



# VIRTUAL



The Metaverse  
and the  
New Frontiers  
of Human  
Experience

'A fascinating,  
provocative case'

ADAM GRANT

'Big and convincing'

ARIANNA HUFFINGTON

# SOCIETY

# HERMAN NARULA

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‘A fascinating, provocative case that the metaverse will not merely transform our virtual experiences – it may actually enrich the quality of our lives’ Adam Grant,  
number one *New York Times* bestselling author  
of *Think Again*

‘Brimming with big and convincing arguments about where human life is heading’ Arianna Huffington,  
founder and CEO of Thrive

‘This mind-expanding, vitally important book blows through superficial takes’ Marc Andreessen, co-founder  
and general partner of Andreessen Horowitz

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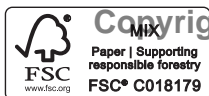
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To Elsa, for whom all worlds open

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# Introduction

One day this book will be read by a person without a body.

This prediction will almost certainly come true before the end of the twenty-first century, perhaps even by 2040. Consider: We already know with some confidence that the mind is a machine that processes information. Connecting it to a computer—one with the capacity to simulate an entire world—is a fully plausible outcome and, I would argue, an inevitable one. Through developments in the field of quantum metrology, we are already able to create sensors that can listen to the electromagnetic “whispers” of the activity of clusters of neurons. Bio-compatible carbon nanotubes, which are immensely strong and immensely conductive, hold promise as “neural laces”: the building blocks of connections to individual neurons. If a brain can connect to a computer—whatever that eventually means—and if the computers of the future can create worlds that are as

detailed as or more detailed than the one we know today, then surely a life mediated by the limits of a physical body will one day seem a pale shadow of the life of the unfettered mind.

This theoretical reader without a body—what some would call a “post-human”—will be able to access and process information in ways we can’t even begin to understand today. What might it feel like to consume this text as information directly delivered to your mind in a digital reality? Maybe comprehension and integration of the book’s ideas will happen instantly or nonlinearly, the hundreds of concepts forming into structures in the post-human brain at the speed of an exploding firework. Perhaps these disembodied readers will ingest this book via new senses that haven’t yet been invented, or will revel in a synesthetic poetry of sounds, smells, and touch as they explore concepts with a fidelity and detail impossible through the bodily senses alone. The adventures we read about in history, science fiction, or fantasy could become the actual embodied reality of a post-human society. This post-human will live a thousand parallel lives in realities we can barely fathom.

As technology and its applications continue to improve and evolve, we are approaching a new epoch in human history, one in which the possibilities of our lives will diverge from the limits of our bodies. At that point, the world of ideas will generate actual worlds that we can inhabit: constructed realities that will exist in conversation with the physical world. Achieving this vision requires no new physics, only the inevitable waves of improvement and upgrade that we’ve become so good at as a species. The physical tools we’ve devised have transformed the Earth while enhancing our lives upon it. Our many cultural technologies—the myths and stories and rituals that have grown up alongside our tools—give form and meaning to our innovations. Reshaping our environments, for good or ill, has been key

to the survival of our species since prehistory. We have always used our imaginations in tandem with our hands to explore new worlds while expanding our own. That is the human impulse, and this dynamic will persist even as our “hands” will increasingly become just a figure of speech.

This vision of a virtual future might strike you as dystopian. Maybe you envision humans being reduced to rows of bloodless, pulsating brains in jars, or you worry that technological change is happening too fast. Maybe you fear that our own world may devolve into waste and chaos as we escape into cyberspace. Perhaps to you the prospect of a life mediated by machines seems like one in which we’ll be deprived of our essential humanity.

But I’d challenge you to set aside your preconceptions and consider the following: Throughout the history of our species, we humans have always imagined other, better futures for ourselves, intangible worlds that we expect to be more fulfilling and experientially rich than our daily lives. Our ability to visualize and believe in these futures is itself a cultural technology, one that we use to improve our experiences of life and reality. Depictions of the afterlife, created by artists for millennia, aren’t just manifestations of religious devotion: They are extensions of an ongoing human impulse to instantiate the intangible, to visualize ideal worlds and thus make them real. We have always wanted to see, feel, and understand more than we do, and in pursuit of these goals we have consistently tried to transcend the limits imposed on us by biology and geology, and extend ourselves into potential worlds mediated only by our minds.

