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—**Dr. Graham Norris**, organizational psychologist, futurist, and entrepreneur

"Lars and Nicolai invite readers on a comprehensive prance through the past, present, and future, most importantly coming back to today to offer ways to leverage their many insights and recommendations. It is a delightful read for novices and experienced practitioners alike."

—**Jim Burke**, founder of DeepDive Foresight and former regional president at the World Future Society

FROM MALTHUS TO MARS

How to Live, Lead, and Learn in an Exponential World

NICOLAI CHEN NIELSEN
AND LARS TVEDE

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INTRODUCTION

We all understand that as the world changes, we need to change with it. The problem is that the pace of change is constantly increasing, and the risk of making wrong turns or falling behind keeps growing. The good news is that you can adapt to these accelerating changes by becoming *Future Fit*.

Future Fitness is the ability to skillfully and efficiently navigate future trends and take action toward your most desired future. Achieving Future Fitness requires efficiency in how you gather data, having appropriate reference models for interpreting the meaning of what you observe, and developing personal habits and mindsets that can help you navigate turbulence. This book guides you through each of these while providing you with additional tools to make you or your organizations more Future Fit.

We have advised more than 200 organizations on organizational changes, management strategies, and the future, including more than thirty Fortune 500 companies. We have also founded or cofounded thirteen companies. Among our start-ups and knowledge platforms, our future-tracking service Supertrends has been particularly important as a source and inspiration for this book.

Supertrends uses artificial intelligence, crowdsourcing, big data, text mining, advanced data visualization, and digital gamification to spot the world's innovations, track their development, and interpret

technology-driven market trends. At the time of writing, Supertrends has mapped over 12,000 key innovations, ranging from the first pre-human use of stone tools some 3.3 million years ago to thousands of predicted breakthroughs over the coming years.

Supertrends has developed a comprehensive system for real-time monitoring of global innovation within any sector or technology, as well as a digital simulation tool for creating business strategies that incorporate the expected changes in future technologies. It focuses on how to navigate, make sense of, strategize, and mobilize across business activities. At the time of writing, the company has some 160 associated partners and specialists, including ourselves, who are all either entrepreneurs, scientists, futurists, leadership coaches, or management consultants from around the world. Throughout this book, these are referred to as "Supertrends experts."

Our goal with Supertrends is to provide futurism-as-a-service, supporting clients in every step of their journey to become Future Fit. The tools we describe in this book are the same that Supertrends uses with its clients. This book includes a number of snapshots from the Supertrends timeline—our crowdsourced attempt to determine when major technology breakthroughs are likely to arrive. It should be noted that these predictions are only qualified guesses, albeit each submitted by some of the world's leading experts working on the relevant technologies. These experts revise their predictions from time to time—especially their assessment of when technology breakthroughs will happen. However, in this book, we also draw on numerous scientific studies and other sources, which can be accessed at www.supertrends.com and www.FromMalthusToMars.com.

So, what are *supertrends* (not the company, but the things)? Generally speaking, supertrends are broad trends that change how societies work in important ways. They can be seen in wealth, health, lifestyles, demographics, and more, but their ultimate underlying causes are predominantly social and technological innovation. Building your Future Fitness hinges first of all on understanding how innovation and the resulting supertrends have unfolded in the past so that you may be better able to predict, take advantage of, and influence how they will unfold in the future.

Part 1 of this book maps a brief history of innovation and supertrends, and it charts their likely trajectories through the next decade and beyond. In part 2, we discuss what this means for you as an individual and offer a number of mental hacks and mindsets to build your Future Fitness. In the third and final part of the book, we use a future-backed approach to outline what these trends mean for organizations and their employees in the future world of work.

Building Future Fitness at an individual and an organizational level is relevant for leaders and non-leaders alike. As the pace of change continues to increase and leadership becomes more and more distributed, it is our responsibility to understand what's going on around us, navigate the trends, and adapt the way we work and live in a deliberate way. We can't slow the pace of change, but we know from theory and practice that it is indeed possible to speed up and clarify our own thinking to get ahead—and stay ahead—of the impending changes.

We encourage you to read this book from cover to cover, as each part builds on the previous one. However, each chapter is also relatively self-contained and provides practical tips and checklists that can be regularly referred back to.

We hope that you will enjoy this book and connect with us on social media.

Lars and Nicolai

Future Fitness is the ability to skillfully and efficiently navigate future trends and take action toward your most desired future.

