CONNECTOGRAPHY

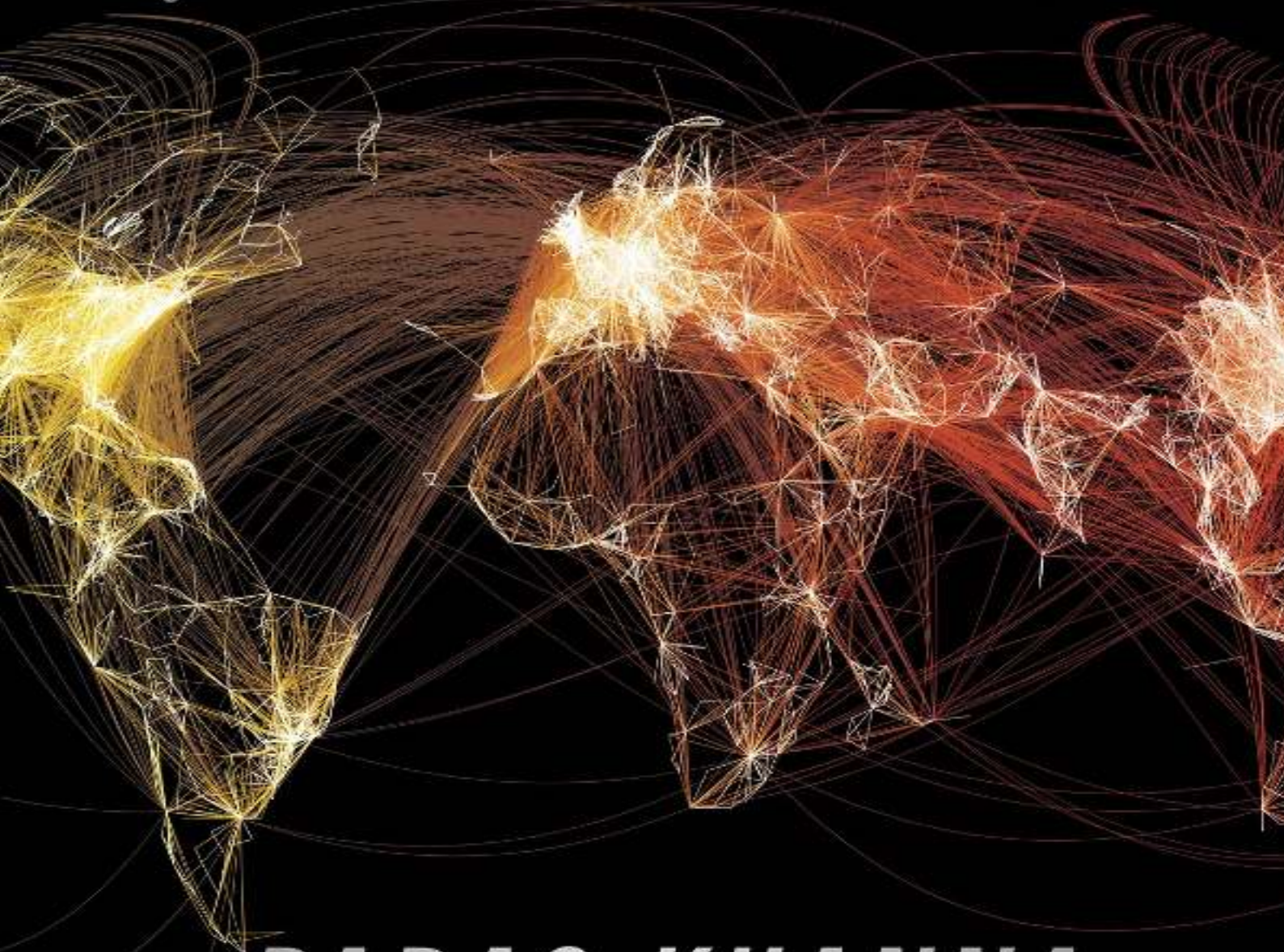## MAPPING THE FUTURE
of GLOBAL CIVILIZATION

PARAG KHANNA

"*Connectography* is ahead of the curve in seeing the battlefield of the future and the new kind of tug-of-war being waged on it. Khanna's scholarship and foresight are world-class. . . . A must-read for the next president."
—CHUCK HAGEL, former U.S. secretary of defense

"*Connectography* is ahead of the curve in seeing the battlefield of the future and the new kind of tug-of-war being waged on it. Khanna's scholarship and foresight are world-class….A must-read for the next president."

        —Chuck Hagel, former U.S. secretary of defense

"To get where you want to go, it helps to have a good map. In *Connectography*, Parag Khanna surveys the economic, political, and technological landscape and lays out the case for why 'competitive connectivity'—with cities and supply chains as the vital nodes—is the true arms race of the twenty-first century. This bold reframing is an exciting addition to our ongoing debate about geopolitics and the future of globalization."

        —Dominic Barton, global managing director, McKinsey & Company

"This is probably the most global book ever written. It is intensely specific while remaining broad and wide. Its takeaway is that infrastructure is destiny: Follow the supply lines outlined in this book to see where the future flows."