This important and necessary social transformation does not require the direct connection of the brain to a machine. While brain-computer interfaces will mark the most dramatic final stage in this progression, the next stage of this process will

see us focusing our social and cultural attentions into a series of constructed digital realities. Today, these simulations are known as virtual worlds: embodied, three-dimensional digital spaces in which people interact via avatars. These complex graphical environments, previously thought to be the province of video games and entertainment alone, are now evolving into something much more. A “metaverse” of virtual worlds extending into every aspect of our culture is starting to emerge, presenting new economic and social opportunities that are comparable in scope to the disruption caused by the internet. Many people have characterized the metaverse and virtual worlds as a fad, or simply an evolution of video games. I believe this limited framework is based on a fundamental misunderstanding of why humans create other realities and how we seek fulfillment.

Confusion over what the metaverse is will generate broken, inconsistent models of what it is for—which, in turn, will ultimately lead to wasteful allocation of capital, ineffective attempts at regulation, and a magnification of the negative aspects of this disruption. My aim with this book is to help prevent these outcomes. In the pages that follow I will offer a new way to understand this massive transition toward a virtual society—a transition that, if we manage it carefully and learn from the mistakes of the first age of the internet, will offer humankind incomparable new dimensions of freedom.

Within decades, the worlds we create out of pixels and populate with avatars will come to matter intensely to hundreds of millions of people; the value found within these worlds will be co-created by an ever larger cross-section of society. Eventually, these worlds may well turn out to be indistinguishable from our own. When this moment arrives, it won't be a dark day for humanity: It will be the ultimate realization of an ingenious exploratory impulse that is as old as the human race. Rather than

representing society's demoralizing descent into technological escapism, the emergence of virtual society will mark the beginning of an era in which we will explore new, positive frontiers in psychological fulfillment and mental health; recenter our economy and modes of education around individual needs; forge remarkable new communities built on shared interests and experiences; and bring about a world more humane than the one we are afraid to leave behind.

This hope for a newly empowering, just, and equitable society sits at the core of this book's vision of our virtual future. I believe that the rise of so-called post-human technologies will soon produce robust virtual societies that will transform the way we live on Earth, while redefining what it means to be human. Picture a world in which you could master a new skill in a single afternoon, using advanced simulation technology that can pack a decade's worth of trial and error into a two-hour span. Or imagine participating in a massive festival that meaningfully involves every single user of the virtual world in which it exists: a universe-scale celebration in which thousands or even millions of people have the chance to be the center of attention. United by a spirit of play and a sense of mutual participation in the same transformative experience, the participants in this world will feel like truly integral parts of something bigger than themselves, on a scale that no terrestrial activity can hope to match.

The virtual worlds that people like me are working to build will be centered around these sorts of useful and fulfilling experiences. In them, users will be able to interact with their friends, meet new ones, learn valuable skills, have exciting adventures, and participate in civil society. These experiences will offer people the chances to explore new challenges, express their creativity, and consistently find satisfaction, social uplift, and joy. The

advanced computing technologies that will power these worlds will be able to generate valuable experiences with speed and precision, like machines that are built to produce human fulfillment.

The rewards of virtual society won't be only psychological ones. Before long, people will earn money in virtual worlds by performing an array of jobs that will match and exceed real-world jobs in terms of salary, accessibility, and satisfaction. The inevitable expansion of economic opportunities within these other worlds will have a transformative effect on human society. In a decade or two, the locus of our culture, economy, and society will shift from a single world—the legacy “real world,” you could say—to many worlds.

While these other worlds will immerse the senses, the fact that they will look and feel “real” won't be what makes them valuable. These worlds will be valuable because they will remake our lives by extending the context of society into new realms, allowing for the transfer of wealth, ideas, identity, and influence—the building blocks of human social relations—between our current reality and the digital ones that we create. The combination of these realities, and the transfer of value between them, will comprise the digital metaverse.