PART 1

INTO THE BLUR AT ROCKET SPEED

THE WORLD IS UNDERGOING enormous technological changes that directly impact our lifestyles, business models, cultures, economies, and more. These changes are not just random dots popping up on the map. In fact, they are largely trends that follow somewhat deterministic patterns. This is because each new innovation is a recombination of previous innovations. You can't put a roof on a house before putting up the walls, and you can't put up the walls before you dig the foundation. Likewise, the technology universe inevitably unfolds in a certain sequence. Predicting this pattern is complex, but it is not impossible to get some idea of the likely sequence or to get some sense of the likely timing. This is because many trends follow rather reliable paths, whether they are linear, exponential, or, occasionally, hyper-exponential. The most famous predicted path is probably Moore's law for the performance of computer chips, which has

correctly predicted almost sixty years of digital development, but there are countless other regularities, as you will see.

We also find that development in some trends at given inflection points tend to trigger the onset of other events or trends. For instance, increasing wealth makes average people want fewer children, while it also makes them more enthusiastic for environmental protection. Many such phenomena apply around the world and across hundreds of cultures, and some of them are remarkably predictable.

There are also patterns in human perception of these phenomena. One is that many—and perhaps most—people systematically underestimate progress and overestimate threats.

There even seem to be specific preconditions that typically inspire bursts of creativity and innovation. When studying the structure of communities—including nations—we can with some conviction predict how innovative they are likely to become. This is a subject of this first part of the book, and it is, in fact, where our tale will start.

Chapter 1

THE END OF MONOTONY

In 2019, the brilliant quantum physicist David Deutsch gave a fascinating TED Talk about what he calls "the great monotony," wherein he posits that the universe itself is actually quite monotonous.

While some astronomers may take issue with that characterization, his point stands that at the time of the big bang some 13.7 billion years ago, a whole lot of new and exciting things started happening, including the development of atoms, molecules, the first planets, stars, meteors, and galaxies. However, most of that novelty was spent as early as 12 or 13 billion years ago. Indeed, quite a lot of it was completed within the first three minutes of the universe's life span.

Since then, as Deutsch describes it, the universe as we know it has largely delivered billions of years of pretty much the same phenomena: stars, comets, barren globes, black holes, and so on.

Of course, an exploding star is very dramatic, but in almost all places, at almost all times, if you placed a webcam on a given object in space, you would notice nothing interesting for ages. And thus, while the idea of traveling to Mars may seem very exciting, for instance, the reality is that once you arrived on a planet with no people or other

forms of organic life, there would be very little to see or do. There is probably a lot more action on one square meter of a forest in Brazil than on the entire surface of Mars.

Celestial bodies are always in relative motion, but this is typically in such monotonous ways that today, one can with reasonable certainty predict their fate millions or even billions of years into the future—and also retro-cast their prehistory millions or billions of years back. Out there, it is indeed largely the "great monotony," as Deutsch calls it. And this monotony is not only about lack of action. So far, we've only detected a few hundred distinct chemicals that exist outside of our planet. By contrast, any single animal on Earth can contain billions of different molecules.

A major reason for the great monotony in space is what Deutsch calls "the hierarchy rule." In the universe, large things are unaffected by small things, but small things may be transformed or destroyed by large things. When a comet hits a star, the star is marginally magnified, and the comet is annihilated. Two different things are molded into one and diversity gives way to monotony.

BREAKING THE HIERARCHY RULE

But, as Deutsch points out, there is actually one remarkable known exception to this rule: Earth. Here, on our lovely planet, the great monotony is broken in billions of ways, from the subtle to the dramatic. You can place webcams or microscopes almost anywhere on Earth and witness constant action, surprises, drama, and so on. This is due to the miracle of DNA, which has enabled millions of different life-forms and billions of different chemical substances.

Therefore, in our biological world, the hierarchy rule does not apply. On the contrary, when two DNA molecules meet in a conception, something *new* always emerges—every single time! For instance, every single child on the planet is unique. Even "identical" twins are quite different. Likewise, in contrast to the hierarchy rule, the small entities, namely DNA, actually control the large ones, which are the rest of the biomass. For example, the DNA in the human body constitutes 0.1

percent of our weight, yet it totally controls the remaining 99.9 percent. This is a gross violation of the hierarchy rule. It is rather the opposite, a rule of spontaneous innovation.

