The World in 2050

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The World in 2020: Power, Culture and Prosperity
Capital City: London as a Financial Centre
(with Frances Cairncross)
What Works: Success in Stressful Times

The World in 2050

How to Think About the Future

Hamish McRae

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For my grandchildren, Magnus, Sebastian, Grace, Leonard and Frankie, and in memory of little James

Where the World Is Now

Introduction: The Journey from 2020

HOW TO THINK ABOUT THE FUTURE

Why should anyone take predictions about the future seriously when so many in the past have turned out to be not just wrong, but absurdly so? That is the core challenge that this book faces. I believe it is worth tackling that challenge for three reasons.

First, if one is looking one generation ahead, twenty-five or thirty years, many of the broad economic trends that will dominate this period are already evident. Beyond that we move into science fiction. Thus we already know roughly how many people will be alive in 2050 and more or less where they will live. We can judge which countries and regions are likely to grow swiftly and which are likely to lose pace. We can see in broad outline the technologies that will drive economic development, though their details and the pace at which those technologies will be adopted are both hard to predict. And we can make some judgements about political and social developments, though turning points are always hard to catch. After all, we are helped by the intergenerational mathematics. The key decision-makers of the next thirty years are alive now, perhaps still studying in schools or universities, or maybe starting out on their chosen careers. Their ideas will shape the world.

Second, all of us make assumptions about the way the world will develop, certainly implicit and often explicit. For example, the careers we choose are shaped to some extent by our vision of the future. We don't choose jobs that look like being replaced by robots. Most of us are aware that we may have to retrain several times during our working careers. So to paint a picture of the future is to try to help people clarify their own ideas and expectations. Even if people disagree with some of the predictions, as of course they will, at least they will have tested their ideas against an alternative vision. One of the humbling experiences I have had a few times over the past quarter-century is that people have come up to me and said that my book The World in 2020, published in 1994, changed their life. They made choices they would not otherwise have made, and the fact that they were prepared to acknowledge this suggests that they thought those decisions were good ones. At least I hope so. If this book can help people put their expectations into some sort of order, then it will be doing something useful.

That leads to the third point: I have done this before. We are now beyond 2020 and can see to what extent that sketch of what the world might look like does indeed resemble the reality. I have tried to learn from the bull's-eyes – always satisfying to have a few of those – but even more from my mistakes.

That book envisaged a world that was more prosperous, healthier, better educated and informed, and more peaceful than in the early 1990s or indeed in any previous period of recorded history. This has proved broadly correct. None of the unbearable catastrophes that might have made all predictions meaningless, such as a nuclear war, have occurred. Even the Covid-19 pandemic seems likely to eventually be brought under control, albeit at massive economic and human costs. There was indeed a warning of a pandemic in that book, though in the context of the AIDS epidemic still raging in the early 1990s. But the book also warned that it would be difficult for the advanced countries to continue to raise the living standards of their citizens, and that the West's liberal democracies would be under pressure as a result. That, too, has been the case, though I suspect that the economists are at fault in their measurement

of living standards, and fail to take into account the benefits of the communications revolution. As for the emerging world, the book if anything underestimated the progress it would make. That China would boom was obvious, though it has done even better than I had expected. Less obvious was India's emergence as a more buoyant economy, albeit an uneven success story, and I quite failed to appreciate how it would leap forward and by 2020 be growing even faster than China.

Economics has a powerful impact on politics and one of the great themes of this book is that China will pass the US to become the world's largest economy and that that shift of economic power will generate massive political tension between these two great nations. But there are other forces beyond economics that drive political change, and these include identity, religion and nationalism. The long hand of history hangs over everything, and politicians have to try to manage the conflicting wishes and aspirations of citizens in that context.

So it was possible back in the early 1990s to see that the UK would feel increasingly uncomfortable with its relationship with Europe, and that it might leave the European Union and seek to negotiate a free trade deal instead. I did acknowledge it might be very difficult to do so. But sometimes the outcome of a known tension flips the other way. I felt there was an even chance that Scotland would have become independent by 2020. As it turned out its electorate has chosen not to follow that path, at least not on the timescale envisaged. I feel it remains an even chance, maybe a little less than that.

As far as the EU is concerned, it has so far proved more cohesive that I had expected, for I had envisaged it would be more of a multispeed Europe, with an inner core of founder states and an outer ring around it. But there will never be a final form for Europe, and it may be that the pressures against greater integration will dominate the next thirty years. Political structures have to evolve to meet the aspirations of each generation, and those aspirations change.

You can see this in the US. It was clear even in the early 1990s that there would be some sort of populist challenge to the vested

interest groups, against what I wrote was the power 'of the medical and legal establishments, of the National Rifle Association, of the Hollywood moguls, even of the liberal press'. I was lucky in my timing, for I expected it to be in the second decade of this century, but as I acknowledged it was impossible to see what form this radical shift in political attitudes would take. Put it this way: it was impossible to predict that Donald Trump would be president, but it was not difficult to identify the forces that led to his election.

What about the other forces that drive change? First and foremost, what about the pressure on the environment? It was easy to predict that concern about the environment would be greater in 2020 than it was in 1990. Population pressure and the explosion of growth in the emerging world would see to that. It was easy, too, to see that local pollution would be tackled with some success in the developed world, but that worries about climate change would climb. One of the great questions now is how grave is the threat of global warming, and this book seeks to make some judgements on that. If the climate outlook appears more serious now than it did a quarter of a century ago, other fears such as a shortage of oil and gas seem less pressing. We remain a global economy driven mainly by fossil fuels, but renewable sources of energy are building fast. By and large, however, the concerns of 1990 remain the concerns of 2020. The world is just rather more frightened now than it was then – and, I judge, rightly so.