        —Kevin Kelly, co-founder, *Wired*

"Parag Khanna takes our knowledge of connectivity into virgin territory, providing an entire atlas of how old and new connections are reshaping our physical, social, and mental worlds. This is a deep and highly informative reflection on the meaning of a rapidly developing borderless world. *Connectography* proves why the past is no longer prologue to the future. There's no better guide than Parag Khanna to show us all the possibilities of this new hyperconnected world."

        —Mathew Burrows, director, Strategic Foresight Initiative at the Atlantic Council, and former counselor, U.S. National Intelligence Council

"Reading *Connectography* is a real adventure. The expert knowledge of Parag Khanna has produced a comprehensive and fascinating book anchored in geography but extending to every field that connects people around the globe. His deep analysis of communications, logistics, and many other globally critical areas is remarkable. The book is full of fascinating insights that we normally would not notice, and his writing reflects his extensive travel experience. His recommended sites and tools for mapping are the most comprehensive that I've ever seen. This book is an invaluable resource for anyone involved in business, science, arts, or any other field."

        —Mark Mobius, executive chairman, Templeton Emerging Markets Group

"*Connectography* gives the reader an amazing new perspective on human society, bypassing the timeworn categories and frameworks we usually use. It shows us a view of our world as a living thing that really exists: the flows of people, ideas, and materials that constitute our constantly evolving reality. *Connectography* is a must-read for anyone who wants to understand the future of humanity."

        —Alex "Sandy" Pentland, professor, MIT Media Lab

"Khanna's new book is a brilliant exploration of supply chain geopolitics and how the intersection of technology with geography is reshaping the global political economy. It is an intellectual tour de force that sparkles with original insights, stimulating assertions, little-known facts, and well-researched

predictions. Highly rewarding reading for anyone seeking to understand the contemporary world ord[...] and why China's 'one belt, one road' project is a winning strategy that outflanks the United State[...] 'rebalance to Asia' by integrating all of Eurasia's economies under Chinese auspices."

"Khanna imagines a near-future in which infrastructural and economic connections superse[...] traditional geopolitical coordinates as the primary means of navigating our world. He makes [...] persuasive case: *Connectography* is as compelling and richly expressive as the ancient maps fro[...] which it draws its inspiration."

"From Lagos, Mumbai, Dubai, and Singapore to the Amazon, the Himalayas, the Arctic, and the Gol[...] desert steppe, Parag Khanna's latest book provides an invaluable guide to the volatile, confusi[...] worlds of early twenty-first-century geopolitics. A provocative remapping of contemporary capitalis[...] based on planetary mega-infrastructures, intercontinental corridors of connectivity, and transnation[...] supply chains rather than traditional political borders."
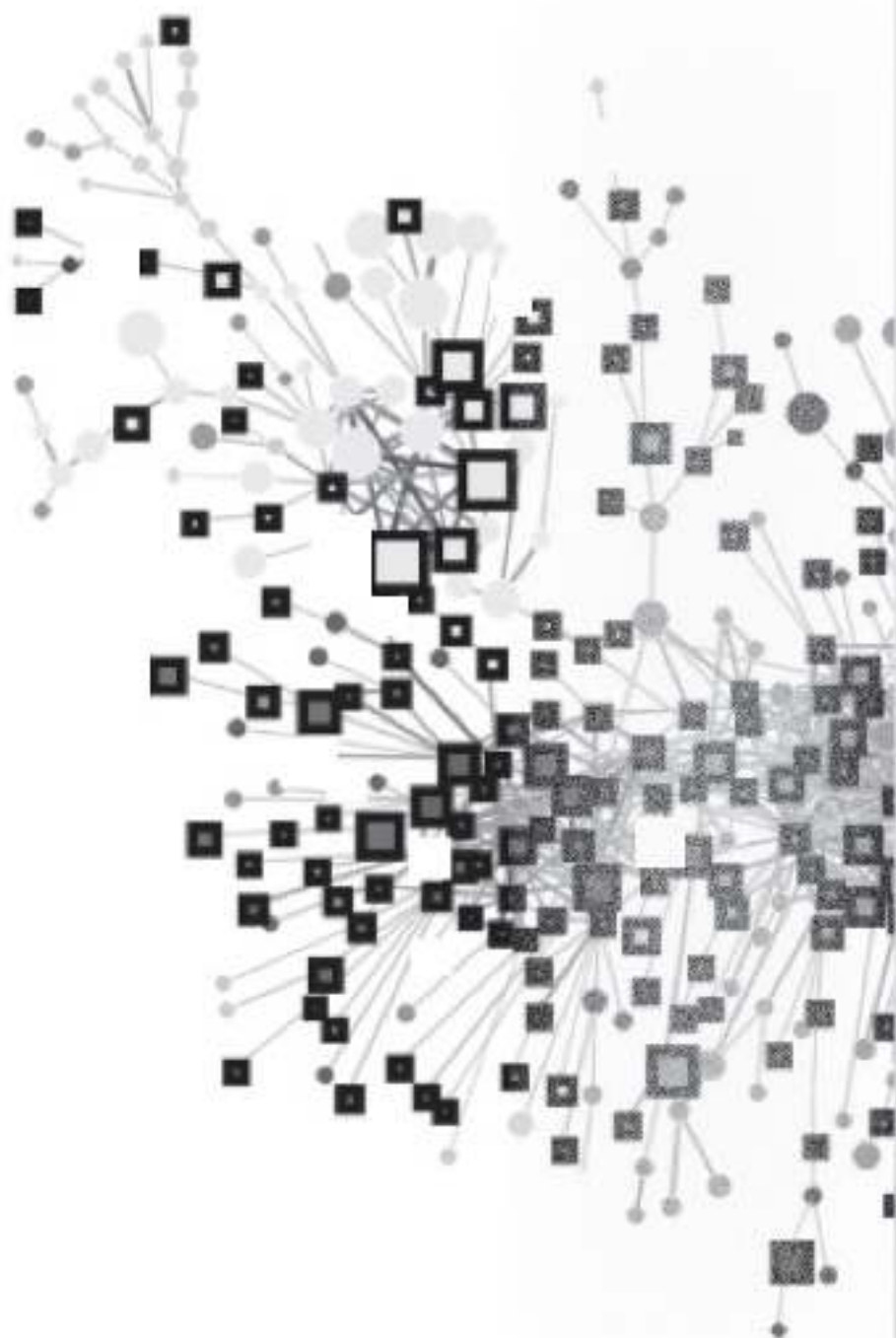
"In high style, Parag Khanna reimagines the world through the lens of globally connected supply cha[...] networks. It is a world still fraught with perils—old and new—but one ever more likely to nurtu[...] peace and sustain progress."