It gets even better, because DNA has created and controlled far more than just the biomass that exists at any given time. Before the origin of life, the sky and seas on Earth were brown and red like Mars. This was until DNA enabled photosynthesis in plants, which then colored much of the land green. Then the plants created oxygen, which colored lakes, seas, and the atmosphere blue. DNA also created shellfish, which in turn created the white limestone of the subsoil.

So, DNA—molecules so small that we need an electron microscope to see them—have completely reshaped the entire planet. So much so in fact that one must dig very deep into the ground to find a handful of soil, clay, sand, or rock that is not clearly affected by DNA. In this way, as Deutsch points out, DNA—those tiny things—have had an overall effect that is 10^{40} times greater than themselves. So, no hierarchy rule here, and no great monotony.

RECURSIVE INTELLIGENCE

Of course, a part of that story is that some 300,000 years ago, DNA created humans and made us the only species with the ability to develop exploratory knowledge (i.e., to interpret and develop hypotheses about the world) and to translate these hypotheses into creative innovation. By granting us this ability, microscopic DNA set in motion an ever-accelerating process of not only spontaneous innovation but also recursive intelligence, the phenomenon in which some form of intelligence creates more intelligence, which then continues in a positive feedback loop to produce cascading innovation. So, in essence, not only did DNA transform the planet, but it also turned Earth into a runaway computer.

Yes, DNA did that. These tiny molecules that we cannot even see. And in this book, we examine how this runaway computer continues to accelerate.

When you break away from the laws of monotony and hierarchy, you get spontaneous innovation and recursive intelligence. In fact, you get a runaway, spontaneous computer.

WAKING UP THE UNIVERSE

So DNA created humans with brains, who later developed the ability to communicate and think critically, rationally, and creatively. This in turn led to the exchange of new ideas, which were continuously tested and improved upon. This led to the anything-but-monotonous world we live in today. And because of our ability to continuously build on existing knowledge, the future will be even more diverse than it is today. David Deutsch has posited that we might one day even control the entire universe, in essence causing it to "wake up" by constantly replacing monotony with innovation. The trajectory of this process from the past into the future is truly fascinating. But interestingly, it hasn't always been like that.

Chapter 2

HOW WE ESCAPED THE MALTHUSIAN TRAP

According to the World Bank, the trend growth in global GDP (Gross Domestic Product) per capita grew on average 1.93 percent per year from 1960 to 2020.[1] Add just under 1 percent annual population growth, and we reach an annual trend growth in total GDP of a bit below 3 percent.

Of course, "trend growth" means the long-term, or average, tendency; there are business cycles and random events that create temporary deviations around that trend. Anyway, just under 2 percent annual growth per capita per year adds up. In fact, over a period of ten years, it typically increases the average standard of living on the planet by some 20 percent.

That's a lot. In fact, it's almost insane, if you really think about it. Ten years from now, the world population will probably be 20 percent more affluent! And if you compound that for a hundred years, GDP per capita—adjusted for inflation—will be six to seven times higher, which means a whole different world. Just think of all your own friends and family and imagine that they all earned—and owned—approximately

six times as much as they own now, starting next Monday. That's the world we'll live in a hundred years from now.

BLUR STRAIGHT AHEAD

So yes, we are jointly racing into a future that will be vastly different, and if that future is blurry—well, that won't slow us down at all. We will get to that blur no matter what, at a blistering speed, like a Formula One car blasting into heavy fog.

And that is mentally difficult to cope with. You've likely already lived through massive changes during your time on planet Earth. If you were to take someone from 2010 and send them just ten years into the future, they would be completely shocked at the massive penetration of smartphones, AI-assisted voice assistants, cryptocurrencies, RNA vaccines, and the emergence of remote work cultures, ride-sharing vehicles in large cities, and more. It's easy to forget how things we now take for granted didn't exist until quite recently—such as GPS, the internet, and PCs. Equally, it can be hard to imagine a potential future that doesn't yet exist. But to become Future Fit, we must cultivate this ability to understand the trends and capitalize on them.

The key cause of the future's blurriness is innovation. Whenever an innovation is launched, we now quickly expect it to improve and continually get ever better. For example, Wi-Fi on planes was for the majority of aviation history unheard of. However, the moment it was launched (albeit with slow speeds), passengers quickly went from awe to frustration and demanded more speed, better ease of use, and greater reliability. Oh yes, we are spoiled. We demand better, faster, and cheaper all the time. This is the development we are used to, and it is likely to continue.

