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The best of centuries or the worst of centuries: Leadership, governance and cohesion in an interdependent world

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About the author

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Contents

Executive summary

William Fulbright was a great internationalist and citizen of the world. He was a crucial figure in building the institutions for internationalism and rule-based systems that fostered the extraordinary advances, unprecedented in human history, of the last seven decades. These include an increase in world life expectancy from around 40 to around 70 years, income per capita rising by a factor of around four, and huge declines in absolute poverty. Internationalism has delivered, big time.

These successes have brought intense pressures on our global commons and major global risks. The challenges include climate change, pandemics, anti-microbial resistance, cybersecurity and weapons of mass destruction. We can rise effectively to challenges only by working together. But there are worrying signs that the commitment to internationalism is waning. Tackling them will take strong and renewed commitment. If we rise to these challenges, this can be the best of centuries; if we fail, it will be the worst.

In recognition of these challenges, and of the opportunities the great advances have brought, the world has built a remarkable global agenda, including the UN Sustainable Development Goals and the Paris Agreement (COP21 of the UNFCCC), both agreed in 2015. I study in this lecture how that agenda was built, particularly through the example I am most familiar with, Paris COP21. Careful planning and wise diplomacy was essential. But so, too, was a shared understanding of the fundamental issues at stake: these included not only the immense risks of unmanaged climate change but also that the transition to the low-carbon economy could provide the growth story of the 21st century. That growth, in the language of the G20, Hamburg 2017, could be "strong, sustainable, balanced and inclusive". It could be enormously attractive, including cities where we can move and breathe, and ecosystems which are robust and fruitful.

Delivery on this global agenda, at scale and with urgency, is now crucial. The world's infrastructure will double in around 15 years, its economy will double in about 20 years, and the population of its towns and cities will double in 40, with their functionings and structures determined in the next 20. These are a decisive two decades for the future of the world. The new infrastructure and economy must look very different from the old if we are to reduce emissions by 20%, as we need to in this period to deliver on the Paris Agreement. And we have the opportunity to make our infrastructure and economies much more resilient to those aspects of climate change that are now unavoidable.

Central to a response on the urgency and scale necessary would be an expansion of the financing capabilities and activities of the multilateral development banks. They have special strengths from their design, shareholding and objectives that allow them to pioneer the examples that can be taken to scale. And they have the risk management capabilities that allow them to work with the private sector as partners still more effectively than they have done so far. I show how the necessary expansion and reform can take place, drawing on my experience as Chief Economist of the EBRD and then of the World Bank. Increased support for the development banks would also send a strong signal of the importance of internationalism and the power of working together.

I indicate an optimism about what we can do. If we rise to these challenges effectively we can indeed make this the best of centuries. I am deeply concerned as to whether we will have the political will, across nations and within nations, to deliver the strong decisions that we need, at the pace required. I describe how the political will can be built, based on understanding of the issues, strong communication and the involvement of the private sector, the NGOs, our cities and other levels of government. I argue also that the academic world has a duty not only to research the issues and provide analyses of the options, but also to engage much more effectively. If William Fulbright had been with us, he would have been in the vanguard of an effective response to the challenges we now face.

1. Introduction: the questions, the challenges, the choices, the argument

This paper[1] is an extended version of the eighth Fulbright Legacy Lectures given at King's College, London, the University of Edinburgh and the University of Oxford on 4, 6 and 8 June 2018. I am deeply grateful for the invitation to give these lectures to Penny Egan, Executive Director of the US-UK Fulbright Commission, and to the Commission, and to all those at King's, Edinburgh and Oxford who hosted me. It is a great honour to be asked to give these lectures in the name of such an outstanding figure in the international history of the 20th century and with such distinguished predecessors as Fulbright lecturers.

Let me begin by celebrating the vision, values and achievements of William Fulbright. He was a great internationalist and 'citizen of the world'.[2] By that description we should understand that he was someone who recognised both our common humanity across communities and nations and that we could do so much more for the wellbeing of the people of the world if we collaborated and made common cause. When he joined the House of Representatives in 1942, the evidence that the consequences of narrow and combative nationalism could be devastating was overwhelming: two world wars and a great depression in the three decades following 1914. He brought forward the Fulbright Resolution to encourage the US to participate in what became the United Nations in 1943 and, soon after joining the Senate in 1945, legislation establishing the Fulbright Program for fellowships and scholarships (in 1946). During his 30 years in the Senate, he was to become the longest serving chair of the Foreign Relations Committee (1959-74).

Thus, he worked for the creation of the United Nations, supported the establishment of the Bretton Woods institutions and embraced the Universal Declaration of Human Rights, three fundamental pillars of the international system created in the years following the Second World War. They gave institutional, ethical, legal and practical expression to the principles of the new internationalism and they provided a global agenda for reconstruction and growth and an architecture for international collaboration.

At the same time we should recognise that this period was largely before decolonisation; Bretton Woods was attended by just 44 countries. Although Independence for India was in 1947, for most other colonial countries it came later. Thus the 'global' aspect of the new order was restricted in this fundamental way.

Internally in US politics Fulbright was alone in the Senate in voting against an appropriation for the Permanent Subcommittee on Investigations chaired by Senator Joseph McCarthy. He opposed the war in Vietnam. He was on the right side of history in both cases and was courageous in his stand. On the other hand, he was, as a Southern segregationist, on the wrong side of history throughout his three decades as a Senator. He was a remarkable man with a place in international history of profound and lasting influence and value. However, great leaders often come with great flaws.

Fulbright was both a visionary and a realist who got things done. I try in this lecture to take inspiration and guidance from him in the sense of seeking a vision of 'what could be' and in examining the practicalities of 'how to deliver'. His extraordinary legacy came from putting the two together.

Let me explain my title by starting with the famous quotation from the first page of Charles Dickens' *A Tale of Two Cities*. He was writing in 1859, about 1775:

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[1] In choosing my title I have drawn not only on Charles Dickens but also on the language of Jim Martin, an extraordinary scholar, writer, entrepreneur and philanthropist, who founded the Oxford Martin School.

[2] President Bill Clinton at the 50th anniversary of the Fulbright Program, 5 June 1996, a year after Fulbright's death in 1995.

It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair, we had everything before us, we had nothing before us, we were all going direct to Heaven, we were all going direct the other way...

For Dickens the best and the worst were simultaneous. The best was for the ruling elites; the worst for the oppressed and the victims of lawlessness. The hope was in part the coming revolution, but also therein lay threats and despair.

The intense stresses within and between nations were fundamental to his story. And as we now look at our own country, across the Atlantic and around the world, we can surely see despair as well as hope. However, we now have stresses and threats that go far beyond those within and between nations. The global commons are now profoundly threatened by the nature and size of the footprint of past and current economic activity and by its potential future growth. Thus we see real tension between the future on the one hand and what we have done and are now doing on the other.

We have passed from the benign Holocene of the last 10 millennia during which our civilisation came into being, and have entered what many are calling the Anthropocene, where our era is powerfully shaped by the pressure we humans have put and are putting on the world. We must recognise, however, that these pressures, in large measure, are a consequence of the great successes and advances of the last 70 years in terms of living standards, wealth and life expectancy. And we should recognise further that a key driver of these advances has been the global collaboration and integration championed by Fulbright.

We must now understand and handle these consequences of the "best of times" of the last decades and recognise what could happen if we fail to change our ways of producing and consuming. We must, and we can, break the relationship between economic activity and damage to our environment. In so doing we can create new opportunities for the best of centuries, with rising living standards, cohesive societies, cities where we can move and breathe and ecosystems which are robust and fruitful. As we work to change our ways, and grow differently, internationalism will continue to be vital to success. Narrow nationalism, aggressive unilateralism and a refusal to understand the scale and nature of threats, and indeed the urgency of radical change, could sentence us, as I shall argue, to the worst of centuries.

The purposes of this lecture are: to demonstrate the immense magnitude of our choices; to show the forces that have shaped where we are and that will determine the nature of these choices; to recognise, indeed celebrate, that we now have a new global agenda which embodies both shared values and ambitions and a positive response to the choices; to examine what is involved in delivering on that agenda and creating the best of centuries; and in so doing to argue that collaboration across generations and nations and building stronger international institutions will be at the heart of that delivery. We will collectively choose either the best of centuries or the worst. In this sense it is a different story from Dickens', when the best and worst co-existed. The choice is between one or the other – and it is ours to make. No doubt, however, even if we do manage to choose the best of centuries, it too will have its stresses and flaws.

While arguing that the best of centuries could be in our hands, I will raise deep concerns about whether we will collectively show the political will to make the changes we must. While the new paths that are now available to us are profoundly attractive and the old paths are deeply dangerous, the radical changes that are necessary must be delivered in the next two decades and decided now. Our political systems are, all too often, weak at delivering radical change unless threats are recognised as intense and immediate. The threats are present in the here and now, and are indeed intense. Action on scale is urgently needed, but we have to look ahead and foresee the immensely grave consequences of inaction. The dangers from a hostile climate are already with us and tangible but on nothing like the scale of the catastrophe that could occur if we are negligent. I

am indeed optimistic about what we *can* do but am much less so about what we *will* do. The first task in promoting action is to show what is possible, that it can be effective and, in this case, that the route is very attractive. That is a necessary condition. A second, and simultaneous, task is to work to improve the probability of action. That work is, in large measure, political but it has to be analytical too.