This book is your guide to virtual worlds and digital metaverses: why they are important, why they are necessary, and why they will change society for the better. In it, I hope to provide a working theory of how the metaverse will create value for both individuals and society. With this theory in hand, we can then look at the ways in which this value might be maximized. In the process, I hope to move beyond the business and technical contexts of the metaverse and into the human context. My goal in these pages is to present a comprehensive explanation of why ideating within virtual spaces matters so much to our past,

present, and future. While I hope that investors and entrepreneurs will find this book useful, I have written it with many others in mind, too: scientists, regulators, historians, content creators, and everyday people looking to reconcile the hype they've heard about the metaverse with some sense of why it will matter to their own lives.

You can consider this book an attempt to offer a historically grounded and practical theory of metaverses: how to define them, how to measure their utility, and how to understand their interaction with existing ideas. What are the fundamental forces that drive humans to create these other worlds? How will they evolve as they take digital form? Why do they matter to individuals and to society? In the first half of this book, I'll address these questions and explain why the metaverse is more than just the future of the internet: It's the future of human experience. Though this book assumes and builds on the work of anthropologists and sociologists, it does not seek to replicate that work, only to demonstrate that the utility of other worlds is an established fact.

In the second half of this book, I will take a more microscopic view of the digital metaverses that will soon come to affect all of our lives. I'll attempt to establish a set of guiding principles for creating a metaverse that is equitable, useful, efficient, and fulfilling. I'll propose an ideal organizational model for building a valuable metaverse; examine how social, psychological, and economic value are related within virtual contexts; and offer some thoughts on ideal modes of oversight and regulation for the metaverse. My goal with this section is to establish the parameters for an optimally valuable metaverse, as well as the best ways to bring it to life.

My vision and predictions for the future are rooted in practical experience. As an entrepreneur and computer scientist who

has spent much of the last decade building complex virtual worlds and the infrastructure for the metaverse, I have direct insight into the technical and organizational challenges that we face on the road to virtual society. Perhaps more important, I've long been immersed in the company of entrepreneurs, investors, and builders working toward the problem of creating the metaverse. This book represents the best synthesis of what I've learned from them over the past decade.

When I was growing up, digital games let me learn and experience things that were inaccessible in the real world. These games instilled in me a sense of wonder and exploration. My experience with them was, in fact, the opposite of the stereotypical image of a gamer who wants to withdraw from the world. In the games I played, I wanted to go somewhere, to do more, to be more, and to feel more fulfilled. Often, I would return from my gaming sessions feeling transformed. I strongly identified with the children in *The Chronicles of Narnia* by C. S. Lewis, who would go through the wardrobe into another world of adventures and return with fresh understandings and new perspectives—so much so that, as a kid, I personally investigated countless wardrobes for potential interdimensional portals. (I didn't find any.)

Now that I am lucky enough to build virtual worlds for a living, I am more convinced than ever that engagement within them can and will change people's lives for the better—if, that is, we take the time now, at this crucial juncture, to base our plans for the future in a clear understanding of the value that these worlds can create for individuals and society. This value is not limited to entertainment or escapism. One of the greatest surprises of my career has been the incredible importance of simulated virtual worlds to the future of military planning and strategy. My experience building virtual training environments

for real-world militaries has convinced me that these simulated spaces will have immense value to countless other fields of human endeavor.

You might be skeptical that the metaverse will create any value whatsoever. After all, recent history is littered with examples of wild predictions around various innovations that pundits tend to lump together: virtual reality, augmented reality, artificial intelligence, cryptocurrency, and, yes, the metaverse. Society is now continuously anticipating, arguing, and betting on technology and products that do not yet fully exist. In the process, pundits and prognosticators tend to latch on to certain narratives of the future, regardless of whether they are accurate or optimal. Those narratives then become disproportionately important in determining which ideas and projects get funded, built, and used.