The hardest area to predict has proved to be technology, and in particular the social implications of technological change. That was my most serious 'miss'. I could see that the world would be transformed by computers being linked together. That was what we were doing already as journalists in news gathering and reporting. But I could not see the mechanism by which this would happen. My excuse is that at the beginning of the 1990s, while the internet existed as an academic and defence tool, it had yet to have widespread general application. The key innovations that transformed it were developed progressively through the 1990s. Thus the World Wide Web was not made available to the public until 1991. Mosaic, the first popular browser, was launched in 1993,

and the first effective search engines, WebCrawler, Lycos, AltaVista and Yahoo!, came through in 1994–5. Google, the search engine that came to dominate the world, was launched in 1998.

This phenomenon is not new. It was noted by the economist Alfred Marshall, in 1920, when he wrote: 'The full importance of an epoch-making idea is often not perceived in the generation in which it is made. A new discovery is seldom effective for practical purposes till many minor improvements and subsidiary discoveries have gathered themselves around it.'

And so it has been with the motor car, which needed a raft of minor improvements such as the windscreen wiper and the self-starter, and some major ones such as higher quality roads; or the supermarket, which needed Sylvan Goldman, owner of a supermarket chain in Oklahoma, to invent the supermarket trolley in 1936. I'm not sure one could call the iPhone a 'minor improvement', but by bringing together mobile telephony and the internet it made possible the array of services that we now take for granted. One could, back in the middle 1990s, have envisaged a superior mobile phone that would do what the iPhone does, but Steve Jobs had to work out how to make the vision reality.

That brings us on to the challenge of forecasting what technology might make possible by 2050. Projecting incremental advance is easy. Fly across the Atlantic now and you may well be in an aircraft built in the early 1990s. The newest generation of aircraft are more efficient and the next generation will be more efficient still. But people will still be flying in today's aircraft in 2050, and the laws of physics don't change. The global car fleet will be largely electric and self-driving will be the norm. But vehicles won't travel significantly faster in 2050 than they do in 2020. Falling costs and greater access to cars will have social impacts, but we can have some feeling for what those might be.

Projecting the next great leaps of technology is much harder. We simply don't know what advances currently at the frontiers of the possible will truly change the world, and which ones will prove blind alleys. Just because something can be done does not mean it is of any practical use. Or it may simply be too expensive for

widespread application. There are, however, many areas where there are social or economic issues that are crying out for a technical fix. Take something very simple: security scans at airports. Technology should be able to make that seamless. You should be able to walk through a scanner with your belongings, and with none of the stuff about putting your toothpaste in a little plastic bag. Technology will identify who you are, as well as what you are bringing with you. But – and this is the harder thing to see – technologies that identify and track everyone may not be socially or politically acceptable. Imagine a world where every immigrant is tracked every moment of the day, or every person on earth is on a DNA database.

This leads to ideas about how societies may develop everything from the job contract, through family organisation, through inequality, to the future of the nation state itself. It was possible in the early 1990s to see that self-employment would grow, which it has in many advanced economies. It was harder to see what would happen to that most basic element of family life, the marriage contract. As it has turned out divorce rates have levelled out in the US and much of the developed world, but they have not fallen as fast as I expected. It was harder, too, to make a judgement as to whether inequality would rise in the developed world, and the data there is not conclusive anyway. But it was easy to see that, globally, inequality would fall as the emerging world's living standards caught up with those of the advanced countries. As for the nation state – well, it has made rather a comeback. As the weight of China and India, both strongly nationalistic entities, grows, it seems reasonable to expect that comeback to persist. Indeed, one of the major themes of this book is that the social and political ideas of the two Asian giants will have a massive impact on Europe and North America. Economic success is not everything, but it is a hugely important driver of ideas about society.

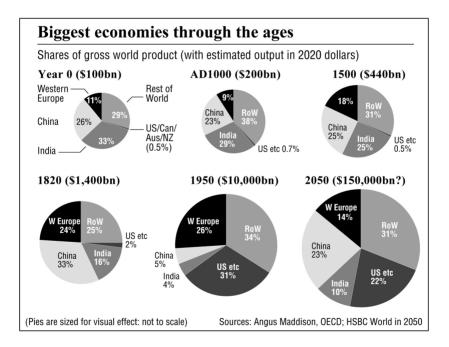
THE ECONOMIC CORE

In two important ways it is easier now to predict about the future of the world economy than it was in the 1990s. One, paradoxically,

is that we know more about the past. The other is that a lot of work has been done trying to model future growth, and this has – with some qualifications – proved quite accurate.

For the past, our debt is to the late Angus Maddison, a British economic historian who did much of his work at the Organisation for Economic Co-operation and Development (OECD) in Paris and the University of Groningen in the Netherlands.² He looked back over the past 2,000 years and calculated the GDP of the various regions and countries of the world, together with GDP per head. There is a snapshot of the world at the time of Christ, then increasingly detailed calculations of what happened since the year 1000. His core findings were published by the OECD in a series of booklets, notably in *The World Economy: A Millennial Perspective* in 2001. He died in 2010, but his work has been carried on by a group of academic friends and followers.

This long view of history shows what for many people will be huge surprises – as you can see from the graph here, drawn from his work.



Back in the year AD I the Roman Empire was only the third largest economic region. Both India and China were much larger, with China nearly double its size and India larger still. They were still by far the largest economies in 1000 and 1500, dwarfing the European countries — indeed, right through to 1820, when the Industrial Revolution began to enable Europe to pull ahead. Then, through the nineteenth century, Europe grew rapidly and the US began its rise to global stardom, though it was not until the 1880s that the US passed China to become the world's largest economy. By 1950 what Angus Maddison dubbed 'Western Offshoots', the US, Canada, Australia and New Zealand, had become one-third of the world economy. China and India had fallen far behind.