A key part of my argument for this lecture at a university is that academics have a fundamentally important role to play: first, in analysing where we might go, second, in examining and creating policy options and, third, in communicating in ways which are clear and simple. We often do moderately well at the first two, analysis and policy, but we have to do them still better and quickly. In economics in particular, we are not very good at including the possibility of radical disruption in our models and still weaker at analysing the public policies that can foster radical change in our actions. We generally do badly at the third. It is our duty to communicate much better. Time is not on our side.

Given this broad framework of the questions, challenges and choices, let me describe the structure of the analysis and argument which follow. We begin in the next part of this paper by describing and trying to understand how the world has changed and is likely to change. We have to identify how we came to be where we are and the forces driving change. This will in turn help us understand the risks we run and the opportunities available. We know we will learn much about both along the way and thus must think about methods and approaches which foster such learning. As we examine how the world might change, we start to define the meaning of the worst of centuries: the possibilities of unmanageable climate change, pandemics, anti-microbial resistance, loss of biodiversity and extinction of species, cyber warfare, and severe and extended conflict, including, potentially, the use of weapons of mass destruction. And we will begin to see the possibility of much more attractive ways to growth and development: sustainable cities, cohesive communities, robust ecosystems, international collaboration.

The remarkable global agenda agreed in 2015 is set out in Part 2. The analysis involves examining and reflecting on what we mean by 'good' and 'better' in terms of outcomes and processes and how agreements on the objectives that can guide and underpin action can be built. This will involve in turn identifying the key dimensions of wellbeing we regard as being of the greatest relevance. Implicitly or explicitly that requires a discussion of the values which lie behind and shape objectives – and that includes values and obligations in relation to future generations. The global agenda consists, primarily, of the UN Sustainable Development Goals (SDGs), agreed in September 2015, and the UNFCCC COP21[3] Paris Agreement of December 2015. That we have such an agenda is truly remarkable given differences in interests and values across peoples and nations. In Part 3 I will present and celebrate that agenda and as a participant examine how it was built.

A good agenda should be a challenge to act and deliver. For this we must identify the policies, actions, behaviour and institutions which could foster the outcomes and processes which will make the "best of times" much more likely. Of course, life is and will be full of uncertainty but we can drastically improve the odds. I will present, in Part 4, this question as one of delivery on the global agenda. In so doing, we must ask how the political will to make the necessary radical changes could come about. As I have indicated, I am optimistic about what we can do, but deeply concerned as to whether and when we will act.

A core conclusion on delivery will be that now is the time to invest and recast some of our key international economic institutions and architecture. There are three, related, reasons: first, the world has seen fundamental structural and economic change over the last three or four decades, with a profound shift of the balance of economic activity towards the emerging market and developing countries, an increasing interdependence across regions and nations, and extraordinary

[3] This is the United Nations Framework Convention on Climate Change, Conference of the Parties number 21.

technological change; second, we have, since 2015, a new global agenda for sustainable development embraced by more than 190 countries; and third, we have intense pressure on the global commons, requiring urgent action. We can see clearly the direction, nature and scale of the changes in the institutions that will be necessary to shape the new economic processes and outcomes we now need and seek. In recasting and acting we must combine two things: we have to move with real urgency, given the decisive nature of the next two decades, and we must recognise that institutional change takes time. But we can and must think, build for the future, and act and invest at the same time. That is the challenge of serious analysis, wise policymaking, national action and international collaboration in a world with intense and urgent challenges.

In tackling the challenges of this century, internationalism is of fundamental importance: indeed, given our interdependence and the pressure on the global commons, it has never been more important. I will make the case for, and describe how to create and foster, an international agenda and international action, mostly through two central examples in which I have been deeply involved: the Paris Agreement on climate change and the international development banks. The mechanics of and lessons from these are core to showing the need for internationalism, how it can be built, and how effective action can be delivered. The choice of climate change as an example should not be seen as any implied minimisation of other risks. Oceans, forests, land-use and biodiversity are of great importance in their own right, as well as overlapping with climate change. And there are great risks from pandemics, cyber-security and weapons of mass destruction. I am illustrating international action in one core area; it is of intense importance and urgent. But I think the example is instructive for other challenges too.

I am sure that we are all keenly aware that internationalism is under threat, particularly in some quarters of the rich world: but not everywhere. Now more than ever is the time to make the case. It must be sound, strong and based on analysis and experience. It must also be communicated in ways that are clear, persuasive and understandable. I will return to communication towards the end of the lecture. My main task is to build the case and to show what is now both necessary and urgent.

2. How the world has changed and where might it go?

Our assessment of how the world has changed, and is changing, and the implications for international policymaking and institutions should begin with the extraordinary outcomes for human wellbeing that we have witnessed over the last several decades. These outcomes, in large measure, have been fostered by the international economic order created in the aftermath of the Second World War and by action and progress in the countries that achieved independence or liberation in the two or three decades following that war. Winston Churchill reportedly said, "The farther back you can look, the further forward you are likely to see". In this part of the lecture, we look back over the period since the Second World War and then look forward.

Looking back

A short lecture allows little space for such a large subject as the progress of wellbeing in the world over seven or eight decades. I will confine myself to headlines in six broad areas: health and demographics; education; income; gender; environment and politics. These, broadly speaking, cover the key elements of the SDGs. Given the long period and, as ever, problems of definitions and measurement, I will talk mostly in round numbers. For the key elements of what I have to say, decimal points do not matter.

On health and demographics: world life expectancy has risen from around 40 years in 1950 to around 70 today. That is an increase of around five months per year. World infant mortality rates[4] have plunged from more than 70 per 1,000 live births to well below 30. The global fertility rate (the average number of children per woman) has reduced from over five to around 2.5 today. And the global population has roughly trebled from 1950, from around 2.5 billion then, to around 7.5 billion today. That extraordinary rise in population puts great pressure on the planet but we should recognise that it arises from extraordinary success in terms of the reduction of the numbers of people meeting early deaths.

Of course, there is great variation across regions. Two major, and populous, countries in developing regions, Nigeria and Bangladesh serve as examples.[5] In Bangladesh, from 1960 to today life expectancy has increased from approximately 45 to 72 years, while in Nigeria it has risen from around 40 years to 53 (World Bank, 2018). In terms of infant mortality, both have experienced significant declines, with Bangladesh decreasing from 175 deaths per 1,000 births in 1960 to 28 in 2016. While the decrease has not been as pronounced in Nigeria, there has still been a remarkable fall, from 196 in 1964 to 67 in 2016. Finally, changes in birth rates in those two countries also illustrate the variation across regions: in Nigeria there has been a gradual decline from 46 births per 1,000 population in 1960 to 38 in 2016. In Bangladesh, the trend has been more pronounced with 49 births per 1,000 people in 1960, decreasing to 19 in 2016 (World Bank, 2018).

If we look across regions and countries, there has been a substantial equalising in life expectancy: across the major regions it is now between 68 and 75 years, with the exception of Africa where it is around 58 years (World Bank, 2018). Africa's fertility rate is around five although it is falling (World Bank, 2018). Africa has seen real progress on the health dimensions of wellbeing but much more slowly than in other parts of the world. We must, in considering the prospects for this century, pay special attention to the challenges facing Africa, including the very rapid growth of population. Africa must surely be a priority for international collaboration in support of national and regional action. Of the two billion people likely to be added to the world's population in the next four

[4] Deaths of children under one year of age per 1,000 live births.

[5] Here I use 1960 rather than 1950 as the base year for examining change, for reasons of data availability.

decades or so, one billion are likely to be in Africa. Stronger women's education and job opportunities, health services and access to reproductive health care are all measures which could both realise great benefits in their own right and bring down fertility rates.

At the same time, we must recognise that Africa is particularly vulnerable to climate change and the future of the climate in this century and beyond is enormously dependent on the nature and patterns of growth elsewhere, and particularly on infrastructure investment in Asia. In this century, of all centuries, development is not a zero-sum game and giving a high priority to Africa requires action across the world.

These remarkable changes in global health have origins which lie, in large measure, in public action – community, local, national and international (Fullman et al., 2018). These include: investment in public health, including water supplies and sanitation; investment in education, particularly of women; vaccinations and other forms of disease prevention; investment in health service infrastructure and delivery. Looking forward these will be important investments for the achievement of the SDGs. We should note too that economic growth itself has an important positive effect on health outcomes. And many investments, such as those in sustainable energy, transport and water infrastructure, have a powerful effect on growth, as well as contributing directly to health. And stronger health itself contributes to growth.

On education: in 1950 around 45% of the world's population was illiterate (UNESCO, 2005); today it is close to 15% (World Bank, 2018). The bulk of the change has been in the developing world. This is in itself a huge reduction in global inequality. This decrease has not, however, been evenly spread across regions, and there are some large differences. In sub-Saharan and North Africa the illiteracy rate is around 35% and 23% respectively, while in other developing regions such as Latin America it is around 6% (World Bank, 2018). Literacy is, of course, a crude and basic measure of education, although fundamental. Its spread across the world is indeed an equalising force. But while it is possible that increases in life expectancy will slow down, it looks highly likely that investment in quantity and quality of education will increase rapidly in developing countries, from primary to secondary and beyond.