As a result, tech soothsayers are often correct about the general direction in which society is headed while also being wildly wrong about the specifics of the journey from here to there. Just think of the dot-com crash and the demise of so many companies that, while in the right field, had the wrong model of how value was created therein. The public is not well served when a new technology's loudest promoters cannot clearly explain its point or its purpose. Opaque and breathless narratives of the future tend to breed cynicism and resentment. This state is where we're at right now with the metaverse.

In the media and among entrepreneurs and investors, virtual worlds have been discussed and understood primarily through the prism of video games, commerce, and entertainment. Many are adamant that the metaverse is the next big thing, and yet are maddeningly vague when it comes to defining both what it is and why it will and should matter. Their visions for the metaverse often seem to be rooted in the immersive

worlds of fiction: the *Matrix* films, for example, or books and stories by Neal Stephenson or William Gibson. When pressed for an exact definition of the metaverse, these people generally describe high-resolution embodied 3D environments with rich interactive possibilities—in which users might shop, play, meet, learn, and love.

The best that can be said for these frameworks is that they are woefully incomplete. Outdated or superficial visions of virtual worlds and the metaverse tend to focus on the what, but not the why; the thing, but not its purpose; the opportunities that will be made available to us in embodied digital spaces, but not the reasons why we would want to pursue them in the first place. These conceptual gaps present a problem if you are trying to build a metaverse business, or to regulate the space, or even to understand the changes that are about to happen. In the absence of meaningful discussion of the value that virtual worlds will create for individuals and society, the metaverse can start to seem intangible and superficial.

This broad, shallow model is inhibiting our ability to perceive and shape the future. We need better models for the future, ones that are conceptually expansive, rooted in visions of social value instead of just corporate profit. We must know why we're building what we're building, and why virtual worlds and the metaverse are worth the effort. And if we can understand the *why* of the digital metaverse—if we can clearly articulate its purpose and its potential—then we can grow that vision into a world of its own, one that will represent and serve humanity at its best.

In this book, I will focus on the *why* of the metaverse, in order to emphasize the purpose that it will serve in our lives and for society in general. The digital metaverse that I envision is one that will create untold social, psychological, and eco-

conomic value for its users and for the wider world. It is a framework for a rich virtual society that will enhance, not supplant, our lives here on Earth. Like the development of writing, or the advent of the computer age, the dawn of the metaverse will be a grand pivot point in the history of humanity: a manifestation of the age-old human impulse to create cultural technologies that can usefully enhance and transform our lives and societies.

We almost always fail to understand that culture adapts to technology in nonlinear ways. If you had told most investors at the dawn of the internet that, in twenty years, people would be trading badly drawn JPEGs for millions of dollars while obsessively photographing every meal, or that a system like blockchain could be developed by entirely anonymous individuals, nobody would have believed you. Our transformative technologies tend to assume their own velocity and direction, which is why we must focus our thinking on why these technologies will matter to our lives rather than what forms they will take. In the absence of intelligent, capacious models and responsible, proactive thinking by key stakeholders within the spheres of investment, regulation, and infrastructure, the process of building the metaverse will be one of waste and unforced errors. It's important to avoid those pitfalls.

If you want to see around the next corner, this book is for you. It's a book that I wish I had been able to read back when I was first starting out in this business and was eager for something that might guide my own thinking and efforts. I hope that you're able to use the following chapters to guide your own thinking about the metaverse, and to help you understand its concrete human purpose. I believe that the digital metaverse will rank among the most important changes that humanity has ever experienced, because it is likely to act as a fork in history. The ability to live in many realities at once will be a fundamen-

tal break in the most basic nature of our lives versus those of our ancestors, one that will spark the adaptive radiation of society into wholly new forms. The metaverse will evolve our understanding of what it means to be a human, in ways that we are just now beginning to contemplate. When we are all living and creating in virtual worlds, it will mark the first true step from existing as one person in one world to existing in many worlds as a metaversal person.

Our journey into this post-human future is rooted in the past. Far from being just a new shiny thing to dangle in front of tech investors, the metaverse is the latest manifestation of a human worldbuilding tendency that is as old as our species. For millennia, humans have chosen to construct other worlds of meaning, to make those worlds matter, and to use those worlds to create social and psychological value here on Earth. To understand why, in the future, we might all end up ingesting this book as a bunch of disembodied brains, we must first look back in time: beyond the pyramids, beyond Stonehenge, all the way back to the very beginning of the human race.