The other message is that the limits to what is possible are extremely generous. Just think of a butterfly. It starts as an egg, then mysteriously transmutes into a caterpillar larva. Then a pupa. Then a butterfly. Then it flies around. Then it makes perfect copies of itself.

You and I might not understand the science of how that's possible,

but it is, and so is precise, satellite-guided navigation. And so is anesthesia, whereby you can cut into a living human without them feeling a thing. And so is sending a message from London to France to China in a split second. The things we can do now already seem like magic, and the things waiting for us out there in the blur will seem even more so. Nature—including our butterfly—is amazing, but so are the things we create.

THE GREAT DIVERGENCE

When it comes to human innovation, we haven't always been so impressive. In fact, for large parts of history we did *not* have crazy, accelerating supertrends. Indeed, compared to today's frantic rate of change, innovation once moved really slowly, if at all.

In those days, lots of people experienced zero innovation throughout their entire lifetime. In fact, for approximately *99.8 percent* of human history, we had no visible innovation and thus no corresponding trend growth in GDP per capita. Instead, people lived in what is now called a **Malthusian economy** (i.e., one in which there was minimal innovation and thus minimal economic growth). And as economies did occasionally grow a little, the result was more people, but not more income per person. In 1798, the pessimistic priest Thomas Malthus, whose name inspired the term Malthusian economy, predicted that the growth of human population would be exponential, whereas growth of food production would be linear. Mass starvation lay ahead, he concluded.

However, just the opposite happened. In his book, *A Farewell to Alms*, economics professor Gregory Clark illustrates it with this graph of what he called "The Malthusian Trap" and the subsequent Great Divergence:[2]

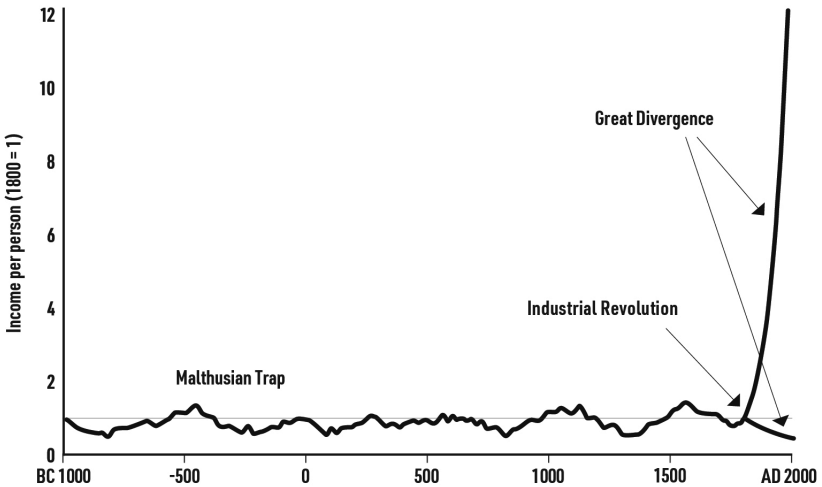

Figure 2.1. How we escaped the Malthusian Trap.

As can be seen, the world's average standard of living remained broadly unchanged for 3,000 years. But then something wild happened: a part of the world's population suddenly experienced exponential growth in living standards, whereas another part (primarily sub-Saharan Africa) experienced declining living standards. That was the Great Divergence.

So why did this happen? The explosively rising standard of living in some parts of the world happened due to innovation. Declining living standards in other parts were due to continued population growth (aided by new access to modern medical care), without corresponding increases in productivity. Fortunately, today only about 15 percent of the world's population seem to be trapped in stagnating or declining communities.

NINE STEPS TOWARD PROSPERITY

We posit that an important corner of the world left the Malthusian Trap around the year 1450—that is, around 570 years before we wrote this

book. Since 1450, the world has changed more drastically than during the preceding approximately 300,000-year-long history of *Homo sapiens*. By the way, exactly the same can arguably be said about the world since the year 1800, or perhaps even for the last four decades.

Of course, this raises a question. Our species is some 300,000 years old. So why did all this stuff only begin around 570 years ago? After all, the last 670 years constitute only around 0.2 percent of human history. Why was 99.8 percent of human history spent in the Malthusian Trap? And what got us out of it?