The literacy gap between females and males has narrowed, with female literacy now around 83%, up from 61% in 1970s, and for males now around 90%, up from 76% in 1970s, for people aged 15 years and above (World Bank, 2018). For girls, we are now seeing much higher attendance at primary schools around the world from 65% in the 1970s to now around 90% (World Bank, 2018). Nevertheless, the number of girls out of school remains a major challenge, with approximately 34 million not enrolled in primary education (UNESCO, 2018). There are, of course, fundamental gender challenges around human rights, ability to work, property rights and so on which are of immense importance. We must recognise that gender issues are not only about justice and human rights, although these are of first and fundamental importance. They are also about the functioning of economies and societies. Most activities function better with stronger female involvement, whether they be in governance, education, loan repayments, agricultural programmes and so on.[6]

As incomes rise people attach higher importance to investing in education. For much of the period since the 1960s public sector education spending in developing countries has fluctuated between 1 and 2% of GDP. In recent times this has, however, increased to an average of 3–4% (World Bank, 2018). Private spending is 4 or 5% of GDP. Current public spending in high income countries is in the region of 5% of GDP (OECD, 2017), with a similar amount from private spending. While the rich countries are likely to continue to press on with the expansion of tertiary education, we should regard the likely rapid advance in primary and secondary education in the developing world as a potentially powerful equalising force.[7]

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[6] The important World Bank Policy Research Report of 2001, published during my time as Chief Economist, *Engendering Development* (written by Beth King and Andrew Mason and their team), assembles the evidence in a very powerful way.

[7] See, for example, Bhalla (2018).

Since 1950 world income per capita has grown on average at an annual rate of around 2%, rising by a factor of close to 4 (World Bank, 2018; Bolt et al., 2014; Maddison, 2005). Population has roughly trebled so that total output has gone up by a factor of around 12.[8] This growth has led to immense pressure on the global commons, particularly, as we shall see, via the intensive use of fossil fuels.

We should recognise, however, that there have been major variations across periods and over geographies. For a quarter of a century after the Second World War, the world's growth in income per capita was around 3% p.a. and driven largely by the rich countries and reconstruction after the war. For much of the 1970s and 1980s, growth stuttered or stalled in part as the result of oil and financial crises. From the early 1990s to the great financial crisis which began a decade ago, growth of income per capita picked up to around 2% again, but increasingly the driver of the growth came from emerging market countries, particularly China.

We are beginning to see, at last, a recovery from the financial crisis. China and India are likely to maintain strong growth for some time. For a while, we may see growth of incomes per capita of around 2% p.a. and of population growth around 1% p.a. The population growth rate is, however, falling and will likely reach around 0.4 or 0.5% p.a. by mid-century, and world population is likely to plateau towards the end of the century (UN Population Division, 2018). Overall, the world economy is likely to grow at a rate in the region of 2.5 to 3% for the next couple of decades.

The fall in absolute income poverty as a result of this growth, particularly in China, has been remarkable. The share of people living in absolute poverty, or (using current World Bank definitions) living on less than US$1.90 per day, fell from around 72% of the global population in 1950 to just less than 10% in 2015 (World Bank, 2018). This represents a decrease from 1.8 billion people in 1950 (of a total world population of around 2.5 billion) to around 700 million of a total population of 7 billion in 2015. In historical terms it is an astonishing change.

The target of the Millennium Development Goals (MDGs; see below) to halve the proportion of people living on less than US$1.25 per day (then the World Bank poverty definition) between 1990 and 2015 was met, in large measure, as a result of dramatic falls in China: since the 1970s around 800 million people in China have been lifted out of poverty (World Bank, 2018). But we should recognise that absolute poverty has been falling rapidly in other developing countries too, including in India, falling from around 20% in the 1970s to well under 5% now (ibid.). While the fall in absolute poverty in the last three decades has been remarkable, it remains a major global challenge, with many people who have risen out of poverty still highly vulnerable to falling back in.

Inequality of incomes between countries has fallen as a result of growth in emerging market countries being much faster than in developed countries over the last two or three decades (Bourguignon and Scott-Railton, 2017). However, within many countries that period has seen some increase in inequality, particularly when measured in terms of the shares of income and wealth going to the top 1% (Alvaredo et al., 2018).

On the political front, democracy has made major advances in the last seven decades. In 1950 around 15% of the world's population was living in colonies and only around 30% in democracies (Roser, 2018). Today the figures are close to zero per cent in colonies and more than 50% in democracies. Notwithstanding the rise of democracy over the period as a whole, we must also recognise that in the last two decades advances in democracy may have stalled. In many countries we have seen the rise of autocratic figures and of populism.

The increase in democracy has also come with an improvement, in some respects, of human rights since the 1950s. This includes the reduction in physical harm to citizens, including torture, government killing, political imprisonment, extrajudicial executions, mass killings and disappearances (Farris, 2014). These overall trends paint a picture of improvement since the 1950s.

[8] Using an average annual compound growth rate for levels of world GDP per capita of around 2% based on Maddison (2005) and other sources. Comparisons over such a long period of GDP are necessarily crude; it is the order of magnitude that is important, rather than the precise number.

There have been many setbacks, however, and there remains much which is deeply troubling, including declines in press freedom (Reporters without Borders, 2018), the rise in partisanship and some backsliding on democracy. We still see, in many countries, the continued marginalisation, demonisation or persecution of groups and individuals based on religion, race, language, nationhood or sexual orientation.

Conflict around the world continues to pose serious challenges. There are now more incidents of armed conflicts[9] per year than in the mid-1940s, rising from approximately 20 in 1950 to over 30 in 2013 (Allansson et al., 2017). While armed conflict between countries has steadily decreased since the 1950s, there has been a rise in sustained internal armed conflicts between state and non-state groups (PRIO, 2017). These armed conflicts also often have significant regional or international dimensions or involvement. There has, however, been a decrease in total annual deaths from armed conflict over much of this period. In 2005 the deaths from conflict reached their lowest point, around 12,000, since the end of the Second World War. Since then, however, there has been an increase to nearly 100,000 in 2016, driven by continuing armed conflict in the Middle East (Allansson et al., 2017). This increase represents a worrying change that has reversed many of the achievements made in this region so far, has resulted in large-scale migration, and constitutes a direct barrier to regional development. And it carries serious threats of regional or global conflict.

In some countries we have also seen a reaction against internationalism. Interestingly, however, support for globalisation has not fallen back in emerging market and developing countries. In lower- and middle-income countries, globalisation is seen as a 'force for good' by over 70% of people with only around 10% seeing it as a 'force for bad'. In higher-income countries, the feelings towards globalisation are more mixed. While there are still majorities that see it is as a 'force for good', large proportions of the populations, over 30% in some major richer economies such as France and the USA, see globalisation as a 'force for bad' (Smith, 2016).

In fact, the world is experiencing a slow-down in the growth of world trade. After a few decades in which trade grew at around twice the rate of GDP, the ratio of world trade to GDP has remained fairly constant over the last decade, making this the longest period of stagnation in the trade to GDP ratio since the Second World War (Hufbauer and Jung, 2016). There are several reasons for this: some can be found in economic transitions and some in politics. As Martin Wolf (2016) has pointed out, growth of trade in manufacturing has slowed, and many opportunities from foreign direct investment (FDI) have already been exploited. This, together with China slowing down its internal investment, is leading to a decline in cross-border holdings of financial assets (Wolf, 2016); FDI and cross-border holdings often come with associated trade activities. Trade liberalisation policies are stalling and tendencies towards xenophobic sentiment in politics could further slow down trade and reduce foreign investment. Some of the regulatory measures that have been put in place after the financial crisis are likely to further reduce cross-border financial flows, and possibly also trade.

Finally, in our review of progress, which has pointed to remarkable advance on most dimensions, we should turn to an increasingly difficult story: the growing and already immense pressures on our environment. In 1950 forests covered approximately 35% of the world's land surface, now it is 30% (UN FAO, 2016). In 142 tropical countries, the overall area of natural forest declined by 11% between 1990 and 2015 (Keenan et al., 2015). A recent exercise in estimating global biomass, a measure of abundance of all organisms living on earth, showed that over the time of human civilisation, approximately 5,000 years, 83% of wild mammal biomass, 80% of ocean mammal biomass and the biomass of half of all plants has disappeared (Bar-On et al., 2018), much of this over the last century. Oceans have recorded a 30% increase in acidity since the start of the industrial revolution and acidity is projected to increase in this century resulting in a pH level that the oceans have not experienced for more than 20 million years (National Oceanic and Atmospheric Administration [NOAA], 2013). At the same time, indoor and outdoor air pollution were responsible for an

[9] Armed conflict is defined as "a contested incompatibility that concerns government or territory or both where the use of armed force between two parties results in at least 25 battle-related deaths" (Allansson et al., 2017).

estimated 9 million premature deaths in 2015 (Landrigan et al., 2017). This is particularly prevalent in the large rapidly developing countries such as India and China.