# VIRTUAL SOCIETY

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## Chapter 1

# ANCIENT METAVERSES

**I**n present-day Turkey, amid the rocky plains of Southeastern Anatolia, juts a monument, thirty meters in diameter, of immense age. The T-shaped limestone structures dotting this ancient hillside, some standing as tall as five and a half meters, are set around enclosures and painstakingly carved with depictions of animals. More than 240 of these structures have been uncovered by archaeologists, who, as of this writing, have excavated a tiny percentage of the full site, which is known as Göbekli Tepe. Taken together or separately, the megaliths serve today as a dispatch from the Neolithic: a barely scrutable glimpse of our past that still offers a relevant lesson for our future.

When this monument was erected more than 10,000 years ago, the place from which I write here in southwest England had barely tasted freedom from continent-scale ice sheets.

Woolly mammoths still clung to existence, and agriculture had not yet been widely adopted. Yet in this alien world of near prehistory, at least 6,000 years before Stonehenge was built, primitive humans constructed a series of extraordinary stone megaliths and decorated them with elaborate carvings.

Why were these structures built? In the context of their era, there was no earthly reason for them to exist. It would not, therefore, be unreasonable to wonder if their construction wasn't actually motivated by earthly reasons—if it was, perhaps, compelled by belief in some other world.

To the best of our knowledge, the spiritual world or other reality implied by this monument (if, indeed, its purpose was religious) does not actually exist. Yet the representational universe contained within Göbekli Tepe—this early “virtual world”—involved the movement of enormous masses of stone over the course of a thousand years, surely at a nontrivial cost for its hunter-gatherer creators. A task of such magnitude is never undertaken on a whim, but especially not in the harsh environs of Neolithic Anatolia, a time and a place fundamentally unsuited for frivolous architectural digressions. To these nomadic builders and their society more than 10,000 years ago, the world invoked by these megaliths must have mattered as much as, if not more than, the physical world in which they lived.

The megaliths at Göbekli Tepe may seem to you like a product of a distant and alien past. But I believe they represent a fundamental human impulse, a power that we still manifest today. The first monuments erected by humans weren't carved out of stone so much as out of ingenuity. They were living ideas birthed into existence through collective agreement, imaginary forces imbued with the power of life and death, virtual worlds created through the force of a society's collective imagination.

For 10,000 years, humans have found ways to make the unreal real, just by willing it so.

We have always been a species of worldbuilders. Since humanity first emerged, we have used ingenious means to exist simultaneously in multiple realities: the animal reality of our earthly lives and the elevated reality of the worlds we create with our minds. We've been designing these other realities now for millennia, with tools no more advanced than our language and our imagination. While we sometimes build stone monuments to mark our belief in other worlds, these worlds exist separate and apart from the structures we raise to commemorate them. We speak our virtual worlds into existence, and we sustain them by the force of our collective belief.

From a cursory vantage, the dusty stones at Göbekli Tepe may seem like crude monuments from a forgotten, foreign world. But if you examine the carvings in detail, a universe of images and meaning floods your vision: scorpions and snarling beasts, geometric patterns, gesturing vultures and headless humans. Imagine how meaningful the mythologies held by these people must have been in order for them to craft such intricate works into stone—how tightly their belief system must have been interwoven into their everyday existence.

Just as the megaliths of Göbekli Tepe suggest a dynamic interplay between a virtual world and everyday existence, the virtual worlds that we'll be discussing throughout this book are far from static stories that are disconnected from our daily lives. They are worlds that our society treats as real, ones that can be the sources of actual wealth, power, and identity in the physical world. We build and inhabit these other worlds today for the same reasons our ancestors built them eons ago: to generate fulfillment and value, to materially improve our lives on Earth. Rather than marking the gates to these other realities with

monuments of stone, these days we create digital gateways that conduct us from one world into another.