Now look forward to the projection for the world in 2050. Sometime around 2030, China again takes its place as number one, and India surges forward. The US will have had a mere 150 years in pole position. We will come to the economic modelling behind this projection in a moment. You can understand why many people in China feel the country is simply resuming its natural position in the world.

As for India, it had a larger economy than that of the UK until the 1890s, when it was number three after China and the US. It looks as though it will pass the UK in the early 2020s, and if by 2050 it has again become the world's third largest, it, too, will be resuming what many Indians feel is its natural position.

There is one further example of the pull of history that is both intriguing and troubling. It is the changing position of Russia. On the eve of the First World War, and just before the Russian Revolution, its economy was second only to Germany among the European nations. It was larger than the UK, France or Italy. It retained that position through to the 1960s, and in 1990 on the eve of the breakup of the Soviet Union, what soon was to become the Russian Federation had a larger economy than any European nation. Then came, in economic and also in social terms, a catastrophe. You can argue that Russia's command economy was unsustainable and that what happened when the Soviet Union broke up demonstrated that. But there can be no argument about

the scale of the collapse. By 2020 its economy was not only smaller than those of Germany, the UK, France or Italy. It was smaller in relative terms – relative that is to its European neighbours – than at any stage in the past 2,000 years. You can begin to understand Russian resentment at its diminished status.

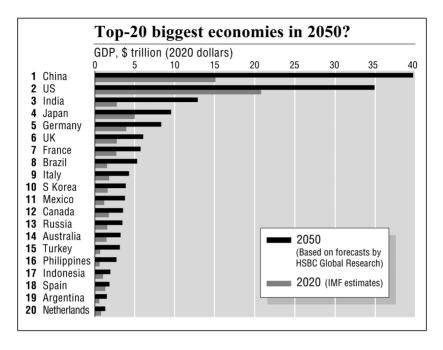
Angus Maddison's work gives us perspective on where we are now. For perspective on the likely future, the best place to start is the work of Robert Solow.³ He is an American economist who won a Nobel Prize in 1987 for his development of a model that sought to explain how economic growth took place. He distinguishes between two different forms of growth. One is frontier or cutting-edge growth, where growth comes from developing and applying new ideas. This encompasses everything from more efficient factories to using new technologies to improve the quality of services - think how satnay cuts delivery times. This is the main driver in the most advanced economies. The other is catch-up or copy-and-paste growth, where a less-developed country applies the technologies invented elsewhere, and this is the main driver of the emerging economies. Put bluntly, this form of growth is why China will pass the US to become the world's largest economy.

An economic model is just a model: you have to decide what variables to put into it. The most famous application of the Solow approach was by Goldman Sachs with its BRICs report. The first mention of the acronym that brought together the four largest emerging economies was in a modest paper by Jim O'Neill, Goldman's chief economist, in 2001.⁴ It noted that these four countries, Brazil, Russia, India and China, were contributing more growth to the world economy than the Group of Seven (G7), the seven largest developed countries, the US, Japan, Germany, the UK, France, Italy and Canada. And it pointed out that China was already a larger economy than Italy, and that the BRICs as a group would grow much more quickly than the G7. A couple of years later O'Neill returned to the theme, using economic modelling to quantify this out-performance, with his paper *Dreaming with BRICs: The Path to 2050.*⁵

The results were stunning. It projected that China would pass Japan to become the second largest economy by 2015 and the US, to become the largest, around 2040. India would pass Japan in the 2030s to become third after the US. Russia and Brazil would also prosper, both taking a much larger place in the world economy than they had back in the early 2000s. O'Neill did qualify these projections by saying that they were optimistic in the sense that they assumed reasonably successful development, and that there was a good chance that the right conditions for such growth would not fall into place in one or more of these countries. We now know that while China and India have, if anything, beaten these projections, both Russia and Brazil have for different reasons started to fall short.

This paper struck a chord that resonated around the world. It is surely the best current example of the aphorism attributed to Victor Hugo that 'nothing is as powerful as an idea whose time has come'. It caught the shift of power that is taking place and will by 2050 have reshaped the world. So now there is an annual BRICS economic summit and a development bank based in Shanghai. (The S stands for South Africa, Africa's largest economy until it was passed by Nigeria in 2012. It was invited to join the group so that the continent would be represented.)

However, the BRIC countries are very different. Both China and India are huge, rapidly growing developing economies, with China far further advanced along the path than India. Brazil is a middle-income economy, having developed much earlier — really from the 1930s onward — but one that is struggling to advance further. Russia is still coping with the disruption following the breakup of the Soviet Union, and while it has huge natural resources it also, unlike India and Brazil, has a sharply falling population. As a general way of viewing the world, the BRIC work is wonderful. It caught the mood of the moment, and Jim O'Neill, now Lord O'Neill, deserves great credit for promoting it. But the concept of the BRICs has proved misleading. To oversimplify a bit, the economies of the developed world are broadly the same, whereas those of the developing and emerging world are very different.



Another version of the model, developed by Harvard Professor Robert Barro, was used by the bank HSBC, and its projections were published in 2011 and 2012. That is where those projections in the graph above come from. As the main author of this report, Karen Ward, notes, whatever happens in the frontier nations, there are many years of catch-up growth left for the rest of the world. However, she also adds: 'As economies become wealthier and technology more sophisticated, they will gradually lose the advantages of "starting from behind".'6

Whether a country manages to catch up depends on a number of things, but most important are its levels of education and the quality of its institutional infrastructure, such as property rights and the rule of law. Intriguingly, democracy may not matter that much, at least not in the short and medium term. A good example of a high-income, non-democratic economy, but one with good education and until 2020 the rule of law, is Hong Kong. It will in the years ahead become something of a test case

of the relationship between the rule of law and growth. Will its performance falter now that China has imposed tighter control over the territory's legal system? To some extent at least, the answer is almost certainly yes.