Let me focus for a moment here on climate, which has occupied me for much of the last decade; I will come back to the subject later in the lecture. Carbon dioxide (CO_2) emissions were around 6 gigatonnes (Gt) a year in 1950, now they are around 40 (Ritchie and Roser, 2018). CO_2 concentrations in the atmosphere were around 300 parts per million (ppm) in 1950 (ibid.), and rising at 0.5ppm a year; now they are over 400ppm and rising at more than 2ppm a year. If we go on adding CO_2 at 2ppm for another 20 or 30 years, then it is likely that a 3°C increase in average global surface temperature (compared with the late 19th century, the usual benchmark), will be way out of reach, let alone "well-below 2°C", the target of the Paris Agreement. A rise of 3°C would be extremely dangerous, taking us to a temperature we have not seen on this planet for around 3 million years. Remember that Homo sapiens has been here for only around a quarter of a million years. And we risk considerably higher temperatures than that if we do not radically change how we produce and consume.

While on so many key dimensions of development we have seen extraordinary advances, on the environmental side the growth of global output by a factor of 12 since 1950, together with very dirty and polluting production methods, has put the planet in an extremely vulnerable position, indeed a deep crisis.

Looking forward

What have been the forces driving this whole set of changes? Will those that have brought great advances continue and can they be fostered? Can those that have brought the environmental crises be managed as we continue to advance our wellbeing and overcome poverty? My response to these questions is that, when we look at the forces of change that have driven the last 70 years, we should conclude that whether and how they continue is up to us. It is up to us to recognise and understand what is possible, what policies and actions matter the most, and how political decisions can be made. In other words, whether this will be the best or worst of centuries is in our hands.

Let us examine the forces at work and speculate on how they may play out. Again, in just one lecture, I have to stay at a high level of argument. And, in discussing processes or forces, let us also recognise that they are also, in large measure, themselves outcomes. There is no logical problem here. We are familiar with the idea, for example, that some activities, such as education, are both instruments and goals; see, for example, Amartya Sen's discussion of capabilities in the context of development as freedom (Sen, 1999). Many of the forces are interwoven and some are mutually reinforcing. We shall examine: human capital; policies and institutions; technology; the changing structure of the world economy; and environment/climate change.

We begin with human capital. As I mentioned earlier, life expectancy around the world has, over seven decades, increased by 30 years from around 40 to around 70. Big drivers of increase in the past decades have been around public health, including clean water and sanitation and vaccination. It does seem reasonable to suppose that while improvement can and will continue, particularly in poorer countries, the biggest effects may have occurred. The UN Population Division expects life expectancy to increase by around 11 years over the next eight decades, or by around 1.5 months a year, or around one-third as fast as in the period since the Second World War until now.[10]

On the other hand, for education we are likely to see rapid change. For many countries, much of the current population would have been fortunate to have gone through secondary education. We are likely to see a rapid expansion in primary, secondary and tertiary education across the world. Of course, enrolment alone is not enough, and what happens at school is crucial: we will see an

[10] Generally, population forecasts have taken little or no account of possible devastation from unmanaged climate change.

increasing emphasis on quality. The demand for quantity and quality seems very strong. This increase in human capital could have a powerfully positive effect on productivity.

The future for policies and institutions seems more uncertain. We have, in the main, seen investment environments around the world improve over time, as the importance to economic performance of sound policies and institutions has become better understood. But protectionism and populism have been on the rise in some parts of the world and that raises question marks over the future of the policy and institutional environment, particularly around the multilateralism and openness in trade and investment which have played such a big part in the growth story. That does not, of course, mean that simplistic market fundamentalism and pure free trade have been the policies that have been chosen and which have driven growth over the period. The story of trade, markets and growth has been much more subtle than that. Nevertheless, the big growth stories of the past seven decades have been mainly the rich countries in the first period and East Asia more generally, particularly China in the last 30 years. Increasing openness to trade and investment have played a critical role in both cases.

The current pace of advance in technology is, in many respects, extraordinary and it looks as if it has a long way to run. In digital/information/communications, in biotechnology, and in materials we are seeing change which is transformational in terms of how we live our lives, how we work, how our health can be managed, how we consume in the home and elsewhere, how we interact. In my view, this pace of change is likely to continue. It is striking, therefore, that we see fine scholars such as Robert Gordon (2016) arguing, in relation to the US economy, that productivity growth must inevitably slow and that, in essence, we have already had the most transformational of innovations likely to be on offer, concerning, for example, energy and public health. Further, another fine scholar, Larry Summers, has argued that the US may be experiencing "secular stagnation" in that the desire to save outweighs the desire to spend on investment, with the reasons for the imbalance likely to be long-lasting and difficult to overcome (see Summers, 2014). It is largely a Keynesian story, and indeed the term goes back at least to Alvin Hansen in the late 1930s, who was writing with an explicitly Keynesian perspective.

I do not share these two types of pessimism, particularly when we look beyond the United States. On the Gordon-productivity story, the challenges, in my view, are around policy. Will we be able to mobilise the new technologies in ways which bring real economic benefit rather than large-scale unemployment? Will they be able to combine with the increasing human capital which can be fostered in ways which increase productivity for the large majority? This will not necessarily be straightforward, but the opportunities for transformation seem potentially very large, and it is our task to discover the productivity-enhancing and participatory policies and put them into practice. The opportunities from artificial intelligence, for example, could surely be guided in a thoughtful way towards productivity increases for the large majority. These are challenges for the social services as much as for technologists and engineers.

Similarly, the pessimism of Larry Summers on secular stagnation is, in my view, also overdone. The world is awash with not only savings but also investment opportunities. Our challenge is to put in place the policies and institutions which can turn these investment opportunities into real investment demand. And I think we can see how to do that. Sustainable infrastructure is a key example.

The growth of the emerging market and developing countries over the last few decades has been strongly influenced by three factors: the catch-up opportunities from lagging far behind the rich countries; policy and institutional changes that have overcome barriers to growth, including greater reliance on markets; and increasing openness towards the world economy. Those forces are likely to continue to drive the growth of these countries, provided that policies and openness do not turn back. China's income per capita is around a third of the USA's, and that of India is about a third of

that of China.[11] There is a great deal of catch-up to come. The substantial changes in the structure of the world economy, with a declining output share of the rich countries, have a long way to run.

Our greatest concerns should be around environment and climate. The world economy will double in 20 to 25 years at a growth rate of around 3%. The world's infrastructure will double in 15 years. The population of the world's cities and towns will double in around four decades and these cities and towns will be shaped by decisions in the next two decades (Bhattacharya et al., 2016).[12] The infrastructure and other investments we make in the next two decades will be decisive; if these investments look anything like business-as-usual, the world's future looks deeply dangerous. If we are to keep temperature increases below 2°C we have to cut annual global greenhouse gas emissions by at least 20% in the next two decades.

Assessment

Our very rapid review of progress in the decades since the Second World War and our look at the decades to come has pointed to some clear conclusions. These last seven decades have seen extraordinary achievements in life expectancy, education and income growth, and to some extent democracy and human rights. We have seen rapid and large falls in global poverty and falls in global inequality in health and education. Things really have got better.

But will that process of improvement continue? Probably strongly in education and substantially in health over the next few decades. There are, however, major question marks over domestic and international economic policy. We can and must work so that improvements in these areas continue. We have seen that they can no longer be taken for granted.

There are deep concerns over the climate: the urgency of necessary action and the potential magnitude of damage are still poorly understood. In the next two or three decades we can make a world where an increase of 3°C or more over the next century is frighteningly likely. This could transform where we could live, severely damage livelihoods, move billions of people and lead to severe and extended conflict. The worst of centuries.

There are indeed other severe risks that I have not majored on here. Anti-microbial resistance, or AMR, has become a very serious threat. According to Lucy Shapiro (2018), a distinguished Stanford development biologist, every year at least 23,000 Americans die of drug-resistant bacterial infections, and many of the approaches currently used to discover new antibiotics are failing. "As time goes by," she says, "every single available antibiotic is becoming increasingly useless" (Shapiro, 2018). Jim O'Neill and his team who worked on the *Review on Antimicrobial Resistance* suggest that "without policies to stop the worrying spread of AMR, today's already large 700,000 deaths every year would become an extremely disturbing 10 million every year" by 2050, more people than currently die from cancer.

The increasing dangers of pandemics are also seriously worrying. A recent World Bank (2017) report has put the annual global cost of pandemics in the region of 0.7% of global GDP, and there are risks that it could be substantially more. The Spanish flu of 1918 killed about 5% of the global population.[13] Part of this is down to climate change. The changing flight paths of birds, carrying various bird flu viruses, imply that they are more likely to meet. Part of it arises from the increase in air travel.

The potential risks of cybersecurity and the proliferation of weapons of mass destruction are also deeply troubling. I cannot provide a detailed discussion here, but they are issues to which we must,

[11] The ratios depend on the way that incomes are measured and compared, and I deliberately use round numbers, but the broad argument is robust.

[12] Notwithstanding the continuing trend towards increasing urbanisation, long-run analysis of population densities in cities suggests that population density in urban areas is decreasing (Rode et al., 2014; Angel et al., 2005).

[13] The level of deaths depends on both the degree of contagion and the likelihood of fatality associated with the virus. More deadly combinations could emerge.

as a world, give careful attention and which will inevitably involve international action for their management.

For all of these risks, there are credible policy responses. All of them involve international collaboration. I have concentrated on climate change because that is the one that I know most about. Also I think it is potentially the biggest risk. But for all these risks the consequences of failure could be deeply damaging, not just for this century but also for those that follow.