In our opinion, what caused the escape from the Malthusian Trap was primarily events that first took place in a small part of Western Europe and then spread across much of the globe. We can describe this with nine new phenomena:

1. *The Renaissance* (ca. 1200–1600), which promoted artistic expression, humanism, individualism, empirical experimentation, and creativity.
2. *The Age of Discovery* (ca. 1500–1800), involving the European explorations and ultimately the (if partly temporary) European colonization of most of the globe.
3. *The Reformation* (ca. 1520–1650), where the traditionally individualistic Northern Europeans rejected the perceived over-institutionalization of the Catholic Church and replaced it with a more individualistic and decentralized interpretation of religion. This also emphasized literary skills and personal achievement over collective obedience.
4. *The Scientific Revolution* (ca. 1540–), which replaced mysticism with exact, testable knowledge, and which formed the basis for the later Industrial Revolution. It also united people, because whereas people may fight religious wars, they don't fight wars about alternative laws of math, and so on. Testable truth is a peacemaker.

5. *The Enlightenment* (ca. 1600–1800), which placed the ideals of freedom, democracy, science, religious tolerance, the rule of law, division of power, rationality, and common sense as primary values of society.
6. *The Industrial Revolution* (ca. 1750–), in which technical ingenuity brought mass-production and chemical processing, and which led in part to a wealth explosion and in part to mass urbanization and cultural upheavals.
7. *Female Liberation* (ca. 1840–), where women gained access to education and political influence, which greatly increased overall creative output.
8. *The Precision Economy* (ca. 1980–), which was largely driven by IT-led computation capabilities that in many ways far outpace the human mind, as well as the mass digitization of previously non-digital mediums (e.g., audio, images, text). Furthermore, as the internet became available to the public, the quantity of information anyone with a connection could access multiplied by many orders of magnitude. The power of digital products included the fact that they could be replicated at close to zero cost and moved anywhere at the speed of light. Also, following the sequencing of the DNA, the coding of life in its finest details became feasible. DNA is now digitized and increasingly programmable, like a machine.
9. *The Social Networking Revolution* (ca. 2000–), where people, building on the internet, organized into countless social online networks, and anonymous, non-credentialist crowds (i.e., people not formally approved in the form of specific education or union membership) began to collaborate on countless creative tasks.

BUT *WHY*, SHERLOCK?

This explains what happened, but not why. To get toward why, please look at the following graph. It shows the history of human innovation as far back as we can put a person's name to an accomplishment. And it goes forward until the chosen cut-off year of 1950.

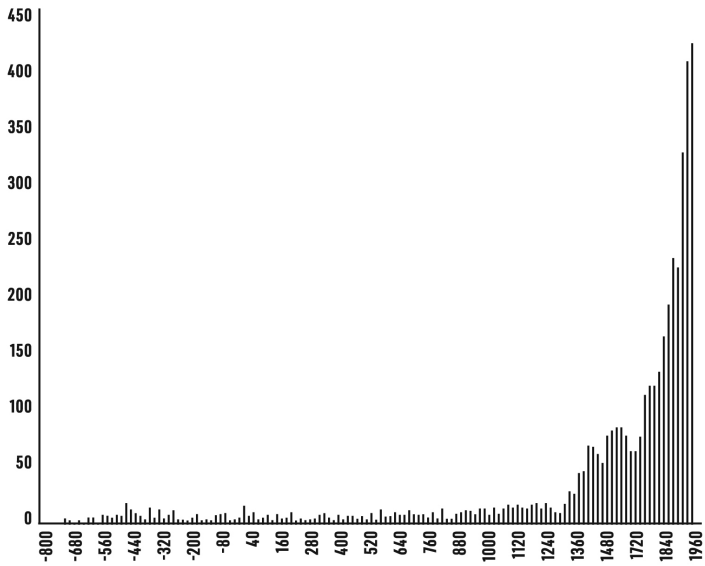

Figure 2.2. Human accomplishment from 800 BC to 1950 AD.

This remarkable graph was created from work done by the American Enterprise Institute (AEI), which used quantitative history tools to study human accomplishment spanning the 2,750 years from 800 BC to 1950 AD.[3] The study's objective was to identify all cases in history where a named person had made a creative innovation in art, science, or technology that was so important that it was quoted in at least half of the leading modern reference books worldwide.