"Today's world has multiple geographies that do not fit the old geopolitics of states. I[...] *Connectography*, Parag Khanna gives us not only new techniques for mapping but a whole new map-[...] different, useful, and mesmerizing."

CONNECTOGRAPHY

MAPPING THE FUTURE OF

GLOBAL CIVILIZATION

PARAG KHANNA

CONTENTS

The natural consequence of any obsession is passing it on to one's children. I've been collectin[g] globes, maps, and other geographic artifacts since my itinerant childhood. Thus it is hardly [a] coincidence to have been writing portions of this book while methodically assembling a thousan[d-] piece world map with my daughter. The map is a Mercator projection, named for the sixteenth-centur[y] Flemish geographer who sought to make maps more useful for navigation but in the process massive[ly] distorted the scale of the extreme latitudes. Hence my daughter exclaiming, "Greenland is so big[!"] (While also wondering why it was colored orange.) Africa was the easiest continent to piece togethe[r.] With fifty-four countries, each little jigsaw shape was full of clues such as contrasting national colo[rs] and city names. We left the vast oceans for last—a truly frustrating slog, with hundreds of featurele[ss] pieces differentiated only by shades of blue. We passed the time discussing where the oceans a[re] deepest, where the largest underwater mountain ranges are, and how people survive on remote island[s.]

When the entire puzzle was complete, we carefully wrapped it with a roll of wide, transparent tap[e] and stuck it on her wall. Taking a step back, I could easily envision how neatly all the continents we[re] once joined together as the supercontinent Pangaea and begin to imagine how over the next fifty t[o] hundred million years they will again cluster together (around the Arctic), fusing into anoth[er] supercontinent scientists call Amasia.

But what if we are already connecting all the continents together today? What will our planet loo[k] like once we have built seamless transportation, energy, and communications infrastructures amon[g] all the world's people and resources—when there is no geography that is not connected? A better ter[m] for it might be "Connectography."

—

THIS BOOK IS ABOUT the staggering consequences of connectivity on almost every facet of our lives. [It] completes a trilogy on the future world order. The arc began with *The Second World*, a tour of the ne[w] geopolitical marketplace in which multiple superpowers compete for influence in major regions ri[fe] with instability and divisions. I argued, "Colonies were once conquered; today countries are bought[."] And yet smart states practice a shrewd multi-alignment of being friendly with all great powers at t[he] same time to extract maximum benefits without committing to deep alliances. The sequel *How to Ru[n] the World* examined the increasingly neo-medieval global landscape in which government[s,] companies, civic groups, and other players all compete for authority yet collaborate in a new kind [of] mega-diplomacy to tackle global challenges. It ended with a call for "universal liberation throu[gh] exponentially expanding and voluntary connections" as the path to a global Renaissanc[e.] *Connectography* is about how we get there—literally and intellectually.

The road map of this book follows several interconnected thrusts. First, connectivity has replace[d]

division as the new paradigm of global organization. Human society is undergoing a fundamental transformation by which functional infrastructure tells us more about how the world works than political borders. The true map of the world should feature not just states but megacities, highways, railways, pipelines, Internet cables, and other symbols of our emerging global network civilization.

Second, devolution is the most powerful political force of our age: Everywhere empires are splintering and authority is dissipating away from central capitals toward provinces and cities that seek autonomy in their financial and diplomatic affairs. But devolution has an important counterpart: aggregation. The smaller our political units get, the more they must fuse into larger commonwealths of shared resources in order to survive. This trend is playing out around the world from East Africa to Southeast Asia as dynamic new regional federations take shape through common infrastructures and institutions. North America too is growing into a truly united supercontinent.

Third, the nature of geopolitical competition is evolving from war over territory to war over connectivity. Competing over connectivity plays out as a tug-of-war over global supply chains, energy markets, industrial production, and the valuable flows of finance, technology, knowledge, and talent. Tug-of-war represents the shift from a war between systems (capitalism versus communism) to a war *within* one collective supply chain system. While military warfare is a regular threat, tug-of-war is a perpetual reality—to be won by economic master planning rather than military doctrine. Around the world, thousands of new cities or special economic zones (SEZs) have been constructed to help societies get themselves on the map in the global tug-of-war.