Parts 3 and 4 of this lecture focus on the policies, collaborations and actions that can turn this into the best of centuries.

3. The global agenda

The changes that we have seen since the Second World War constitute, on a number of dimensions, a strong and sound platform for further progress. But the changes we have foreseen tell us that key aspects of the paths that we have taken hitherto must change radically. It is remarkable that discussions amongst the countries of the world, in particular within the United Nations, took us in 2015 to a global agenda, which clearly recognises the need for such change and sets targets to guide it. These targets or goals are both ambitious and wise; and they are shared through an extraordinary consensus. However, having targets does not tell us how to achieve them. And the consensus cannot be taken for granted. These final two parts of the lecture describe first, the substance and logic of the targets in the global agenda, together with the process by which it was constructed, and second, how that agenda might be delivered and sustained.

The global agenda includes at its core the Sustainable Development Goals (SDGs) agreed at the UN in September 2015 and the UN Framework Convention on Climate Change (UNFCCC) agreement on climate at the 21st Conference of the Parties (COP21) in Paris in December 2015.[14] What is this agenda and why does it matter? What is the rationale, and how did the agreement come about? I will examine these questions in this part of the lecture before turning to delivery in the final part.

Fulbright was a leading figure in the creation of the global agenda and institutions which were built after the Second World War: the United Nations, the Universal Declaration of Human Rights; the Bretton Woods institutions, the IMF, the World Bank, the WTO. That period also saw the beginning of the European Community. This new global agenda was, however, created by far more countries, more than 190; in Bretton Woods, for example, which was pre-decolonisation, there were just 44 countries round the table. And one country, the USA, was dominant in the aftermath of the Second World War. That earlier global agenda arose from the bitter experience of a devastating 30 years prior to 1945, with two world wars and a great depression. It was clear that divisiveness, defensiveness, narrow nationalism, and the inability to collaborate were deeply destructive. The post-world war agenda was thus rightly focused on a new internationalism; and on reconstruction.

The new 2015 agenda is much more forward-looking, deeper and more broad-ranging in its objectives. Far more countries were involved in its making and it applies to all. It is remarkable that the international community was able to get together not only to identify shared values and objectives for the coming decades, but also to recognise the importance of sustainability as embodied so strongly in the SDGs. In constructing the Paris climate agreement at COP21, the international community recognised the enormity of the possible dangers and the necessity for urgent action well before the deepest impacts of the potential crisis were upon us. This was behaviour which was analytical, forward-looking, collaborative and moral.

This demonstrated clearly that narrow self-interested nationalism is not the only relevant feature of the behaviour of nations. We might think of that narrow approach as the lower self or "thinking fast", as opposed to the higher self or "thinking slow", to make an analogy with the work of Danny Kahneman, the distinguished psychologist, on the behaviour of individuals (Kahneman, 2011). A great advantage of, and motivation for, international treaties and international institutions, including multilateral development banks, lies in the getting together of nations to create structures that embody higher values than one nation might follow on its own. Through these treaties and institutions they try to act in ways that reinforce those higher values and foster actions which are to the benefit of the world as a whole.

[14] The agenda is more than this, however. In 2015 there was an important agreement in Addis Ababa in July on financing for development. And in 2016, in Kigali, there was an agreement extending the Montreal Protocol on ozone degradation to HFCs, a potent greenhouse gas.

In understanding the SDGs and their origins, it is instructive to compare the Millennium Development Goals (MDGs) and the SDGs and identify the sources of the differences. The MDGs were agreed at Monterrey, Mexico in the autumn of 2000. I was there as Chief Economist of the World Bank. The MDGs were of great importance as the first internationally-agreed, overarching development targets, but they embodied a much narrower conception of development than the SDGs. Further, the MDGs did not have development objectives for the world as a whole but only for the developing countries. They did not put environment and sustainability at centre stage. Indeed, many still thought in terms of harsh trade-offs between economic advance and environmental responsibilities. And there were many who thought of the environment as a particular enthusiasm or 'hang-up' of richer people or countries – or, still more negatively, as a ruse by rich countries to put obstacles in the way of the development of poor countries.

At the time, the MDGs were a remarkable achievement. They were an attempt to capture a spirit of the millennium, to build a better and fairer world. It was striking how broadly that spirit was shared. Let me illustrate by describing what I observed directly. Because of the vagaries of the English alphabet, the World Bank and the US were seated close to each other at Monterrey. The international behaviour of the US under the presidency of George W. Bush may not have appeared to everybody as a model of altruism and enlightenment. Yet the commitment and enthusiasm in relation to the MDGs of the US under George W. Bush, who was present at Monterrey, appeared very genuine. I was to see this commitment to Africa's development a little later at the UK (Gleneagles) G8 summit of July 2005, after I had led the writing of the report of the Commission for Africa.

The MDGs began by identifying the key dimensions of development: overcoming income poverty, advancing health and education. They then set, in eight broad goals, targets for outcomes in developing countries along those dimensions. The targets were set in relation to improvements between 1990 and 2015. Thus the first target included, for example, a commitment to halve the proportion in absolute poverty[15] over that period. There was a small nod in the direction of the environment.

The MDGs also embodied, in Goal 8, a commitment to build a global partnership for development, including on open economic systems, debt, technologies and essential drugs. It was in this context that cross-party support in the UK for the target of 0.7% of GDP for overseas development assistance (ODA) was built, and eventually enshrined in law in 2015. That commitment and its delivery has brought the UK respect and international influence. In my view, it added, for example, to its influence in the international interactions at COP21 In December 2015.[16]

The MDGs formed the basis of the strategies of development agencies around the world, including the UK's Department for International Development (DfID). As Chief Economist of the World Bank from 2000–2003, I reported on progress on the goals to the Development Committee, the key ministerial steering committee for the World Bank, comprising relevant ministers of different countries. I also put the data on progress towards the MDGs at the front of the annual flagship publication, the *World Development Report*.

The MDGs were in the main 'stretch targets' and many were not achieved. However, the commitment to halve the proportion in absolute poverty was met early, largely as a result of the growth in China which lifted hundreds of millions out of poverty. The proportion fell from around 35% in 1990 to around 10% in 2013, the last year for which comprehensive data are available (World Bank, 2016).

The creation of the MDGs was rightly seen as a substantial success and, as its target date of 2015 drew near, initiatives in the UN to put together the successors to the MDGs began. In July 2012, a

[15] Absolute poverty was then defined in relation to a poverty line (in relevant prices) of US$1.25 per person per day.

[16] The other countries exceeding 0.7% are Sweden, Norway, Luxembourg, Denmark and the Netherlands.

Commission was established, chaired by David Cameron, the Prime Minister of the UK, President Ellen Johnson Sirleaf of Liberia and President Susilo Bambang Yudhoyono of Indonesia.

It is interesting to identify the changes in the world and in perspectives which took place in the 15 or 20 year gap between the periods when the MDGs and SDGs were discussed and created and to examine how these changes are reflected in the later goals. We characterised key aspects of global change in our discussion in the preceding section. The 15 years or so from the mid-1990s constituted a period of extraordinarily rapid growth and poverty reduction in China and a substantial change in the world's economic geography. That same period also brought an increasing realisation of the intense pressures on the global commons, and that these pressures required the strong involvement of all. Hence the SDGs, in contrast to the MDGs, both put sustainability at centre-stage and were goals which applied to all countries. Interestingly, given that the private sector had at last been recognised as having the central role in investment, it too was part of the SDG Commission: for example, Paul Polman, an outstanding business leader of our age, was at the heart of the work.

Box 1: The United Nations Sustainable Development Goals

Goal 1: End poverty in all its forms everywhere
Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture
Goal 3: Ensure healthy lives and promote wellbeing for all at all ages
Goal 4: Ensure inclusive and quality education for all and promote lifelong learning
Goal 5: Achieve gender equality and empower all women and girls
Goal 6: Ensure access to water and sanitation for all
Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all
Goal 8: Promote inclusive and sustainable economic growth, employment and decent work for all
Goal 9: Build resilient infrastructure, promote sustainable industrialization and foster innovation
Goal 10: Reduce inequality within and among countries
Goal 11: Make cities inclusive, safe, resilient and sustainable
Goal 12: Ensure sustainable consumption and production patterns
Goal 13: Take urgent action to combat climate change and its impacts
Goal 14: Conserve and sustainably use the oceans, seas and marine resources
Goal 15: Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss
Goal 16: Promote just, peaceful and inclusive societies
Goal 17: Revitalize the global partnership for sustainable development

There are 17 goals in the SDGs (see Box 1) and each goal has associated with it a number of numerical indicators. The targets refer to 2030 and they are sometimes referred to as the '2030 agenda'. They build on the MDG dimensions of income, health, education and the environment but are much more detailed on sustainability, inequality, gender, cities, climate, oceans, forests and environment more generally. They are, in some respects, expressed in fairly broad terms. For example, the first is to end "extreme poverty in all its forms everywhere" by 2030. The second is to "end hunger, achieve food security and improved nutrition and promote sustainable agriculture".

But they do give a clear and helpful sense of purpose and direction.[17] The 17th goal is about partnerships. Of the preceding 16, 11 of them refer to environment, sustainability or climate explicitly, and the remainder essentially implicitly.