The project took five years to complete and involved fifty people. And it was a huge nerd job that involved poring over 163 modern

sources of human accomplishment (such as encyclopedias) and meticulously recording 1) what each accomplishment was about, 2) the creative people mentioned, 3) how much print space was allocated to each of them, 4) when they did what was described, and 5) where they lived when they did it. So, it was a mapping of the who, what, when, and where of human accomplishment. This resulted in a list of 4,002 names of prominent philosophers, mathematicians, musicians, poets, astronomers, physicists, biologists, technological inventors, and so on who qualified as particularly significant, plus, a corresponding list of their accomplishments.

As we can see from the graph, the global number of new accomplishments was low and trendless until around the year 1000, where it started to pick up a bit, but without accelerating any more. Further examination of the data shows that the accomplishments were not only trendless, but also scattered around geographically so that bursts of creativity would appear at different spots of the globe, but in each case only temporarily. Each time, spontaneous innovation would flame up, then die. And although the accumulated human knowledge and abilities overall increased slightly over the first approximately 300 years on the graph, there were long, intermittent periods without any acceleration or even with temporary *declines* in global accomplishment. Indeed, many decades showed *no* recorded innovation at all! Like zero. Which makes us think of David Deutch's great monotony.

But then—from approximately 1450 onward—global creativity virtually exploded. If we want to understand why this happened, we could start by looking at *where* it happened. The AEI study showed that initially, it happened almost entirely in Western Europe, and as people from Western Europe later started populating other parts of the world, such as the US, Canada, Australia, New Zealand, Hong Kong, and so on, they brought their innovative culture with them. And this time, the flame didn't die.

Some of the details of the statistics are amazing. For instance, the study showed that from 800 BC until 1950, no less than 97 percent of

all attributed human accomplishment was created within the territories of the Western civilization. Different indicators that track global innovation or accomplishment after 1950, such as Global Innovation Index, continue to show a very strong Western dominance; although, particularly since the 1980s, the Asian nations China, Japan, and South Korea have been rapidly catching up and, in some areas, taken the lead. Similarly, innovation in India and Israel are on the rise. Indeed, on a per-capita basis, Israel is now among global leaders.

WHY WESTERN EUROPE?

In any case, we must ask the question why the creative explosion originated in Western Europe. Again, we can learn something by looking at where in Western Europe most creativity took place. It largely happened in a corridor that is now sometimes referred to as the *Blue Banana*.

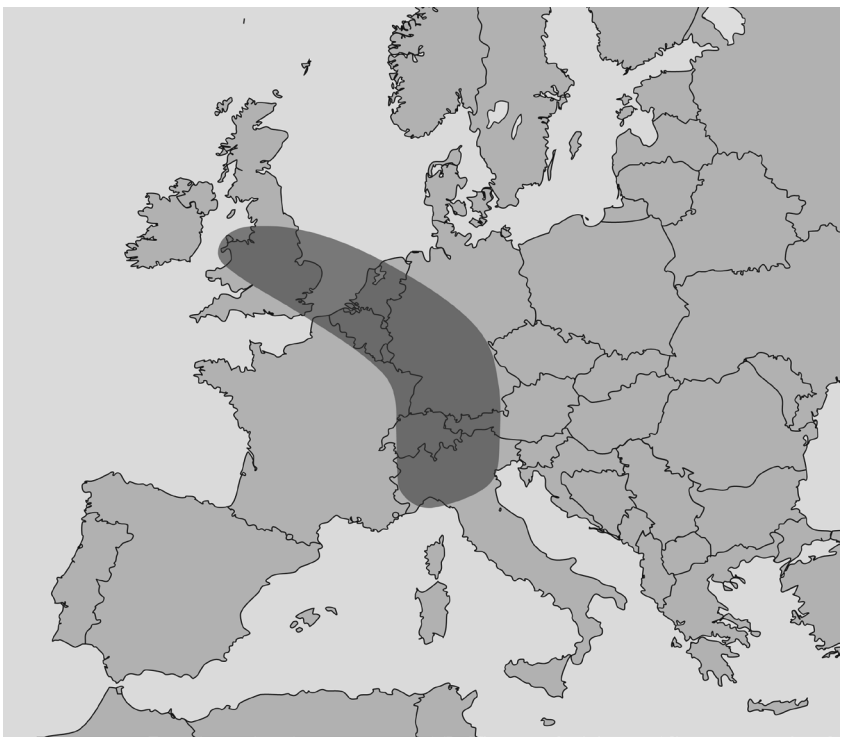

Figure 2.3. The Blue Banana.