The HSBC team re-ran their model with some different assumptions, for example the faster-than-forecast decline in population in Russia. Their work was also broadened to cover a hundred countries. A rather different set of projections resulted, and these have been the starting point for the economic forecasts of this book. The largest economies – China, the US, India, Japan, Germany and the UK – remain in the same position as they were in the Goldman work, but Russia in particular is much further down the league table. Indeed, based on these projections, it will have a smaller economy than Turkey or Spain.

These are just projections and need to be seen as such. They are not what will inevitably happen. Rather, they are the best basis we have for thinking about what may well happen. They raise obvious questions. For the frontier nations – the US of course but also all other sophisticated economies – the great question is whether productivity and hence living standards are indeed stuck. That is something dealt with at length in the sections of the book devoted to technology. If the next generation in the developed world does not have a higher standard of living than its parents and grandparents, then the social glue that holds societies together would be much weakened. If on the other hand living standards are actually rising and will continue to do so, and much of the problem is mis-measurement, then it is possible to be much more optimistic. I shall try to demonstrate that to be the case.

For the emerging world, the questions come in two groups. First there are a string of issues about the ability of countries to sustain catch-up growth. How good is a country at developing its human capital? Is there enough investment in both physical infrastructure (its roads, ports and so on), and legal and regulatory infrastructure (its national finances, its civil service, its currency, its trade relationships, etc.)? Second, once an emerging economy starts to approach full developed status and the gains from cut-and-copy

growth diminish, can it then become a true frontier nation? If not, why not? There are some harsh lessons from history here. Japan made that transition; Argentina failed to do so. I shall try and make some judgements there, acknowledging that I will inevitably sometimes be over-optimistic and sometimes the reverse. The big judgement is that the world will indeed continue to become more prosperous, as well as healthier, better educated and I hope more peaceful. But there are enormous challenges, of which perhaps the most important will be those of the environment.

THE ENVIRONMENTAL CHALLENGES

Our perspective on the environmental challenges the world faces has shifted over the past thirty years. Some concerns remain the same. Water stress was, is, and will continue to be one of the grave pressure points. The loss of habitat, which has continued, should alarm anybody who wants their children and grandchildren to be able to experience the great variety of different creatures on our planet. But some of the great worries of the 1990s have receded.

One then was that the world would reach 'peak oil', the point at which global oil production would start to decline because the big established oilfields would run dry and we would not discover new supplies fast enough to meet demand. That has not proved the case. Not only has a lot more conventional oil been discovered, but hydraulic fracturing of oil-bearing rocks, fracking, has opened up vast new supplies. Instead, there is the prospect that the peak in oil production will come not from a shortfall of supply but, rather, from a decline in demand. Greater efficiency, general efforts at energy conservation, and above all the switch of the world's vehicle fleet from the internal combustion engine to electric power, will start to reduce oil demand. The two other fossil fuels, gas and coal, will remain important. Though the world economy will still depend on fossil fuels in 2050, alternative sources of energy will steadily be replacing them.

Another concern was whether the world could adequately feed 7.5 billion people – in 1990 it was 5.3 billion. It seemed then

it would be a close-run thing. As it has turned out, not only is the world better fed in the sense that calorie consumption per person has risen, but there are fewer malnourished people both in absolute numbers and proportionate to the increased world population. In 1990, nearly a quarter of the world was malnourished, while by 2017 it was close to 10 per cent – still too many, but real progress.

Yet another concern was the impact of urbanisation. Would the mega-cities of the developing world be able to cope with their burgeoning populations? The answer there seems that broadly they have. Urban incomes are almost always higher and health outcomes better than in the country. Local pollution remains a grave concern, but the worst fears of thirty years ago seem unfounded.

If these specific issues seem in many cases more manageable than they might have done, there is a general worry of such huge scale that it overshadows much of the environmental progress that has been made. It is climate change. It is hard to write dispassionately about climate change partly because the science is complex, but more because any discussion provokes a strong politicised response. What is beyond dispute is that whereas thirty years ago there were real concerns about global warming and rising carbon dioxide emissions, there was less certainty about the link between them, and less widespread concern about the danger and consequences of climate change. Now this issue is centre stage.

How the debate will shape over the next generation will depend on a number of things. These start with the science, for we will gradually improve our understanding of what is happening. That will bring clarity and help shape the world's response. As we know more, the scope for political debate will narrow. It will be more 'what should we do to cope?' and less 'do we need to do anything?'. All that is for later in this book. The point to recognise now is that ideas and concerns change as evidence becomes available. The world is as worried about what human beings are doing to their planet as they were thirty years ago. But some worries have retreated and one very big one has advanced.

THE TECHNOLOGY CONUNDRUM

The past thirty years have seen rapid technological advance, some would argue the fastest ever in such a period, though that is less clear. Yet for most people in the developed world, this cornucopia of new products and services – initially the internet, then the iPhone, Google, Facebook, and the millions of apps – have not increased living standards in the advanced economies to any significant extent. Can that be right?

Intuitively, it can't be. Every previous period of rapid technological change has seen increased living standards for the majority of people throughout the developed world, since the Industrial Revolution set the whole process in motion. There have, sadly, been groups of people who have had their jobs displaced and have lost out, and there have been environmental and health costs of technical advance. But overall, in the advanced countries living standards have risen steadily since the early 1800s. You would expect, given the explosion of new technologies that have been developed over the past thirty years, that this would have continued. But this is not what the figures show. Median earnings in the US have barely risen in real terms since the 1970s, while in Europe the picture is more varied, but certainly since 2007 they have at best been flat. In general, people at the top of the income range have done well, while in most developed countries those at the bottom have seen their living standards protected. But for the great mass in the middle it has been a dispiriting time.