Another way this competitive connectivity takes place is through infrastructure alliances, connecting physically across borders and oceans through tight supply chain partnerships. China's relentless pursuit of this strategy has elevated infrastructure to the status of a global good on par with America's provision of security. Geopolitics in a connected world plays out less on the Risk board of territorial conquest and more in the matrix of physical and digital infrastructure.

Connectivity is a major driver of the deep shift toward a more complex global system. Economies are more integrated, populations are more mobile, the cyber domain is merging with physical reality, and climate change is forcing seismic adjustments on our way of life. The significant—and often sudden—feedback loops among these phenomena remain almost impossible to decipher. And yet even as connectivity makes the world more complex and unpredictable, it also offers the essential pathways to achieve collective resilience.

It is precisely in such times of uncertainty that people most want to know what's next. The best we can do, however, is scenarios. During the Cold War, scenarios became an important way to examine how stability could suddenly mutate and escalate into hostility, how peace could give way to war. Today we build scenarios to depict what the world might look like if energy abundance is achieved or if resource competition intensifies, if global migration surges or if restrictions are enforced, if financial flows flood emerging markets or if policy shifts force capital to retrench, if inequality generates widespread political unrest or if governments recommit to delivering jobs and welfare. It's easy to find evidence pointing in all directions.

Good scenarios therefore are about not predictions but processes: the greater the diversity of perspectives, the richer the scenarios that result. At a time when both the "death of globalization" and the "age of hyper-globalization" are heralded with equal confidence, assembling an accurate view of the future is less a matter of binary choices—a rosy versus a gloomy scenario—than of constructing a mélange of several visions. Today we don't get to choose between a world of great power competition, globalized interdependence, and powerful private networks; we have all three at the same time.

In this book, I have combined elements from hundreds of scenarios along with my own research and observations from two decades of traveling to every corner of the world and analyzing global affairs. Thanks to phenomenal improvements in data visualization, some of these findings are depicted in the unique maps and graphics included herein and in the accompanying *Connectivity Atlas* available online at https://atlas.developmentseed.org/. Whatever shape the world takes in the coming decades, there is still no substitute for a good map.

The first known maps of the world—the ancient Babylonian *Imago Mundi* and the Greek philosoph[er] Anaximander's circular map centered on the Mediterranean—date to the sixth century B.C.E. Th[e] Greek astronomer Ptolemy subsequently developed the full grid of latitude and longitude to enab[le] more precise positioning of coordinates. But for many centuries thereafter, Byzantine and Islam[ic] maps remained oriented around holy sites; they were as much about theology as geography. Throug[h] the Crusades and expansion of the Eurasian Silk Road, European scholars strove for greater accurac[y] about geography and climate, producing approximately a thousand *mappa mundi* that contained citie[s,] towns, and animal species but also biblical allegories. The maps of the fifteenth-century Italia[n] polymath Leonardo da Vinci added the relief elements of today's modern atlas, with colors an[d] shading to capture elevation and landscapes.

Even as mapmaking techniques developed, however, the knowledge to fill them was still limited. [In] the decades following Ferdinand Magellan's circumnavigation of the world five centuries ago, man[y] maps continued to feature sketches of sea monsters and the Latin phrase *hic sunt dracones*—"Here [be] dragons"—over East Asia. Mid-seventeenth-century European maps of Africa were still filled wi[th] vague sketches of monkeys and elephants, underscoring Westerners' dearth of knowledge about th[e] precolonial societies of the Southern Hemisphere. Almost nothing was known in the West abou[t] Hawaii and the South Pacific islands until James Cook's voyages in the mid-eighteenth century. At th[at] time, the most important notations on maps were arguably the oceanic currents that guided mariti[me] navigators.

Today's maps have evolved to correct the distortions of their predecessors. The Gall-Peters an[d] Hobo-Dyer projections, for example, use equal area scaling techniques to render the size of continen[ts] such that, for example, Greenland doesn't appear as large as Africa because, in reality, Africa [is] fourteen times larger. But beyond providing more accurate scale and locations, these maps do little [to] represent the reality of place.

This is especially true of today's political maps, to which we ironically ascribe such sacred veraci[ty] even though they are one of history's foremost propaganda tools. Maps are seductive but als[o] dangerous. Competitive cartography is a centuries-old duel as mapmakers promote nationalist[ic] versions of reality. What we put on a map has iconic power to shape how people think. Israel's map[s] show its borders as legally codified, while its neighbors either don't show Israel at all or lab[el] Palestine as "Occupied Territories." In 2014, even the publisher HarperCollins released an edition [of] its *Middle East Atlas* that omitted Israel entirely to cater to the sensitivities of its Arab market. Ind[ia] and China continue to issue conflicting maps as to the precise location of their border in sever[al] different sectors where their armies continue to skirmish. Google Earth has heretofore made its map[s] outside national dictates, depicting disputed areas as such without taking sides. When it mistaken[ly] ceded a disputed portion of the San Juan River to Costa Rica in 2010, however, Nicaragua almo[st]

declared war—on one of the only countries in the world that has no army!