The Blue Banana includes modern-day cities such as Milan, Zurich, Munich, Brussels, Amsterdam, and London. Sometimes, when people discuss the Blue Banana, they also include Paris, Florence, and Prague. In either case, this banana has been pointed out as a European area that has particularly high population density. The obvious reason for this is that, on average, this area has offered more prosperity to its citizens than most other parts of the planet, including most other parts of Europe. The Blue Banana is prosperous.

Two of the key reasons the Blue Banana grew in prosperity were the dissemination of knowledge and creativity. Just take a look at Figure 2.4, which shows the location of printing towns in Europe during the fifteenth century, which was when book printing began in Europe:[4]

Figure 2.4. Fifteenth-century printing towns.

Of course, this pattern is not entirely consistent with the Blue Banana, but you definitely see some overlap. And if you check a modern photo of Europe from space, you see a rather similar pattern. The Blue Banana shines at night.

Figure 2.5. Nighttime photo of Europe that illustrates the Blue Banana.

Now here is another map where the overlap with the Blue Banana is more striking. This map shows what AEI's study called Europe's *creative core*: an area where approximately half of all European innovation (or accomplishment) took place, according to its quantitative history mapping.

Figure 2.6. Europe's creative core.

Just to put these results in perspective, this creative core constitutes only 0.01 percent of the global landmass, and it was home to only approximately 1 percent of the global population.

That's actually mind-boggling: over a period of 2,750 years, 1 percent of the global population living on 0.1 percent of the landmass performed approximately half of all attributed accomplishment or innovation! Furthermore, for a long period, almost all the rest of the global innovation was done within the rest of Western Europe, which constituted just 1 percent of the global landmass. This also means that the remaining 99 percent of the global population only did 2.5 percent of its innovation. So to understand the escape from the Malthusian economy and the explosion in spontaneous innovation, we must focus on what happened in this corner of the world leading up to and following the year 1450.

DISINTERMEDIATION THROUGH 10X+ INNOVATION

One event that triggered the innovation boom in Europe's creative core was the introduction of printing. This technology had actually first been developed in China and Korea, but there, the technical advantage derived from it was limited, since their thousands of different characters made it extremely cumbersome to print. So, it didn't really fly there. In contrast, when Gutenberg in 1439 launched movable-type printing in Germany, it quickly took off, mainly because Europeans had far fewer characters, which made their written languages much closer to being digital.

Right from the start, Gutenberg's printing press was what we now call a *10x technology*, which means it solves a problem approximately ten times better than what it replaces. Before Gutenberg, the price for a handwritten Bible was approximately 300 florins. However, in 1454, Gutenberg could sell them for thirty florins each, meaning a 10x improvement. Moreover, just twenty-nine years after that—and forty-four years after the invention of printing technology—Ripoli Press could make books at 1/500 the cost charged by a scribe.[5] This meant that book printing was not only a 10x technology but also had within forty-four years become a 500x technology, equal to a doubling of the cost efficiency roughly every five and half years.

When technologies do 10x leaps (not to mention 500x leaps), it often makes them available for the many instead of the few. In this case, European book production went from 2.8 million copies in the fourteenth century to one billion in the eighteenth century—an increase of approximately 360x.[6]

This empowered people so that they became less dependent on others—the printing press empowered people to obtain information without relying on the church or state for it. In marketing terms, this was perhaps the world's most important case of *disintermediation* (i.e., cutting out the middleman). Ten-times technologies often enable this.

And it was a brilliant example of a third typical consequence of 10x+ technologies, which is that they often change market dynamics from

supplier push (i.e., proactively pushing products to customers) toward *client pull* (i.e., enabling individual customer activity to automatically determine what is proposed or offered to that specific customer). While before printing, priests and kings pushed information to the people, after the innovation, the people increasingly decided for themselves which books and pamphlets to read. Information thus got weaponized and was used by the people against the centers of power. By the way, a similar phenomenon occurred with the internet where the push models of newspaper, broadcast TV, and radio increasingly got replaced by pull models on the web.

10x+ technologies tend to promote disintermediation, unbundling, and a shift from push to pull dynamics in the markets.

10x+ technologies, such as printing and later the internet, also tend to have widespread cascading consequences—on other technologies, on lifestyles, and on human organizations. In Europe, one of the organizational effects of printing was the emergence of the Protestant faith. This movement began in 1517 in the Blue Banana location of Wittenberg, Kurfürstentum Sachsen (part of present-day Germany). Here, the priest and theologian Martin Luther nailed a document listing ninety-five theses to All Saints' Church.