There are two views about this. One, argued among others by Robert J. Gordon, a professor at Northwestern University in Evanston, Illinois, is that the great burst of American prosperity is over. Productivity, which had slowed to a crawl, will be held back by rising inequality, stagnating education, an ageing population and the rising debt of college students and the federal government. His book *The Rise and Fall of American Growth*⁷ suggests that the next generation of Americans may be the first to have a lower standard of living than their parents.

The other view, argued by Professor Hal Varian, an emeritus professor from the University of California at Berkeley, now chief economist at Google, is that there isn't a productivity problem. Rather, there is a measurement problem: we are undercounting the benefits that the communications revolution has brought. One of his examples is photography. He notes that between 2000 and 2016 the number of photographs taken worldwide increased twentyfold. But because the shift from film and printing to digital and online cut the cost of each one from some fifty cents to zero, this shows up as a reduction in GDP. The living standards of the world have risen in the sense that people take many more photographs, but living standards as shown by GDP per head have fallen because once you have a smartphone, the cost of taking and sharing a photo is free.

When there is a known product such as a photograph, or a service such as a telephone call, and the cost falls dramatically, you can make some sort of adjustment to take this into account. But there are many other examples of new products and services made possible by the communications revolution where it is almost impossible to do so. What price should we put on social media? As of 2021 approximately 60 per cent of the world's population share their data on some social media platform. For nearly all of them the service is free to the user, and the advertisements that pay for it are funded largely by diverting money from other media. So this great revolution does not show up at all in higher living standards.

This creates a huge challenge for anyone trying to see how technology might change the world over the next generation. What I think we can see is that the combination of two technologies, big data and artificial intelligence, has huge potential for increasing the efficiency of service industries. Data is accumulating on a scale that would be unimaginable a generation ago. But there is too much for human beings to be able to use, learn from or deploy effectively. That is where AI, which has been around since the 1960s, comes in. This matters because it is vital to increase the efficiency of the service industries, but it has proved extremely hard to do so. Services make up some 80 per cent of the US and UK economies. Yet while

manufacturing has become steadily more efficient, service industry productivity has barely risen.

It is easy to see why. You can automate a factory, but you cannot automate a hospital. Mass manufacturing was the great driver of increased living standards during the twentieth century. Manufacturers produce near-identical products in a carefully controlled single location. Services, by contrast, must be crafted for the individual at multiple locations. A doctor's appointment, a child's music lesson or a retiree's pension plan all require human attention to make sure that the service fits the need. So somehow we have to find ways of applying the extraordinary technological advances in IT to do for services what the moving production line did for manufacturing.

In one sense this is wonderful, because we can be confident that living standards will continue to advance. But like all changes it will be disruptive, and deeply so. It is easy to be negative about such disruption because it is easy to put a negative interpretation on what has happened over previous periods of disruption. For example, when looking at the implications for AI, it is easy to focus on the jobs being lost to it, as many will be, rather than try to imagine how people released from repetitive tasks will find more creative and fulfilling careers. Just as it was impossible to imagine the boom jobs of 2020 in 1990, it is impossible now to imagine what jobs many people will be doing in 2050. But we can have a feeling for some of the social and educational skills that will be in demand. They will include 'hard' skills such as numeracy and literacy, but also 'soft' ones, including flexibility and empathy for other human beings. How you teach, encourage or nudge young people to build these is another matter.

That leads to a troubling question. Will inequality in the developed world rise over the next generation as a result of technological change? Viewed globally, inequality will almost certainly narrow rapidly over the years to 2050. That is a result of catch-up economic growth, driven by the transfer of technology. If the economic projections noted above are anything like correct, China, India, much of Africa and so on will narrow the gap in

living standards between them and the developed world. There will be the greatest explosion of the number of middle-class people that has ever happened in human history. In that sense, the world in 2050 will be a middle-class world.

But a narrowing of differentials between countries can take place alongside a widening of differentials within them. That has happened since the early 1990s in most of the developed world, to some extent in incomes, but more markedly in wealth. Indeed, within most emerging countries wealth gaps have risen, too. Is this a result of technology? In part it must be, for it is pretty clear that large swathes of production-line and middle-management jobs are no longer needed. Meanwhile, demand has increased at the top and bottom end of the skill range.

There are, however, other forces at work. The West has had a long period of peace in the sense that there have been no major wars. Wars destroy wealth. Thus there was a sharp narrowing of wealth differentials in Europe and to some extent in the US as a result of two world wars. Put crudely, those who have wealth, the rich, pay for war. There have also been no financial catastrophes over the past thirty years on the scale of the crash of 1929, or the great inflation of the 1970s. The two economic crises of the twenty-first century, those triggered by the banking crash of 2008 and by the Covid-19 pandemic, have certainly destroyed some wealth, but nothing like on the scale of a major war. The world economy recovered quite swiftly from the banking crash, and while writing in 2021 it is too early to make a judgement, it does look as though the economic scars of the pandemic will heal reasonably swiftly. Put simply, these two crises have not narrowed wealth and income differentials. If anything, they may have increased them.

What both of these crises have done, however, is make people across the developed world become more concerned about unfairness – the way in which market economies distribute their rewards. Those families that are doing well seem to be doing better, while those that are struggling find the struggle harder.

There is a further twist to the story of increasing inequalities in the developed world: a change in dating and mating, which seems

to have been brought about in part at least by technology. There has been a tendency since the 1980s, particularly in America, for young people to choose their life partners from similar education and income groups rather than from different ones. But this phenomenon, clumsily called assortative mating, seems to have increased as a result of online dating. When people meet each other randomly, in a bar or at a workplace, at least some sorting has taken place: lower-paid workers go to the pub along with high-paid ones. When people specify precisely the sort of person they want to meet, it seems that they choose people similar to themselves in terms of education, interests and so on. If high-earners mate with other high-earners, the result is that inequality increases still further.