Amusingly, borders change so constantly that they are themselves the best reminder that there [is] nothing permanent about maps. Indeed, over time even the most basic cultural labels that we associat[e] with the compass directions evolve in meaning. A quarter century ago, "East" meant the Soviet Union; the Cold War was often referred to as the "East-West conflict." Yet today nobody would place th[e] label "East" over Russia. The *real* "East" is China-centric Asia that contains over half the world['s] population and represents one-third of the global economy. Similarly, "West" used to refer to only th[e] Judeo-Christian countries of western Europe, or more expansively the members of the transatlant[ic] NATO alliance. But today when we speak of the "West," we mean the European Union's almost thirt[y] members as well as North America and even the entire South American continent, the third pillar [of] the Western world.[1] And indeed, with many countries of the erstwhile "South" (meaning "thir[d] world") such as India growing faster than the West, the diplomatic bloc of the Southern Hemispher[e] has all but dissolved. "Old World" once meant Europe, and "New World" referred to the America[s]. Now the West has become the "old," while Asia is the "new." As the reality of Asia['s] hyperdevelopment sank in for a recently arrived Western journalist in Singapore, he mused during ou[r] first conversation, "Modernity now begins in the East and flows west." And in the coming generatio[n] one identity that never really existed—"Northern"—is being born in the Arctic region as the zone [of] the earth's sphere above 66° north latitude becomes more populated as temperatures rise.

Maps are the original—and still most commonly used—infographics. But pre-infrastructure map[s] are increasingly irrelevant in today's world. The corporate strategist Kenichi Ohmae thus claimed th[at] maps are "cartographic illusions" because of how little they reflect our ability to overcome geograph[ic] distance through technology. In polite society, sins of omission are regarded as lies; the same shoul[d] be true of maps. Concluding his exhaustive and eloquent survey of the history of cartography, th[e] British historian Jerry Brotton sagely points to the paradox that "we can never know the world witho[ut] a map, nor definitively represent it with one."[2] Yet still we must try. A complex world needs map[s] more than ever, but it needs better ones. Maps have graduated from art and theology to commerce an[d] politics; now they need to better reflect demographics, economics, ecology, and engineering.

During the early Cold War, America's Sixty-Fourth Topographic Engineer Battalion surveye[d] rugged terrain such as jungles and minefields from Liberia to Libya and Ethiopia to Iran to help th[e] United States produce more accurate maps for military operations and munitions targeting. By th[e] time of the Vietnam War, it was phased out and replaced by satellites. There is a revolution under wa[y] in cartographic technology that is enabling us to reinvent the map, making it a living, moving imag[e] of the world. Rather than static 2-D on paper, we can now view the world, and the trends and relation[s] transpiring within it, in dynamic and digital 3-D, on digital screens or holograms. Cartography [is] making the leap from X-ray to MRI.

The best maps juxtapose physical geography with man-made connectivity. They are constant[ly] updated snapshots reflecting ground realities and virtual gravities. Each time we "refresh," the[y] should depict new natural resource discoveries, infrastructures, demographic movements, and oth[er] shifts. The GeoFusion flight tracker, available to passengers on British Airways, uses real-tim[e] WorldSat data to show with precise detail the brown-green granularity of farmland, the jagge[d] counters of mountain ranges, and the wide gray patches of cities, with touch-screen navigation of sca[le] and elevation. All kids should have this app on their iPads. For one thing, they would see right awa[y] that the world is round rather than flat.

When one pilots through GeoFusion, it also becomes obvious that dividing the world into politic[al]

units is utterly secondary to the fact that mankind is becoming a dense coastal urban civilization. E[y]
2030, more than 70 percent of the world's people will live in cities, with most of them located with[in]
fifty miles of the sea. While human settlement along fertile river plains and oceanic coasts is a[n]
ancient pattern, the demographic concentration, economic weight, and political power of today['s]
coastal megacities makes them—more than most states—the key units of human organization.

If we are an urban species, then producing data-driven cityscapes—mapping cities from *within*—[is]
as important as capturing their scale. In the 1980s, GPS technology firms began painstakingly drivi[ng]
and geo-coding roads all over the world, building up databases for the suites of navigational tools th[at]
are now in almost every new car's dashboard. Google soon joined the fray, adding more satelli[te]
imagery and street views. Today every individual can become a digital cartographer: Maps have gon[e]
from *Britannica* to *Wiki*. OpenStreetMap, for example, crowdsources street views from millions [of]
members who can also tag and label any structure, infusing local knowledge and essential insight f[or]
everything from simple commuting to delivering supplies during humanitarian disasters.*[1] We ca[n]
now even insert updated imagery from Planet Labs' two dozen shoe-box-size satellites into 3-D map[s]
and fly through the natural or urban environment.

All of this is coming to the palm of your hand. Google Maps is already by far the world's mo[st]
downloaded app; it represents the "ground truth" far better than Rand McNally. With the rise of th[e]
global sensor network dubbed the "Internet of Everything" (Internet of Things + Internet of People[)],
our maps will perpetually update themselves, providing an animated view into our world as it really [is]
—even the five thousand commercial aircraft in the sky and the more than ten thousand ships crossi[ng]
the seas at any given moment.*[2] These are the arteries and veins, capillaries and cells, of a planeta[ry]
economy underpinned by an infrastructural network that can eventually become as efficient as t[he]
human body.