Though we might not always consciously realize that we are building these worlds, our skill at doing so affects and informs everything we do as a species. This book is in part about how this fundamental human talent for worldbuilding will shape our future, and how the coming age of virtual society represents not a new and foreign phenomenon, but the continuation of ancient traditions serving intrinsic human needs. But before we move toward the future, let's let our gaze linger a bit longer in the past, and closely examine what we mean by virtual worlds and worldbuilding.

## | WHEN WORDS BECOME WORLDS

Creating models of reality is an essential part of high-level thinking. In order to survive and operate effectively in the world, we must be able to simplify and experiment with outcomes as we plan or make decisions. In so doing, we create and evolve worlds of ideas that exist apart from and in conversation with the embodied world. This process is so fundamental to our language and our cognition that we rarely stop to consider its centrality to our day-to-day lives.

“The limits of my language mean the limits of my world,” Ludwig Wittgenstein wrote in *Tractatus Logico-Philosophicus*. When we verbalize these worlds of ideas, we begin to create social models of them, ones that people other than ourselves can begin to access and use. In a meaningful sense, then, our words create our worlds. The common phrase “visualize a better world”—one in which world peace is the norm, for example—fundamentally means to visualize a virtual world, one in which

that idealized outcome has already come true, and then to use the truth of that world to create equivalent value here on Earth.

This individual capacity for worldbuilding can precipitate the creation of rich, detailed, intergenerational worlds that can inspire us to great and sometimes terrible accomplishments: the birth of great religions, for example, many of which came to have tremendous utility to society while also serving as the source of continuing pain. We often construct these social realities to fill a definable need: to explain otherwise incomprehensible events, to justify actions, to add additional excitement to our lives, or simply to lend order to the chaos and danger of life. As people come to believe in these other worlds, their faith expands the worlds' parameters, and these realms can, effectively, come to life.

We do all of this work not just because we enjoy the act of building and believing in these worlds—although doing so can indeed be very enjoyable—but because they serve individual and social purposes without which our societies could not function. Society uses embodied worlds of culture and imagination to create common purpose and handle the emergent complexities of interpersonal dynamics; society uses these structures to regulate avarice and ambition and direct human energies toward noble purposes. A world with no shared culture, no structures within which to harness ingenuity and create shared experience, would be a brutal reality in which life would be reduced to modes of sustenance and survival.

“Myth is language,” wrote the anthropologist Claude Lévi-Strauss, “functioning on an especially high level where meaning succeeds practically at ‘taking off’ from the linguistic ground on which it keeps rolling.” These mythic worlds “take off” and become socially constructed realities: other worlds that rely on participants across the spectrum mutually agreeing to believe

that they exist and that they matter. As such, in a meaningful sense, these virtual worlds are brought to life by this mutual agreement.

These other worlds aren't alternative realities into which we choose to escape: They are *more* reality. They are found spaces into which we can extend, evolve, and improve our social structures. Even today, these living other worlds and the events that happen there can enrich, expand, and affect our economy, our culture, and our daily lives. Think, for example, of the art and culture created as a result of societies' belief in other worlds. The ceiling of the Sistine Chapel is a priceless work in our world and also, in a sense, a gateway to the virtual world that inspired it, just as the Göbekli Tepe megaliths were effectively gateways to the world that inspired their creation.

Modern-day financial markets also count as other worlds that create value for our own. In these markets, fortunes and reputations are won and lost when societies en masse agree to ascribe great value and power to assets that often have no inherent worth beyond that which their stakeholders agree that they have. Professional sports also qualify as living, vibrant worlds of meaning. Look no further than the lengths to which superfans go to manifest their devotion to their chosen teams. Fans live and die with the fortunes of their hometown clubs, even though the outcomes of the games that they watch with such intensity will make no direct difference to their daily lives. Impactful athletic contests can become venues where we can temporarily modify reality in order to solve or sublimate social issues. When some under-resourced country defeats a wealthy nation in a World Cup match, for instance, the victory is felt profoundly by the smaller nation. It can serve to salve wounds, create pride, instill confidence and good feelings. These matches are mechanisms for meaningful social cohesion.