The point here is simply that technology has complex social and economic consequences, consequences far beyond the creation and destruction of certain types of jobs. At the moment, the focus is on how technology changes people's access to and understanding of news: the 'fake news' issue. It may well be that the shift from paper to online has encouraged people to choose the news and commentary they receive more specifically than before. As a result, technology may have hardened political divisions. But it may well turn out that the more important impact of the communications revolution on human behaviour is not how people shop or vote, but how they choose their life partners!

THE SHIFTING IDEAS ABOUT HOW SOCIETY SHOULD BE ORGANISED

Predicting social change is always difficult, but in some ways it is even more difficult now than it was in the early 1990s. It was reasonable then to assume that Western democratic values would spread more widely through the world. Francis Fukuyama's essay arguing this, *The End of History?*, was published in 1989; it was expanded into a book in 1992.¹⁰ For much of the past thirty years, that is indeed what has happened. The fall of the Berlin Wall and the expansion eastwards of the European Union, the dissolution of the

USSR, the economic reforms started by Deng Xiaoping in China, the relaxation of bureaucratic controls on the Indian economy, the gradual adoption of market economics in much of Africa and Latin America – all these reflected an acceptance that the West had won the intellectual battle as to how economies should be organised. If your country wanted to become rich it had to follow the Western model. There was no alternative.

This seemed to be a triumph of consumerism over communism, in the sense that the people of the emerging world relished their ability to acquire the trappings of a Western lifestyle. China, which produced less than a million passenger cars in 1990, was by 2017 making a peak of some twenty-five million. It is an extraordinary industrial and economic story, but also a tangible illustration of an extraordinary social story. The people who had endured a brand of communism for some forty years that repressed individualism and personal consumption have now become just as eager to 'keep up with the Joneses' as American consumers did from the 1950s onwards. Chinese citizens show their status by the car they drive just as enthusiastically as their American and European counterparts did a couple of generations earlier. It is a reasonable assumption that, as India grows richer, its people will move along a similar path – actually, it is already pretty evident that they will.

This leads to a key question: will the values of the new middle class of China, India and the emerging world more generally be broadly similar to those of the middle class of the developed world?

I think the answer will be: broadly, yes. But neither sets of values are static. Look at the changes in family structure across most of the developed world since the Second World War, with the decline of marriage, the loosening of the ties of extended family and the increase in the proportion of people living alone. Attitudes to the role of women in the workforce have changed radically, too, though many women feel they have not changed nearly enough. It seems sensible to expect parallel swings in social attitudes among the new global middle class, which in any case is far from a common entity. Not only is the spectrum of social values across the emerging world surely much greater than the spectrum across the developed world;

there is even greater tension than in the West between longstanding cultural values and those of modernity.

Yet there does seem to be a commonality of what might be called 'middle-class life', in the sense that a family home in the suburbs of Bangalore is not so different from a family home in the suburbs of any large city anywhere in the world. Or take that most basic family decision of how many children to have: as incomes rise and women and girls gain more access to education, families become smaller everywhere in the world. If there is to be a big shift in what the middle class aspires to, it will probably be a global one. It is easy to foresee a world dominated by middle-class values, simply because that income group will dominate the world's population – a state of affairs that has never occurred before in human history. But it is harder to see whether and how those values will themselves change, when they are no longer shaped principally by people in Europe and America. That is part of the great shift in power that will continue to take place, a shift that will affect global politics for generations to come.

POLITICS, RELIGION, CONFLICT

Economic power and political power are inevitably intertwined, but as we have learned over the past half-century, the link is tenuous. For obvious reasons neither Japan nor Germany have sought to rebuild their military power, but they have not really attempted to create overseas economic empires either. Where their companies have established overseas plants it is because of commercial necessity: German cars are built in the US and China to enable them to serve those markets, rather than for some greater national purpose. Russia, by contrast, has certainly sought to deploy power globally but it has been hampered by the weakness of its economy. Its outrageous invasion of Ukraine began as this book went to press. While it is impossible to make any judgement of the full implications of its action, it seems quite clear Russia will emerge even weaker in the years ahead.

China, conversely, has been more cautious, and much more effective, in making the world take it seriously, not only as an

economic superpower but also as a commercial and political one. So it builds roads in Africa not simply to enable it to extract minerals and agricultural products, but also to forcibly expand its political influence. Inevitably, China's economic success story carries the explicit message for the rest of the developing world that its political system delivers the goods. There is also an implicit message that China has provided economic support more effectively and less intrusively than the aid programmes of Western democracies and the activities of NGOs. There has naturally been criticism of the way Chinese investment has taken place, for example the use of Chinese rather than local labour. But anyone driving around sub-Saharan Africa will be impressed by the quality of the roads and other infrastructure that China has provided.¹²

Chinese investment in the West has also had a strategic focus: to gain access to technology or natural resources. Investment, initially welcomed, has been subjected to greater scrutiny in both the US and Europe, partly because of a lack of reciprocity but also because of a wider sense, even a fear, that Western openness is somehow being exploited. This tension will not go away, and it will have to be managed as China's clout within the world economy increases.

The link between economic relationships and political relationships is one of the central themes of this book. Political tension between the US and Europe on the one hand, and Russia on the other, has been the dominant feature of the world since the Second World War. Sadly, that will continue – sadly, because there is no underlying reason why it needs to. Russia and Europe are natural economic partners, while the US has won the economic war with Russia. With China it is all too easy to see how what should be a cooperative relationship may break down. China's relations with its East Asia neighbours are difficult. Its aspirations to control the South China Sea will be hard to square with maritime law, and will be a flashpoint for generations to come. Will the whole region, with the exception of Japan, become China's accepted sphere of influence, rather as Latin America became subsumed by the power of the United States at the beginning of the twentieth century? Would the US accept that?