It should be clear that sustainable infrastructure is directly relevant to the big majority of these goals. For example: energy is vital to living standards but dirty and polluting energy damages health; better lighting allows children to study in the evenings; improved water supplies free labour which is largely that of women and helps avoid the dangers they face when walking to collect water. This centrality of investment in sustainable infrastructure is crucial to analysis and action on the delivery of the SDGs.

Overall they are called the *Sustainable* Development Goals, and I have already stressed, and will stress in what follows, the importance of sustainability. We should therefore have in front of us a working definition of sustainability. Formally, this means that this generation acts in ways which make available to future generations opportunities that are at least as good as their own, assuming that the next generation behaves in a similar way towards its successors. That idea of opportunities points attention to the various capital stocks we leave to the next generation, since those stocks shape what they can do. Relevant stocks include: human capital (particularly health and education); social capital (referring to cohesion, governance and institutions); natural capital (including the environment, forests, oceans and natural resources); and physical capital (including plant, machinery, buildings, infrastructure, and so on). This whole set or vector of capital stocks does not have to be the same as that inherited. Advances in some areas may offset reductions elsewhere.

Broadly we have, as seen above, in the last few decades, advanced strongly in terms of our human capital and physical capital but have reduced our natural capital severely. On social capital, there have been gains and losses. Probably our democratic freedoms have, in many countries, improved but some societies appear to have lost cohesion and sense of community.

Other, complementary, perspectives on sustainability point (as in the UN Conference on Sustainable Development, RIO+20, in Brazil in 2012) to the three areas of economic, social and environmental sustainability. By economic sustainability we generally mean economic advance that is broadly robust; social includes cohesiveness and managing inequality; and environmental includes climate, forests, ocean, and so on. It is important that we do not set these three against each other, as they are, in large measure, mutually reinforcing.

Finally, on definitions relating to sustainability, I should clarify our meaning of sustainable infrastructure as an idea I shall use often. Infrastructure supplies goods and services which facilitate other activities; important examples are transport, energy, water, communications. It is sustainable if it meets the above criteria for sustainability. Examples include renewable energy, or public transport which runs on clean energy.

Interestingly, the G20 in Hamburg in the summer of 2017 under the German Presidency, building on the G20 Hangzhou meeting under the Chinese Presidency of the year before, embraced the 2030 agenda and said that the G20's highest priority was "strong, sustainable, balanced and inclusive growth". The Hamburg statement on this issue included the United States under its current President.[18]

The SDGs were agreed at the UN in September 2015. Three months later, at 8:30pm on 12 December in Paris, Laurent Fabius, the French Foreign Minister and Chair of COP21 of the UNFCCC, brought down the gavel to signal the adoption of a major international agreement to tackle climate change.

[17] And three are also many detailed indicators associated with the SDGs at a finer level of specificity.

[18] We note that the members of the G20, apart from the US, also affirmed in Hamburg that the Paris climate agreement was "irreversible". That is strong language for a G20 statement.

The Paris Agreement was the outcome of a long and complex process. It is important to understand how international agreements can be built and this is a central example. I will start the story in Bali, COP14, in December 2007, and tell it only briefly. Bali was my second COP; I have been at all the COPs since. My first was in Nairobi, COP13, the year before, which I attended just after the publication of the *Stern Review on the Economics of Climate Change* in October 2006.

Bali set the target of achieving an international agreement for COP15 in Copenhagen at the end of 2009. Unfortunately, Copenhagen turned out to be chaotic and quarrelsome, and indeed very cold. It was not well prepared and there were understandable suspicions amongst developing countries that the developed countries were hatching an agreement which would be pushed on them. Also it made the mistake of planning for world leaders to come at the end and, by that time, it was assumed there would be something ready for them to approve. Somewhat predictably, some key issues were 'kicked upstairs' to be resolved on their arrival; this was, fairly obviously *ex-post*, unrealistic.

Nevertheless, out of the chaos came the Copenhagen Accord. It was not a statement formally agreed by COP15, but it had key elements and a clear sense of direction. It was turned into a more formal statement adopted by COP16 in Cancún in Mexico a year later. The Cancún COP was much better prepared than COP15 and very well led by the President of Mexico Felipe Calderón and Foreign Minister Patricia Espinosa. It was very inclusive and transparent. Importantly, it also involved the private sector in its discussions.

It did, of course, have the advantage of the template of the Copenhagen Accord. Key elements of that Accord included targets for emissions by 2020, which the Accord (in December 2009), invited each country to submit by the early months of 2010. Impressively, the majority of countries did so, with the great bulk of emissions covered by those targets. Second, the rich countries committed to provide flows of climate finance of at least $100bn p.a. by 2020. It is striking that the emissions targets for 2020, at least for the world's major emitters (China, USA, EU), are likely to, more or less, be met. For the developed countries there were the somewhat notional sanctions embodied in the Kyoto protocol (UNFCCC in 1997) which involved catching up in the next period if there was an excess of emissions relative to the target in this period. By 2010 it was becoming fairly clear that such sanctions had little relevance.[19] And they did not apply to developing countries. Thus (essentially) voluntary, but important, commitments between countries in this area do have some traction, notwithstanding the absence of real sanctions. Indeed, we now see that any attempt at sanctions for breaking such agreements are not only unlikely to be credible but are also likely to reduce ambition and create acrimony.

I was very much involved in both COP15 and COP16 although, in each case, not in any formal position. I was, and still am, a professor of economics at the LSE (having left the UK Treasury in 2007, after a short stint of three years which included writing the Report of the Commission for Africa and the Stern Review). In COP15 in Copenhagen, I was working closely with Prime Minister Meles Zenawi of Ethiopia,[20] who was leading negotiations for Africa and I was negotiating informally with Mike Froman, the US Representative who was working with Secretary of State Hillary Clinton. We eventually agreed, just before the end of COP15, the $100bn. That figure has become iconic and has remained up to and including COP21 in Paris. Meles and I had hoped that this flow would be public monies, and initially drafted that way but, in the end, the words "and private" were added. That, of course, leaves difficult questions concerning what is counted in the flow, which governments, developed or developing or neither, actually fostered the private flow, and how far developed countries should take credit for the flows. In COP16 in Cancún, I worked closely with President Calderón, particularly around private sector investment.

[19] And Canada dropped out of the Kyoto Protocol in December 2012, the day after the extension of that Protocol was agreed at COP17 in Durban.

[20] I worked closely with Meles Zenawi when I was Chief Economist of the World Bank (2000-2003) and then again on the Commission for Africa (2004/5), of which he was a member. Very sadly, Meles died in August 2012.

The commitment to try to reach an international agreement in COP21 in 2015 was taken at COP17 in Durban in December 2011, giving four years for preparation. The preparation time was needed. Crucial amongst the intervening COPs was the one in Lima, COP20, the year before Paris, when much of the eventual COP21 text was in preparation. It was splendidly led by Manuel Pulgar-Vidal, the Peruvian minister of the environment and President of COP20. He was working closely with those who would lead COP21 in Paris a year later.

Thus COP21 was well prepared. It was also very well led by its President, Laurent Fabius. The Executive Secretary of the UNFCCC, Christiana Figueres, and the French (specially-appointed) Ambassador for the COP, Laurence Tubiana, were outstanding in the way they inspired, resolved and choreographed. An example of thoughtful choreography was having the heads of government present at the beginning of the two weeks of the conference. They acted as leaders and gave the message to their ministers and staff that they expected an agreement. This contrasted with Copenhagen where the leaders came at the end and too much was left to them to resolve.

We must examine why and how this remarkable agreement came about. Part of the story was working through processes of preparation with diligence on the detail and, particularly, in ways that brought people together. Of course, the package of elements in the agreement itself and how they were crafted was very important too. Box 2 contains a summary of the key elements of the processes and Box 3 of the key elements of the package. We discuss these in turn.

Building agreement to ambitious goals amongst more than 190 countries was in many ways a long shot. It is important to learn the lessons on how such agreements can be constructed. I have already mentioned the importance of outstanding leadership and the extended period of careful diplomatic, transparent, inclusive and thoughtful preparation. In contrast to Copenhagen COP15, there was a conscious effort to avoid, as far as possible, the formation of antagonistic blocks, particularly of developed versus developing countries. In contrast, in preparation for and at COP21, there were important collaborations across developed and developing countries. In November 2014, a year ahead of Paris, Presidents Xi Jinping of China and Barack Obama of the US announced their targets for 2030 emissions reductions for COP21.[21] That gave a strong signal of their joint commitment. And the 'high ambition coalition' involved a collection of developing countries, including particularly small island states, together with a number of rich countries (including the EU, UK, USA, and Canada), to push for "well below 2°C" as the target, and to argue for efforts towards 1.5°C. One important tactical lesson, learned from Copenhagen six years earlier, as I have noted, was to have the world leaders come at the beginning of the two weeks of discussion, not at the end.

There was also, and this is fundamental, great advance in the understanding of some of the underlying issues relative to COP15 in Copenhagen. These changes in understanding reflected how much has changed in the dozen years since the Stern Review, published in 2006. And many of these changes were appearing in the period 2009–2015 between Copenhagen and Paris. First, the science of climate change is much more worrying: the damages are larger than expected, and coming through faster than anticipated. Thus the risk of inaction is greater than we previously thought. The deepening understanding of the risks in the last decade, including the observations of increased intensity of extreme weather events, was an important factor in generating the resolve to find agreement in Paris.

