deal with. Where identities can be created at will, so can disguises. Where transactions break free of established rule-governed processes, fraud and theft are also invited. And where work takes place in a decentralized self-created world, the rights and responsibilities attached to work and employment are also called into question.

Clearly policymakers must start to adapt and prepare now. The COVID-19 pandemic redefined the boundaries of work: policymakers should build on the adaptations of the past few years as they prepare for an even more fluid labor environment. **And governments need to learn from private as well as public sources how to become ambidextrous in a hybrid digital/analogue world**, where real-world organizations and individuals must interact with the new digital entities and emerging data types that will be characteristic of future work and commerce.

Furthermore, policymakers need to recognize that this digital space will create new forms of labor markets that will require new regulations and regulatory capacity. This is why we believe governments must undertake a thorough assessment of their capabilities and preparedness. They should start by examining the human resources capabilities that need to be fostered both inside the administrative arms of government and in the economy at large.

Moreover, they need to consider how to regulate the metaverse in ways that strengthen security, privacy and safety, not only for employees, but for all citizens. And they need to understand the emerging technologies of the metaverse and the digital infrastructure challenges they represent, to ensure that their citizens and their labor forces are not excluded from what is likely to be one of the great drivers of economic growth of the coming era.

Governments must realize that the metaverse transcends boundaries, and working in isolation to put in place a set of rules and regulations is doomed to fail. All stakeholders will have to come together to develop an effective set of international regulations to mitigate the evolving risks and capture the potential opportunities. These stakeholders must include representation from the major tech companies, governments, developers, and users.

While this cross-boundary representation would help us create a governance framework to tackle most of the challenges that we can anticipate now, it must be fluid, ongoing, and, critically, proactive as the metaverse continues to evolve, giving rise to unprecedented challenges and demanding new forms of governance.

Last but not least, as the international community comes together to codify new sets of regulations, it must consider a range of legal and technical issues such as contractual terms, intellectual property, content licensing, and ownership and trading of digital assets, to ensure that the digital workplaces of the future are as safe, equitable, and trusted as possible. **Building these robust, transparent, and future-proofed frameworks will be a key determinant of whether the metaverse's ability to transform society will truly be a progressive force for good.**

Endnotes

1. https://twitter.com/i_am_nickbloom/status/1564236320259461120

2. Dubai metaverse Assembly Outcomes Report, dubaifuture.ae/metaverse

3. https://metaverse.strategyand.pwc.com/m1/en/strategic-foresight/functional-expertise/digital/metaverse/middle-east-perspective-on-the-metaverse.pdf

4. https://metaverse.pwc.com/us/en/tech-effect/emerging-tech/metaverse-survey.html

5. https://hbr.org/2022/04/how-the-metaverse-could-change-work

6. https://metaverse.forbes.com/sites/joshwilson/2022/12/19/software-companies-pushing-to-raise-the-scope-of-virtual-reality/?sh=5c7e8f1e2b9a

7. https://metaverse.forbes.com/sites/forbestechcouncil/2021/09/14/augmented-and-virtual-reality-after-covid-19/?sh=499ec7072d97

8. https://news.microsoft.com/2022/01/18/microsoft-to-acquire-activision-blizzard-to-bring-the-joy-and-community-of-gaming-to-everyone-across-every-device/.

9. https://metaverse.cnbc.com/2022/02/24/metaverse-experiments-conducted-by-samsung-jpmorgan-gucci-coca-cola.html.

10. https://metaverse.bloomberg.com/news/articles/2021-12-14/barbados-tries-digital-diplomacy-with-planned-metaverse-embassy.

11. https://metaverse.washingtonpost.com/history/2022/06/30/snow-crash-neal-stephenson-metaverse/.

12. https://metaverse.matthewball.vc/all/themetaverse, https://metaverse.matthewball.vc/all/forwardtothemetaverseprimer

13. https://metaverse.pwc.com/us/en/tech-effect/emerging-tech/demystifying-the-metaverse.html

14. https://metaverse.pwc.com/us/en/tech-effect/emerging-tech/demystifying-the-metaverse.html

15. Dubai metaversemetaverse assembly Outcomes Report, PwC

16. https://metaverse.pwc.in/consulting/technology/emerging-tech/how-is-the-metaversemetaverse-set-to-shape-the-future-of-business.html

17. https://metaverse.pwc.com/us/en/tech-effect/emerging-tech/virtual-reality-study.html#:~:text=In%20our%20study%2C%20VR%2Dtrained,training%20and%20have%20better%20outcomes.

18. https://venturebeat.com/business/nhs-finds-vr-training-boosts-coronavirus-frontline-worker-performance/

19. https://blogs.worldbank.org/digital-development/can-metaversemetaverse-offer-benefits-developing-countries

20. https://accelerationeconomy.com/metaversemetaverse/3-key-elements-of-shanghais-metaversemetaverse-strategy/#:~:text=The%20strategy%20focuses%20on%20developing,new%20companies%20in%20the%20space

21. https://qz.com/china-is-bringing-industrial-policy-to-the-metaversemetaverse-1849736425

22. https://u.ae/en/about-the-uae/strategies-initiatives-and-awards/local-governments-strategies-and-plans/dubai-metaversemetaverse-strategy#:~:text=The%20Dubai%20metaversemetaverse%20Strategy%20aims,fields%20of%20blockchain%20and%20metaversemetaverse.