The cartographic revolution will leave almost nothing to the imagination. Underwater cameras no[w]
provide precise images of the ocean's ridges and trenches, mineral deposits and reef systems, rapid[ly]
augmenting the less than 0.05 percent of the ocean seabed that has been surveyed to date. Lidar, whi[ch]
uses lasers to detect and survey changes in the atmosphere and identify mineral deposits de[ep]
underground, also allows us to produce precise maps of natural resources.

When we combine demographic data, climatological forecasting, and seismic patterns, we can s[ee]
that more than half the world's population is clustering on the Pacific Rim of Asia along the Ring [of]
Fire, the zone in which three-quarters of the world's 450 active volcanoes lie, more than 80 percent [of]
the world's largest earthquakes occur, and sea levels are rising the fastest. As dramatically as a[ny]
Hollywood film, we can animate the future and potentially our own self-inflicted destruction.

Mapping the complex dynamics among the three greatest forces shaping our planet—man, natur[e,]
and technology—will require a whole new kind of geographic literacy. From the depths of t[he]
Amazon rain forest to the middle of the Taklamakan Desert of China, there are places where the be[st]
guides are still "living maps": elderly tribal folk or nomads who have developed an intuition f[or]
sensing the growth of the jungle or the shifts of the sand dunes. As their skills fade with the[m,]
however, we rely ever more on technology. This new generation of maps and models is thus more th[an]
a collection of pretty digital guides. They should be the focal point for the synthesis of environment[al]
science, politics, economics, culture, technology, and sociology[3]—a curriculum curated through t[he]
study of *connections* rather than *divisions*. We shouldn't be using static political maps any more th[an]
we would cling to QWERTY keyboards when we have voice recognition, gestural interfaces, a[nd]
instant video communication.

Today's "digital natives"—also known as millennials or Generation Y (and Z)—need this new tool kit. ~~There are more young people alive today than ever in history:~~ Forty percent of the world population is under the age of twenty-four, meaning an even larger percentage has no personal memory of colonialism or the Cold War. According to surveys by Zogby Analytics, these "first globals" identify connectivity and sustainability as their prime values. They aren't automatically loyal to the establishment at home or feel secure behind the borders that separate them from "others" abroad. In America, Latin millennials were in favor of full normalization of ties with Cuba; South Korean millennials are for reunification with the North. They believe their destiny is not only to belong to political states but to connect across them. By 2025, the whole world's population will likely be connected to mobile phones and the Internet. As life becomes more connected, we must adjust our maps accordingly.

[*1] Maptitude, StatPlanet, and iMapper are also programs that allow us to insert cultural or economic data into maps. With Google's Tango project, our mobile phones will become 3-D mapping tools that constantly scan our immediate environment and even "see" through walls.

[*2] Eventually, we may not need satellites at all for positioning and navigation with the advent of lower-cost but extremely accurate Quantum-Assisted Sensing that determines location by measuring the impact of the earth's magnetic field on atoms.

CONNECTIVITY
AS DESTINY

FROM BORDERS TO BRIDGES

A JOURNEY AROUND THE WORLD

Let's take a journey around the world—without ever getting on a plane. If we get an early start i Edinburgh, Scotland, we'll arrive at London Euston station around noon, stroll quickly past the Britis Library, and have a quick lunch at the masterfully renovated Victorian-era St. Pancras station, fro which we'll board the Eurostar train, travel under the Dover Strait to Paris, followed by a high-spe TGV to Munich and a German ICE to Budapest. An overnight train along the Danube River brings u to Bucharest, Romania, and another overnight along the Black Sea to Istanbul. Where once a creal ferry was the fastest way to cross from Europe to Asia across the Bosporus Strait, today we can glic over one or the other suspension bridge or continue by train through the newly opened Marmara tunnel and onward to Iran. We could also catch the revived Hejaz Railway through southeaster Turkey, stopping in Damascus and Amman before continuing to Medina or across Israel and the Sina to Cairo, from which we might ultimately descend through Africa all the way to Cape Town on sturdy upgrade of the "Red Line" British colonialists began in the late nineteenth century. Fro Tehran, we'll head eastward on a new Chinese-built railway through the rugged Asian steppe, cro Turkmenistan and Uzbekistan to Kazakhstan's commercial hub of Almaty. Several times per week, w can cross into China's largest province of Xinjiang to its capital, Urumqi, and onward via Xi'an Beijing.

Map 1, corresponding to this chapter, appears in the map insert.

Back in Paris, we might have opted for an overnight sleeper to Moscow, from which we could catc the fabled Trans-Siberian Railway to Vladivostok—and carry on to Pyongyang and Seoul—or branc off a bit earlier toward Beijing, via either Manchuria or Mongolia. Either way, if we opt for th tropical route, we'll speed southward along the world's most extensive high-speed rail network in mountainous Yunnan and its capital, Kunming. From there, we can cross directly into Laos and take Vientiane before crossing into Thailand toward Bangkok, or take a coastal route along the South Chir Sea via Hanoi and Ho Chi Minh City in Vietnam and through Phnom Penh in Cambodia to Bangko Now the options narrow with the geography: we speed on down the Malay Peninsula to Kuala Lumpi and Singapore, the southernmost point on mainland Asia.