[21] And Paris COP21 fitted better than COP15 with the cycle of China's five-year plans. The 12th plan was 2011-2015 and in 2009 was not yet crystallised, inhibiting the wish to commit. By COP21, climate was already a part of China's planning, and the 13th plan (2016-2020) was in preparation.

Box 2. Key factors and processes in creating the Paris Agreement at COP21, December 2015

- Careful diplomatic, transparent and inclusive preparation over three to four years. Important role of COP20 in Lima a year earlier on text and substance.
- Positive atmosphere and strong choreography in weeks before COP21 and during meeting itself. Important role of government heads at the beginning to make it clear they wanted agreement (contrast Copenhagen COP15, 2009, where they came at the end).
- Maintained transparency during meeting (contrast with Copenhagen COP15).
- Avoided formation of antagonistic blocks, such as developed versus developing countries (contrast with Copenhagen COP15).
- Fostered constructive and cross-cutting coalitions. Example (i) China/USA announcement by President Obama and Xi Jinping in November 2014, one year ahead of COP21, of their planned emission profiles. Example (ii) High ambition coalition, arguing for target of well-below 2°C and efforts towards 1.5°C, with small island states and EU, UK, USA, Canada and others.
- Deepening understanding of the immense risks of climate change and recognition of greater intensity of extreme events.
- Deepening understanding that climate responsibility and growth could be mutually reinforcing rather than in conflict. A major factor in obtaining agreement (and in contrast to Copenhagen COP15, where many saw growth and climate responsibility in conflict). Reframing narrative from 'costs of action' towards 'opportunities and attractiveness' of low-carbon investment and innovation in driving sustainable and inclusive growth.
- Significant involvement of subnational and other actors, particularly cities, private sector and civil societies.

Second, technological progress has moved much faster than we anticipated. There are now much more attractive opportunities, with new options and much lower costs. Rapid deployment has brought very large falls in costs of technologies such as wind, solar, electric vehicles and energy storage, far greater than foreseen a decade ago. Third, there is increasing recognition of the very attractive opportunities that lie in low-carbon growth, including cities where we can move and breathe, and ecosystems that are robust and productive. We now recognise that the alleged horse race between growth and climate responsibility is artificial: the two are reinforcing.

On the political front there has been some progress. The Paris Agreement and the SDGs are fundamental outcomes of immense importance. There has also been a groundswell of political momentum from sub-national actors, including cities and the private sector. Yet the pace of action is much too slow relative to the basic goal of avoiding dangerous climate change. And the issue has not stayed at the forefront of the political agenda in a world where the global financial crisis has cast a shadow over the last decade and we have seen a rise of populism and narrow nationalism in some countries. The announcement by the current US President in June 2017, that he intended to withdraw the US from the Paris Agreement, has been a backward step. Nevertheless, the rest of the

world, and indeed many parts of the United States, have reaffirmed their commitment to the Paris Agreement and action continues to move; in this sense they have passed the 'Trump test'.[22]

A deepening understanding of the options to do things differently, of the immense risks of climate change, and the pollution from burning fossil fuels has led to a growing realisation that the transition to the low-carbon economy could be the growth story of the 21st century. At the core of that growth story would be investments in sustainable infrastructure. Such investment boosts demand and sharpens supply in the short to medium run. It fosters Schumpeterian waves of discovery, innovation, investment and growth in the medium term. And there is no long-term high-carbon growth story – any attempt would self-destruct on the very hostile environments it would create.

This increasing understanding that growth is not hindered by climate responsibility – actually that the opposite is true, they are mutually reinforcing – was key to getting agreement in Paris. That understanding is not yet universal, but it is advancing. The New Climate Economy published a report in September 2014 called *Better Growth, Better Climate* (NCE, 2014), making these points (this was from the Global Commission on the Economy and Climate that I co-chaired with Felipe Calderón), backed by analysis and evidence.[23]

We should contrast this new dynamic understanding of growth and climate responsibility with what we now see as a rather old-fashioned perspective, based on notions of static trade-offs, which was built into older agreements. Indeed the construction and content of the 1992 UNFCCC agreement embodies the idea that there is an "extra cost" involved in climate action and sees this as a potential burden. Thus many developing countries concluded they should not take on that burden unless they had substantial help from the richer countries. Now there is a deeper understanding that the alternative growth path can be very attractive and embody inclusion and poverty reduction, as well as sustainability. Further, it is now generally understood that the necessary cuts in emissions cannot come from rich countries alone because emissions from emerging markets and developing countries are now so large, around two-thirds of the total (Centre for Development Studies, 2015). Thus all countries must be involved and we must find a way to combine growth and poverty reduction with climate responsibility. Fortunately we can now see very clearly that we can. These different perspectives on growth and climate action were key, in my view, to the changing positions of many developing countries between Copenhagen and Paris.

There is also a growing understanding that mitigation of emissions, adaptation to climate change that is happening, and will happen, and development are interwoven and mutually supportive. Examples are everywhere from agriculture (e.g. system of root intensification for rice), forests and soils (e.g. water management and land reclamation), cities (e.g. public transport). We must not try to pull these elements apart or set one against the other.

All that should not, however, absolve rich countries from the moral responsibility to help with the innovation and investment in emerging markets and developing countries which are so important to achieving a new low-carbon growth path. The rich countries grew rich on high-carbon growth and are responsible for a very substantial amount of current concentrations. They have the wealth and the technology. And they should recognise that, while we are all in grave danger from unmanaged climate change, it is the poorest who are hit earliest and hardest.

There were other powerful forces contributing to the Agreement. There were enlightened business leaders who, in addition to recognising the moral responsibilities of firms in society, also took the long view of how climate change could wreck livelihoods and markets and of the great potential of alternative growth models. They recognised too that irresponsible actions and behaviour can turn

[22] At the G20 summit in Hamburg in July 2017, the countries other than the US described the Paris Agreement as irreversible. And technically the US cannot give notice to leave until three years after the Agreement, and then has to give one year's notice. Thus, formally, the US cannot leave until the day after the next presidential election.

[23] It is now co-chaired by Ngozi Okonjo-Iweala, Paul Polman and myself.

away potential customers, employees and shareholders. Business leaders such as Stuart Gulliver (HSBC), Anand Mahindra (Mahindra Group), Indra Nooyi (PepsiCo), Paul Polman (Unilever), Feike Sijbesma (Royal DSM) and many others played a prominent role.

There were outstanding sub-national leaders too, such as mayors and state governors. The Mayor of Paris, Anne Hidalgo, convened a most impressive collection of committed mayors. Former Mayor of New York, Michael Bloomberg, played an important role in both business and city activities. NGOs expressed themselves very powerfully. Those devoted to fighting poverty in the poor countries, such as Oxfam, and those devoted to the environment in richer countries and beyond, such as the Environmental Defense Fund and WWF, made common cause. They understood clearly and argued persuasively that managing climate change is crucial to promoting development and reducing poverty in a sustainable way.

Let us turn to the key elements of the package (see Box 3 for a summary). The design of the Agreement had features which were crucial to obtaining agreement. These carry important lessons for future international collaborations. At the apex was an agreed goal, in this case keeping global increases in temperature "well below 2°C", which could not be delivered by any one country acting alone, indeed which required the great bulk of countries to move together. Second, there was the fact that targets were voluntary (called "Intended Nationally Determined Contributions, or INDCs) which were put together by each country itself and not imposed. Neither were there sanctions for failing to meet them. Indeed, any attempts at such sanctions were recognised as both unlikely to be credible and likely to be divisive. We have seen from progress towards the 2020 commitments from Copenhagen and Cancún that voluntary commitments do have traction and are, in many cases, built into domestic (or regional as in the EU) institutions, regulation and law. Third, there were formal commitments over processes for action and future agreements and for methods of measurement and assessment of emissions. Fourth, there was a recognition that the aggregations of INDCs, here emissions targets for 2030, were not consistent with the overall temperature goal. Thus there was 'scientific realism' and an understanding that ambitions on emissions reductions would have to be raised. Fifth, there was agreement on the importance of the $100bn p.a. flows from richer to poorer countries. The construction of the package as a whole was fundamental to getting agreement.

Box 3. Key elements of the Paris COP21 package that brought agreement

1. Overarching or apex goal which could not be delivered by a single country or group of countries acting alone. Holding world temperature increases to "well-below 2°C".
2. Targets or "Intended Nationally Determined Contributions" were self-determined and voluntary. Sanctions and imposed targets do have traction and some countries and blocs build them into domestic law or policy e.g. China, EU, and UK.
3. Formal commitments on processes and measurement, including on the need to ratchet-up ambitions.
4. Recognition of, or scientific honesty, around the inconsistency between the sum of planned emissions and the goal of "well-below 2°C".
5. Commitment to flows of $100 billion p.a. of climate finance from developed to developing countries.

In addition to the careful design of the Agreement itself (summarised in Box 3), the respective roles of the various elements and factors at work, including leadership, coalition-building, ideas, private sector, sub-national and NGOs (summarised in Box 2), all carry powerful lessons both individually

and in combination on how to build international agreement and action. We try to put these lessons to use in the final section of the paper.