23. https://metaverse.vara.ae/en/

24. https://metaverse.tandfonline.com/doi/pdf/10.1080/10630732.2020.1798177?_cf_chl_tk=RmDat4nGK7JYLxHpUUeL7bQBz36p6AlnBGuyQ4wbvUY-1667580388-0-gaNycGzNCWU

25. https://metaverse.cnbc.com/2022/05/30/south-koreas-investment-in-the-metaverse-could-provide-a-blueprint.html

26. https://metaverse.worldbank.org/content/dam/photos/1440x600/2022/apr/metaversemetaverse-and-developing-countries-by-Randeep-Sudan.pdf

27. https://metaverse.al-monitor.com/originals/2022/10/israel-announces-metaverse-embassy-south-korea

28. https://metaverse.reuters.com/markets/funds/saudi-arabia-announces-64-billion-investments-future-tech-2022-02-01/

29. https://metaverse.reuters.com/technology/saudi-neoms-tech-unit-rebrands-invests-1-bln-2022-ceo-2022-09-27/

Endnotes

30 https://metaverse.al-monitor.com/originals/2022/02/saudi-arabia-invest-billions-metaversemetaverse-blockchain-technology

31 https://metaverse.chathamhouse.org/2022/04/what-metaversemetaverse

32 https://metaverse.nber.org/system/files/working_papers/w25164/w25164.pdf

33 https://metaverse.arabianbusiness.com/industries/technology/how-will-the-metaverse-create-jobs-unlock-economic-opportunities-and-benefit-firms-in-the-mena-region

34 https://metaverse.pwc.com/us/en/tech-effect/emerging-tech/virtual-reality-study.html#:~:text=In%20our%20study%2C%20VR%2Dtrained,training%20and%20have%20better%20outcomes

35 https://metaverse.pwc.com/SeeingIsBelieving

36 https://economictimes.indiatimes.com/tech/technology/demand-for-tech-professionals-for-it-cos-metaverse-startups-surge/articleshow/93094252.cms?from=mdr

37 https://hbr.org/2022/04/how-the-metaverse-could-change-work

38 https://metaverse.weforum.org/agenda/2022/09/metawork-pros-and-cons/

39 HE Gabriel Abed at the Dubai metaversemetaverse assembly

40 https://metaverse.ft.com/content/9463ed05-c847-425d-9051-482bd3a1e4b1

41 https://metaverse.natlawreview.com/article/employment-law-metaverse-us

42 https://metaverse.etui.org/news/metaverse-labour-issue

43 https://metaverse.expressvpn.com/blog/survey-reveals-surveillance-fears-over-the-metaverse-workplace/

44 https://carrcenter.hks.harvard.edu/files/cchr/files/ccdp_2020-008_brittanheller.pdf

45 https://metaverse.ft.com/content/9463ed05-c847-425d-9051-482bd3a1e4b1

46 https://metaverse.shrm.org/resourcesandtools/hr-topics/global-hr/pages/uk-expect-metaverse-employment-disputes.aspx

47 https://metaverse.ft.com/content/9463ed05-c847-425d-9051-482bd3a1e4b1

48 https://medium.com/athena-talks/my-first-virtual-reality-sexual-assault-2330410b62ee

49 https://carrcenter.hks.harvard.edu/files/cchr/files/ccdp_2020-008_brittanheller.pdf

50 https://metaverse.livelaw.in/columns/metaverse-workplace-hybrid-offices-e-currency-social-interaction-it-act-212362

51 https://metaverse.ncbi.nlm.nih.gov/pmc/articles/PMC6679162/

52 https://metaverse.weforum.org/agenda/2022/09/metawork-pros-and-cons/

53 https://accelerationeconomy.com/metaverse/3-key-elements-of-shanghais-metaverse-strategy/

54 https://qz.com/china-is-bringing-industrial-policy-to-the-metaverse-1849736425

55 https://clarkslegal.com/insights/articles/the-metaverse-employment-law-implications/

56 https://metaverse.mondaq.com/unitedstates/fintech/1234182/eu-south-korea-japan-announce-metaverse-regulation-plans

57 https://metaverse.meti.go.jp/english/press/2022/0715_002.html

58 https://u.ae/en/about-the-uae/strategies-initiatives-and-awards/strategies-plans-and-visions/government-services-and-digital-transformation/dubai-metaverse-strategy

59 https://metaverse.vara.ae/en/

60 https://u.ae/en/about-the-uae/digital-uae/regulation-of-digital-properties

61 https://metaverse.vara.ae/en/

62 https://gulfbusiness.com/dubais-virtual-assets-regulatory-authority-enters-the-metaverse-with-sandbox-hq/

63 https://metaverse.connectingtravel.com/news/saudis-alula-enters-the-metaverse

64 https://metaverse.ftc.gov/news-events/news/press-releases/2022/07/ftc-seeks-block-virtual-reality-giant-metas-acquisition-popular-app-creator-within

65 https://ec.europa.eu/commission/presscorner/detail/de/STATEMENT_22_5525

66 https://news.bitcoin.com/european-union-to-launch-global-metaverse-regulation-initiative-in-2023/

Endnotes

67   https://initiatives.weforum.org/defining-and-
      building-the-metaverse/home

68   The crypto crash, also referred to as the "crypto
      winter", was a period of market downturn in
      November 2022 when the prices of cryptocurrencies
      fell significantly.

69   https://metaverse.nytimes.com/2021/12/02/
      opinion/metaverse-politics-disinformation-society.
      html?searchResultPosition=20

70   https://metaverse.brookings.edu/techstream/a-
      proactive-approach-toward-addressing-the-
      challenges-of-the-metaverse/

71   https://blogs.worldbank.org/impactevaluations/
      education-spending-and-student-learning-outcomes

72   https://arbitrationblog.kluwerarbitration.
      com/2021/02/06/the-development-of-international-
      arbitration-as-a-mechanism-for-determining-
      international-business-disputes/

73   https://doi.org/10.1145/3546607.3546611

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