Similar pressures will continue between China and India. This is not new at all, for they have been evident for the past half-century. But as both countries become more important in the world order, containing these pressures, essentially nationalism, may become harder. In 2020 China's economy was five times as big as India's and its GDP per head nearly five times bigger, too. But this disparity is quite recent. In the first half of the twentieth century India actually had a higher GDP per head than China, and even given China's larger population, China had only a slightly larger economy than India in the early 1960s. In the 2020s India will pass China in population and will almost certainly continue to grow more swiftly. So if China is the great rising power now, by 2050 India will be in that position.

There are other potential flashpoints and it is worth noting two further ones here, regions where the balance of power has shifted and will continue to shift. One is the frontier between Siberian Russia and China. It will become progressively harder for Russia's ageing and shrinking population to run the economies of its Far East. By contrast, China needs access to the region's natural resources and has ample human resources to do so. From a practical point of view, large numbers of Chinese people already live and work in eastern Siberia. There is also a legal issue. Parts of what was Chinese territory, including Outer Manchuria, were ceded by China in the Convention of Peking in 1860 and other late nineteenth-century treaties, and so have only been under Russian control for some 150 years. These treaties, including the 1842 Treaty of Nanjing, which gave control of Hong Kong island to the British, are regarded as unequal by China, with some justification.¹³ At some stage it is easy to see China seeking to reclaim those lost territories, too. In the early 1990s the relative positions of Russia and China were quite different and this sort of action would not have been conceivable. Now both in population and in economic power China is much stronger than Russia. By 2050 that gulf will have become wider still.

The other region where big global forces have shifted is in the Middle East. There was until the early 1990s a measure of stability

there. There had been wars, including the Six Day War in 1967, the Iraq-Iran conflict from 1980 to 1988, and the First Gulf War following the invasion of Kuwait in 1990. But however troubling these conflicts have been — and no one should try to play down the misery they have caused — they were largely contained. Since then the region has become even less stable, with the Second Gulf War and particularly since the so-called Arab Spring, the series of political upheavals across the Middle East and North Africa that began at the end of 2010.

It is too early to be able to put much perspective on this unrest, but it is important to recognise one striking feature of the region: its demography. Population growth is very rapid and the median age very young. For example, Egypt's population in 1990 was 57 million, in 2020 it had risen to 102 million, and in 2050 it is projected to rise to 160 million. The median age is currently twenty-five. For Iraq the corresponding figures are 17 million, 40 million, and 80 million, and the median age just twenty. It will inevitably be hard to manage this rate of population growth in any stable and sustainable manner, and still harder to fulfil the hopes and aspirations of these millions of young people. Why, they quite reasonably ask, should young Europeans have so much better life chances?

Then there is religion. It is difficult to discuss the rising religious tensions, obviously within the Middle East but actually everywhere, in a way that does not cause offence. Writing in the early 1990s I avoided the subject largely because I failed to foresee that rising religious feelings would have a material importance in shaping the world over the years to 2020. That was clearly wrong. It is impossible to ignore them now, but extremely difficult to predict how they will affect different societies over the period to 2050. Looking back over the past two millennia there have been periods of religious conflict, sometimes of a particularly horrible kind. But there have also been long periods of tolerance, with different communities living together in harmony and mutual respect.

So I suggest looking forward to 2050 the question is: when does the world next move back into a period of religious harmony? Do

we have to wait for another generation, or will there be some sort of turning point in the immediate future? That is one of the issues explored in the pages to come.

And then there is war. The nightmare that hangs over all Europeans, and indeed anyone with any sensitivity to history, is the horror of the First World War and the catastrophic first half of the twentieth century. A century of extraordinary progress, with its flaws, of course, was blown to bits by the arrogance and stupidity of European leaders. Writing in the 1990s, I felt that the folk memory of that stupidity would preserve stability for another generation. But I was much more worried about the years from 2020 to 2050 and beyond once that memory faded. Russia's behaviour proves my fears were justified.

It is impossible not to be worried now, but for some perspective I find it helpful to read the work of Stephen Pinker, the Canadian professor of cognitive psychology, who has spent most of his career at MIT and Harvard. In particular his 2011 book, *The Better* Angels of Our Nature, 14 demonstrated that violence has declined both in the long and the shorter terms. That is true even factoring in the chaos of the first half of the twentieth century. We may feel that the world is full of conflict, as we see and read evidence of it every day. But actually we are as human beings behaving better to each other – more kindly, more cooperatively – than ever before in the history of our species. If it does not feel like that, perhaps that has something to do with our access to and consumption of the news media. As a journalist I am very aware that good news is not news, whereas bad news is. People buy pessimism. Those of us who do sometimes focus on success stories get mocked for our supposedly Panglossian view of the world. I suspect, too, that it has something to do with the growth of NGOs, which highlight disasters, for it is their job to respond to them. Indeed, that is the principal pitch they make when raising funds. But it may also be because we have a lower tolerance towards violence than earlier generations. We expect more of people, and of ourselves. If that is right, then it is really encouraging – and provides hope for the next thirty years.

A BETTER-BALANCED WORLD, OR A MORE CHAOTIC ONE?

There is a clash between reason and emotion. Reason says that a world where power is more widely spread should be a saner and safer one. But emotion for many people says it isn't. Why does the world, after a long period of success, feel more fragile than it did thirty years ago? Or, rather, why does it feel so in the old developed nations of Europe and North America, for in India, China and elsewhere in the emerging world optimism is much more prevalent?