At that time, the Catholic Church was a major landowner in many nations and had massive income from this and many other sources, including selling indulgences whereby the faithful could allegedly reduce time spent by themselves or their relatives in purgatory. Luther and his Protestants rebelled against this and more. The Protestants' belief was that people should not find their way to God via priests but should instead read the Bible themselves, take responsibility for developing their own moral character, and each find their own journey to salvation. This *decentralized* approach led to a splintering of the Protestant faith into hundreds of branches, whereas Catholicism remained a monolith.

Meanwhile, the printing press also promoted scientific exploration,

where sweeping explanations based on faith and imagination were replaced by reductionist thinking. Every question was broken down to multiple sub-questions, on and on in almost perpetual cascades, and each of these—if at all possible—were tested. And we are still at this, now using devices such as the Large Hadron Collider and electronic microscopes to comprehend the smallest of the small.

An intriguing consequence of this development was initially that far more people learned to read. Numerous subsequent studies have shown that far higher literacy developed within Protestant areas than within those that remained Catholic. In addition to this, over time Protestants developed a predominant mentality that was quite unique. In his book *The WEIRDest People in the World*, Harvard anthropologist Joseph Henrich points out various peculiarities among people he calls WEIRD (i.e., **W**estern, **E**ducated, **I**ndustrialized, **R**ich, and **D**emocratic).[7] For instance, WEIRD people who were Westerners, but mainly those who were Protestant or of Protestant origin, tended to focus on personal attributes and intentions, whereas others would focus more on relationships and situations. This has been illustrated by experiments where people from different cultures are asked to complete the following sentence in ten different ways:

I am _____.

WEIRD people would almost always list personal traits such as *creative*, *curious*, or *impatient*, whereas non-WEIRD people tended to identify themselves through their relationships with other people (i.e., as someone's daughter, someone's mother, etc.). In other words, non-WEIRD people (and thus non-Western people) viewed themselves as more tribal and would be very loyal to their own kin but distrustful of outsiders. WEIRD people, on the other hand, were more trusting of everyone, and because of this were better at forming functioning societies across tribal distinctions. In other words, the WEIRDos were better at creating extended and/or flexible social networks. And when

they did join smaller clans, it was on a very flexible basis and would involve *shifting* social groups such as trade groups, expat groups, political parties, and so on. This brings us to a crucial phenomenon called hyper-sociality.

THE EXPLOSION OF HYPER-SOCIALITY

Nature shows that the most efficient way to compete with other species is to develop cooperation, ideally in the form of **hyper-sociality**. In biological ecosystems, hyper-social species tend to do better than less social ones. Apart from earthworms, the now hyper-social humans and their domesticated animals have by far the biggest biomass on Earth today, followed by the hyper-social ants and termites.

Hyper-sociality is the ability to cooperate on a vast scale and constitutes one of the most powerful competitive advantages. It is a major stimulant of creativity.

An effect of hyper-sociality is to create virtual brains. For instance, when a large group of ants are cooperating on a task, they act as if they were a single organism with a single mind. An hour later, each of these ants might be cooperating with a different group of ants tackling different tasks, and they may thus be part of different virtual brains.

What set the Blue Banana apart was largely an explosion in such hyper-sociality. Before this, for example, traditional Catholic religion had been sufficiently powerful to enforce a set of fixed ideas—enforcing Deutsch's hierarchy rule and great monotony. However, from around 1450, we saw more and more advanced sociality—and then hyper-sociality.

However, from the moment of the explosion in the creative core, more and more sociality—and then hyper-sociality—began replacing this hierarchy and monotony. Just think of the nine steps toward prosperity. A major combined effect of the Renaissance, Enlightenment, Age of Discovery, Reformation, Scientific Revolution, and Industrial

Revolution was to set people free to experiment and discover. Now we had more and more individualism, empirical experimentation, scientific endeavor, long-distance travel, and so on, which all involved hyper-sociality. There was also ever more division of labor, which involved trade and combinations of skills, which, again, are hyper-social activities.

Overall, within this exploding hyper-sociality, we had more and more ever-shifting formations of virtual brains—ever-shifting constellations of people cooperating to exchange products, services, and ideas.

Hyper-sociality is a key component of successful, Future Fit individuals and organizations today.

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