But water hasn't stopped us so far, so let's continue by train through a tunnel under the strateg Strait of Malacca onto Indonesia's largest island of Sumatra, then over the Sunda Strait bridge reach the capital, Jakarta, on Java, the world's most populous island with more than 150 milli people. Just a bit farther and we're on the beaches of Bali, from which we can catch a cruise ship Australia. If we choose the fastest routes and don't miss any connections, we will have traversed th

entire Eurasian landmass—Scotland to Singapore, and then some—in about a week.

And yet we're only halfway done. Instead of the Antipodes, from Beijing we should actually head north through Vladivostok and eastern Siberia. If you fancy sushi, we could take a bridge to Sakhalin Island and pass through a 45-kilometer tunnel to Japan's northernmost Hokkaido Island, passing seamlessly southward across Japan's major islands on high-speed Shinkansen trains. When we reach Kyushu, we'll loop back through a 120-kilometer undersea tunnel to Busan, zipping northward through the Korean peninsula back toward Siberia to continue our next 13,000-kilometer segment that takes us parallel to the volcanic Kamchatka Peninsula and through a 200-kilometer tunnel under the Bering Strait that emerges in Alaska and takes us to Fairbanks. From there, of course, it's straight south to Juneau and Vancouver, Seattle and Portland, San Francisco and Los Angeles. California, Texas, Illinois, and New York all want more Acela Express high-speed rail (though it's planned to hit only about two hundred kilometers per hour, about half as fast as the Japanese). Still, we'll make it from Pacific to Atlantic across the Lower 48 in two days. All that's left is to catch a zippy but smooth hovercraft to London, followed by any of the more than twenty daily trains headed to Edinburgh. A journey around the world—as promised.

One could fly almost seamlessly along this itinerary, drive much of it too except for the oceans, and indeed eventually do it the old-fashioned way on iron railroads.*[1] Many of these routes already exist, and all of them will in due course. The more connections there are, the more options we have.

—

"GEOGRAPHY IS DESTINY," one of the most famous adages about the world, is becoming obsolete. Centuries-old arguments about how climate and culture condemn some societies to fail, or how small countries are forever trapped and subject to the whims of larger ones, are being overturned. Thanks to global transportation, communications, and energy infrastructures—highways, railways, airports, pipelines, electricity grids, Internet cables, and more—the future has a new maxim: "Connectivity is destiny."

Seeing the world through the lens of connectivity generates new visions of how we organize ourselves as a species. Global infrastructures are morphing our world system from divisions to connections and from nations to nodes. Infrastructure is like a nervous system connecting all parts of the planetary body; capital and code are the blood cells flowing through it. More connectivity creates a world beyond states, a global society greater than the sum of its parts. Much as the world evolved from vertically integrated empires to horizontally interdependent states, now it is graduating toward a global network civilization whose map of connective corridors will supersede traditional maps of national borders. Each continental zone is already becoming an internally integrated mega-region (North America, South America, Europe, Africa, Arabia, South Asia, East Asia) with increasingly free trade coupled with intense connectivity across their thriving city-states.

At the same time, maps of connectivity are *also* better at revealing geopolitical dynamics among superpowers, city-states, stateless companies, and virtual communities of all kinds as they compete to capture resources, markets, and mind share. We are moving into an era where cities will matter more than states and supply chains will be a more important source of power than militaries—whose main purpose will be to protect supply chains rather than borders. *Competitive connectivity* is the arms race of the twenty-first century.

Connectivity is nothing less than our path to collective salvation. Competition over connectivity

by its nature less violent than international border conflicts, providing an escape hatch from historic cycles of great power conflict. Furthermore, connectivity has made previously unimaginable progress possible as resources and technologies move much more easily to where they are needed, while people can more quickly relocate to escape natural disasters or to cities for economic opportunity. Better connectivity allows societies to diversify where their imports come from and where their exports go. Connectivity is therefore how we make the most of our geography. The grand story of human civilization is more than just tragic cycles of war and peace or economic booms and busts. The arc of history is long, but it bends toward connectivity.

BRIDGES TO EVERYWHERE

The central fact of the age we live in is that every country, every market, every medium of communication, every natural resource is connected.

—SIMON ANHOLT, THE GOOD COUNTRY PARTY

Connectivity is the new meta-pattern of our age. Like liberty or capitalism, it is a world-historic *idea*, one that gestates, spreads, and transforms over a long timescale and brings about epochal changes. Despite the acute unpredictability that afflicts our world today, we can be adequately certain of current mega-trends such as rapid urbanization and ubiquitous technology. Every day, for the first time in their lives, millions of people switch on mobile phones, log on to the Web, move into cities, or fly on an airplane. We go where opportunity and technology allow. Connectivity is thus more than a tool; it is an *impulse*.

No matter which way we connect, we do so through infrastructure. While the word "infrastructure" is less than a century old, it represents nothing less than our physical capacity for global interaction. Engineering advances have made new infrastructures possible that were the dreams of previous generations. Over a century ago, crucial geographic interventions such as the Suez and Panama Canals reshaped global navigation and trade. Since the nineteenth century, Ottoman sultans aspired to construct a tunnel that would connect Istanbul's European and Asian sides. Now Turkey has both the Marmaray tunnel that opened in 2013 and freight railways and oil and gas pipelines that are strengthening its position as a key corridor between Europe and China. Turkey has been called the country where continents collide; now it is the country where continents connect. The early twentieth-century Japanese emperor Taisho also sought to link Honshu and northern Hokkaido Island, but only in the 1980s did it complete the Seikan Tunnel, which traverses fifty-four kilometers (including twenty-three kilometers under the seabed) and carries Shinkansen high-speed trains.*[2] Once the tunnels to Sakhalin and South Korea are complete, Japan won't truly be an island anymore.