Part of the answer comes from the work of Hans Rosling, the Swedish professor of international health, who sadly died in 2017. He became famous for his presentation of health and wellbeing statistics in a TED Talk – as well as for ending some of his lectures by his party trick of swallowing a sword. 15 In his book Factfulness, completed by his son and daughter-in-law and published after his death, he set out thirteen questions about the world that people generally get wrong. Few people realised, for example, that over the twenty years to 2017 the proportion of the world's population in extreme poverty almost halved. Or that the average life expectancy was now seventy-two. Or that the vast majority of people lived in middle-income countries rather than poor ones. Not only did most people give incorrect (and overly pessimistic) answers to his questions – they were also more incorrect than you would expect from a random choice. He notes that chimpanzees, picking bananas for each answer, would do better. More alarming, the better educated people were, the more pessimistic they were, and hence the worse their performance. On two of three questions he put to the attendees at the World Economic Forum in Davos, they were still worse than the chimps. Nobel laureates and young scientists who were meeting at the Swedish city of Lindau in 2014 were worse still, while a meeting of Norwegian teachers he spoke to were worst of all.

But it cannot just be that people don't know the facts, or that people who are experts in one field are particularly bad when trying to assess what is happening in an area outside their competence. It

cannot just be the effect of negative news in the media, or the fundraising activities of the NGOs. There must be something deeper. Hans Rosling describes it as a negativity instinct, Steven Pinker as a negativity bias, or 'progressophobia'.

It is complex. Rosling attributes it partly to a misremembered past. People fail to remember the unpleasant aspects of earlier periods and therefore fail to appreciate how much progress has been made. It may be partly because assuring everyone that the world is in general getting better, when there are obvious specific examples where it is not, seems heartless. Pinker notes that it is a form of intellectual one-upmanship, in that complaining about modern society is a backhanded way of putting down rivals. And it may simply be intellectual fashion. Say things are getting worse and you are seen as a sage. Say they are getting better and you are classed at best as naïve and at worst as a fool. Pinker observes that there has been a stream of optimistic books about human progress but not one has won a major literary prize. By contrast non-fiction Pulitzers have gone to 'four books on genocide, three on terrorism, two on cancer, two on racism, and one on extinction'. But it is the pessimists who have in general been wrong, and the optimists (broadly at least) who have been right.

There is, however, an important qualification. Blind optimism, of course, is as irrational as blind pessimism. There is no good way of expressing the thought that we should feed an element of caution into any generally positive view of the future – an awareness that humankind is capable of making catastrophic mistakes. What is really needed is a judgement as to where the most serious risks lie. Hans Rosling calls for a fact-based world view, that 'the world is not as bad as it seems', and that is surely the most helpful base on which to make projections of the future. Unless we are clear about where we are, we cannot hope to know where we might be going.

THE NEXT STAGE OF THE IOURNEY

The next section of this book sets out where the different parts of the world are now – the base that we start from. It acknowledges

the embedded qualities and advantages of the developed world, noting the differences between its different regions as much as the similarities. It is more optimistic about the strengths of the United States than many of that country's own citizens, scarred by the political turmoil of the Trump presidency and the many divisions that remain. It looks at the emerging nations, including, of course, the two giants, China and India, and in particular recognising the inadequacy of the concept of an emerging world to capture the extraordinary diversity of middle-income and lowerincome countries. This is a snapshot of a world that is racing ahead, 'emerging' indeed, but in many cases already making that transition to developed country status. But advance will take place at different rates. The challenge for a world of nation states is for the leadership of those states to make the most of the advantages, and to tackle the disadvantages, of the regions for which they have responsibility. It is a challenge for the citizens of the advanced and emerging nations, too.

After that, the book looks at five forces for change, starting with demography, which is massively important in determining both the potential for economic growth and the 'feel' of a society, in particular its vibrancy or otherwise. It looks at the pressure on resources and the environment, and in particular the humungous challenge of climate change. It next looks at the changing nature of international trade and finance, and whether globalisation will continue to shape all our lives. Then technology, of course: where to look for the transformative technologies that will reshape our lives. The final chapter of this section looks at how ideas about the role of government and how the governance of societies will shift in different parts of the world.

Then we come to my judgements as to how the different parts of the world might look a generation from now – how those five forces will help shape the countries and regions sketched in Chapter 1. I have taken the five traditional continents of the Americas, Europe, Asia, Africa and Oceania as a framework, accepting the anomalies that this structure involves. For example, most of Russia's land area is in Asia, but the majority of its people

live in Europe. There are some regions which are inevitably dealt with more briskly, too briskly I am afraid, than others. For that I ask forbearance. There will be some judgements that for some readers will jar. There will be some that will turn out to be very wrong. But all of us who are trying to peer into the future are making a journey. We all have views that will change as new evidence comes along – as the roadmap we are following must be redrawn. I do believe that is better to have a roadmap and change it than not to have one at all.

Then there is the final section of this book, 'How the World Will Look in 2050'. This is my best effort to wrap up all the information, the projections, the judgements, the fears and the hopes into a coherent whole. I acknowledge the ten things I am most worried about, and I pick out what seem to me to be the ten biggest ideas that have, for me, emerged from this book.

Overarching everything, however, is a thought – I would say a truth – that has been best expressed by Barack Obama. It reflects the views of Hans Rosling and Steven Pinker, and Barack Obama has made the point several times. But the version¹⁶ I like most was when he was talking to a group of young people in Laos in September 2016. This is the key passage:

If you had a choice of when to be born, and you didn't know ahead of time who you were going to be, what nationality, whether you were male or female, what religion, but you said when in human history would be the best time to be born? The time would be now. The world has never been healthier. It's never been wealthier. It's never been better educated. It's never been less violent, more tolerant, than it is today.

He went on to explain that we did not always see that, because there are terrible tragedies and injustices. But the opportunity for young people to tackle those tragedies and injustices was greater than ever before. Finishing this book while war rages in Ukraine, the global pandemic continues and with the background of wider fractious international relations, it is really important to see the world now in this long historical context. The best time to be born must be now. So let's set off on the next stage of the journey to the world that will be run by our children and grandchildren, and do so with a spring in our step.