We are in only an early phase of reengineering the planet to facilitate surging flows of people, commodities, goods, data, and capital. Indeed, the next wave of transcontinental and intercontinental mega-infrastructures is even more ambitious: an interoceanic highway across the Amazon from São Paulo to Peru's Pacific port of San Juan de Marcona, bridges connecting Arabia to Africa, a tunnel from Siberia to Alaska, polar submarine cables on the Arctic seabed from London to Tokyo, and electricity grids transferring Saharan solar power under the Mediterranean to Europe. Britain's exclave of Gibraltar will be the mouth of a tunnel under the Mediterranean to Tangier in Morocco, from which a new high-speed rail extends down the coast to Casablanca. Even where continents are not physically attaching to each other, ports and airports are expanding to absorb the massive increase

in cross-continental flows.

—

NONE OF THESE MEGA-INFRASTRUCTURES are "bridges to nowhere." Those that already exist have added trillions of dollars of value to the world economy. During the Industrial Revolution, it was the combination of higher productivity *and* trade that raised Britain's and America's growth rates to 1– percent for more than a century. As the Nobel laureate Michael Spence has argued, the internal growth of economies would never have reached today's rates without the cross-border flows of resources, capital, and technology. Because only one-quarter of world trade is between countries that share a border, connectivity is the sine qua non for growth both within countries and across them. Connectivity itself—alongside demographics, capital markets, labor productivity, and technology— thus a major source of momentum in the global economy. Think of the world like a watch whose battery is constantly charged through kinetic energy: The more you walk, the more power it has. For all the effort we expend calculating the value of national economies, therefore, it is time to devote as much attention to the value of connectivity between them.

There is no better investment than connectivity. Government spending on physical infrastructure— what is known as gross fixed capital formation—such as roads and bridges, and social infrastructure such as medical care and education, is considered investment (rather than consumption) because it saves costs in the long run and generates widespread benefits for society. Large-scale spending on infrastructure was relatively low for most of the nineteenth century, accounting for about 5–7 percent of England's GDP and peaking at 10 percent on the eve of World War I. [1] The United States ramped up its infrastructure investment to almost 20 percent of GDP from the late nineteenth century through World War I, enabling it to double Britain's growth rate and become the world's largest economy. Even though the major American and Canadian canal and railroad companies went bankrupt at the turn of the twentieth century, they left the country with an extensive transportation network that enabled continental-scale commercial expansion right up to the present.

The influential British economist John Maynard Keynes strongly argued for such public works investment as a tool of creating jobs and boosting aggregate demand, policies adopted by President Roosevelt during the Depression. From World War II onward, fixed capital formation rose like a west- to-east wave from under 20 percent of GDP to over 30 percent. Germany's 1950s *Wirtschaftswunder* (economic miracle), Japan's 1960s 9 percent growth rates, the "Asian Tigers" of the 1970s and 1980s (South Korea, Taiwan, Singapore, and Hong Kong), and then China starting in the 1990s, where it topped 40 percent of GDP and powered sustained growth of close to 10 percent for the past three decades. China embraced Keynes like nobody's business.

The past several decades prove beyond any doubt that connectivity is how regions move from economies valued in the billions to the trillions. Furthermore, infrastructure is a foundation of social mobility and economic resilience: Urban societies with ample transportation networks (such as southern China) rebounded much faster from the 2007–8 financial crisis, with people able to move efficiently to find work. Spain was among the hardest hit by the eurozone recession but thanks to its high-quality infrastructure is today Europe's fastest-growing economy. As global debt surges to record levels while interest rates remain at historical lows, the world's finances should be directed toward underwriting productive connectivity rather than ethereal derivatives.

For a massive country such as America to live up to its self-proclaimed destiny, it too must spend

sample content of Connectography: Mapping the Future of Global Civilization

- click Upcycling Celebrations: A Use-What-You-Have Guide to Decorating, Gift-Giving & Entertaining pdf, azw (kindle), epub, doc, mobi
- **I'll Seize the Day Tomorrow for free**
- click A Season Beyond a Kiss (Birmingham, Book 2)
- click Tangled Vines (Tales of the Scavenger's Daughters, Book 2) here
- Greed and Glory on Wall Street: The Fall of the House of Lehman pdf, azw (kindle)
- *click Slavery Inc: The Untold Story of International Sex Trafficking*

- http://deltaphenomics.nl/?library/The-True-Story-of-Hansel-and-Gretel.pdf
- http://crackingscience.org/?library/Mining-Capitalism--The-Relationship-between-Corporations-and-Their-Critics.pdf
- http://toko-gumilar.com/books/A-Season-Beyond-a-Kiss--Birmingham--Book-2-.pdf
- http://www.khoi.dk/?books/Tangled-Vines--Tales-of-the-Scavenger-s-Daughters--Book-2-.pdf
- http://www.uverp.it/library/Embrace-the-Darkness--Guardians-of-Eternity--Book-2-.pdf
- http://interactmg.com/ebooks/Slavery-Inc--The-Untold-Story-of-International-Sex-Trafficking.pdf