While it is increasingly recognised that climate actions are mutually beneficial and come with immense opportunities, there is still insufficient understanding of the magnitude and urgency required. Meeting the Paris targets requires greenhouse gas emissions to peak very soon. In all cases the path requires global emissions to reach 'net-zero', or to be at levels which maintain the balance between sources and sinks, sometime in the second half of this century, if we are to meet the target of well below 2°C. Thus meeting the Paris target will require net-negative emissions in major sectors, because some sectors are likely to have positive emissions. It is clear that change must be strong and rapid. Indeed, the next two decades are critical. At the same time the new paths are full of opportunity. The transition to a low-carbon economy is the growth story of this century.

4. Delivery on the global agenda: ideas, collaboration and political will

We have looked back and we have looked forward. We have recognised the immense progress over the last seven decades, but also the immense risks we face in this century. Following this logic, or at least the spirit of the argument, the world has set out a global agenda which could make this the best of centuries. It is remarkable that this agenda came about and we must share it, sustain it and celebrate it. But how can we deliver? Will we be able to deliver? Tackling these last questions is the purpose of the final part of this lecture.

To deliver we must deepen ideas, invest in change, build new collaborations and foster political will. This will require not only enlightened leadership but also a strong, shared and constructive spirit of internationalism. That spirit can be created and built; it can also fail and corrode. Let us examine what is involved in building the better way and what we can do to reduce the chances of failure. Business and civil society will have a role to play as well as governmental and political systems. And academics, particularly in the social sciences, in my view, have a duty to play their part. Showing the possibilities for delivery and its great attractions together with getting on with the job are, in my view, the best way to sustain commitment to the global agenda. We examine in turn, the deepening of ideas, investing in change, and the building of new collaborations and of political will.

Deepening and strengthening ideas

The global agenda described in Part 3 is about sustainable economic and social development, in other words, about precisely those areas that should be at the centre of research in economics and the social sciences. This should involve several strands. First, it should embody a deepening understanding of the goals and objectives in the context of a 'big picture' of the functioning of the world economy. Second, it requires careful application of the principles of public policy and political economy in constructing policies and collaborations to advance goals and objectives. Third, it should be informed by detailed micro work along with the big picture, to help understand behaviour and the working of institutions.

Forgive me if I note here my own personal journey. My professional academic life has been around economic development, public policy and international action. That is what took me to the economics of climate change. Further, the study of one village, Palanpur, in Uttar Pradesh in India has been central to my own research life for more than four decades and is fundamental to my understanding of the forces of economic and social development, or *How Lives Change*, the title of my latest book on the village, with Himanshu and Peter Lanjouw, which will be published by OUP in August 2018. The study of tea on smallholdings in Kenya 50 years ago was my first applied project and the lessons on agricultural innovation, the entrepreneurship of farmers, in this case mostly women, on infrastructure and on public–private partnerships have stayed with me throughout my professional career.

The first key specific priority in relation to the ideas for the delivery of the global agenda and determining whether this will be the best or worst of centuries concerns the urgency and scale of action. If global emissions are to be reduced in the next 20 years, at a time when the economy is doubling and infrastructure is more than doubling, it must be clear that investment in these two decades, particularly infrastructure investment, must be radically different from the past. At a time of rapid urbanisation this is particularly true of towns and cities.

This urgency and scale applies also to our natural infrastructure embodied in forests, biodiversity, soils, grasslands and oceans: here we have been destroying or disinvesting rather than conserving and investing. The remarkable growth in the world economy and its footprint has put these under great stress. They are of huge importance in their own right and in their implications for climate

change. My focus on physical infrastructure in the context of climate change in this lecture should not be taken as implicit comment on the importance of the issues around natural infrastructure. I have chosen my examples where I am most familiar with the detail.

A second key priority for research and ideas is to recognise and put into practice an understanding that research and action on the major challenges embodied in the global agenda require collaboration across the academic disciplines, including sciences, engineering and technology, the humanities and the social sciences. For example, progress on education and health turns on understanding medicine, psychology, technology, markets and incentive structures, cultures, means of communicating, computers and so on. The economics and psychology of education have shown us the vital importance of teacher quality, including whether or not teachers show up for work. On both physical and mental health, we have been learning much more, for example, about the role of lifestyle, air pollution, and social pressures, including around social media. Technology and artificial intelligence are likely to play an ever-stronger role across much of our lives with fundamental progress on algorithms that can learn how to learn, on robotics, much greater online access and an enormous expansion of data. And, of course, computers, tablets and mobile devices are now at the heart of everyday life themselves in working, communicating and learning. Human capital is a core area of fundamental investment potential, it is rightly central to the SDGs, and it is basic to reducing inequality, including gender inequality. We are learning how to do better and should invest much more in such learning. The interweaving of disciplines will be at the core of progress.

We must recognise further that expanding what people can do is much more than education and health. The functioning of society and communities has a profound influence on people's abilities to make use of their human capital. We have learned much here from Amartya Sen on capabilities (Sen, 1999); I have also written in a similar spirit on empowerment (Stern et al., 2005). For example, work opportunities or reproductive health care will be of limited value to women if social or family constraints prevent access.

Understanding the role of sustainable infrastructure and how it can be fostered and financed is crucial to the delivery of the global agenda. Infrastructure investments, that for the most part means in energy, transport, water/sanitation, and communications, are vital to achieving the large majority of the SDGs. Many of the SDGs point directly to these activities and investments, for both cities and rural areas. Clean water and sanitation (Goal 6) are basic influences on: poverty (Goal 1); hunger (Goal 2), health and wellbeing (Goal 3); education (Goal 4) – for example, decent toilets play a big role in girls' school attendance; gender equality (Goal 5) – for example, many girls and women have to spend a lot of time fetching water and are vulnerable in the process; (Goal 10) reduced inequalities (similar reasons), and so on. Similarly, energy, transport and communications exercise crucial influences across the whole range of goals, including driving the progress of sustainable and inclusive growth and higher incomes. For example, they have been vital in the ability of the people of Palanpur to acquire jobs in nearby towns, and for the smallholder tea growers of Kenya to get the tea to factories in good time to preserve its quality.

Spillovers and interactions in health are of profound international importance in an ever more interconnected world. Possible pandemics and anti-microbial resistance are crucial areas for which research and collaboration will together be vital in effective action. Again we see the central importance of the interweaving of public administration and good data, internationalism and the medical and social sciences and humanities. Interesting examples come from anti-microbial resistance; maps of the incidence of AMR have very clear hotspots in China and India, where in China there is extensive use of antibiotics in pigs and in India in cows, both highly cultural phenomena (see Van Boeckel et al., 2015). In rich countries, too, antibiotics are used excessively in agriculture and the medical profession feel pressured to prescribe liberally to humans. And for possible pandemics: bird flight paths are altered via climate change so that we now see closer intermingling of birds from different continents, allowing new varieties of bird flu to develop and

move, and it is the close intermingling of birds and humans in some societies that makes the passage of a virus from birds to humans more likely (see Shapiro and McAdams, 2018).

A third priority for research and ideas is the study of the analytics of public policy. This has been my professional life and I could, of course, go on at great length, but I will restrict myself to a few examples to illustrate a general set of issues. It seems a strange thing to say to an audience largely of non-economists, but we economists must work to develop ideas and analyses of public policy as if time matters. This applies to the economics of public policy across the board. I give four examples, all highly relevant to climate change.

The first is that in climate change there are real risks of irreversibilities, catastrophic changes and instabilities. Further, the happenings along a path are of vital importance (it is the sum of emissions over time that matters), not just the end points. Yet, economists have in large measure built models of the effects of climate change involving only minor perturbations, with underlying growth rates largely unaffected, and with few or no irreversibilities. All too often, in our subject, and climate is a clear example, a problem is shoe-horned to fit our standard tools or models, rather than asking what conceptual or modelling treatment it demands. We are beginning to do better but must move quickly. Scientists continue to be, understandably, puzzled by the disconnect between the problems they describe and the stories told in the models built by economists.

A second example is that this is an area where we have multiple market failures of real importance as obstacles to change. The emissions of greenhouse gases is, of course, a basic externality; emissions are very costly to others, yet are available free-of-charge unless there is policy to correct this basic market failure. But we also have other important relevant market failures in five further areas: around R&D, capital markets, networks, information, and other forms of deeply-damaging pollution of air, water and soil from burning fossil fuels.[24] All five of these further failures matter, and effective policy must treat them together. It is a mistake to design policy in relation to climate change as if we can make the assumption that we live in a world where all markets work well except for the externality from the emissions of greenhouse gases.

A third example of the importance of public policy as if time matters is that the models on action on climate change have also been seriously defective in their treatment of the dynamics of technical change. We have seen remarkable discoveries (the LED lightbulb, digital management of energy systems) and extraordinarily rapid falls in cost (solar and wind energy, renewables) in the last decade. Who would have thought a decade ago that solar and wind energy would out-compete, without subsidy or carbon tax, fossil-fuel energy in many parts of the world, taking into account requirements for storage? Who would have thought that the heads of the main car companies would be talking about the end of the era of the internal combustion engine and that we are on the verge of the widespread use of self-drive cars and shared transport? Yet the models built by economists capture and captured almost nothing of these vital dynamics and the great potential of dynamic increasing returns to scale in discovery, innovation and learning.

Finally, on basic ideas which are central to public policy on climate change, I will comment briefly on discounting. The idea of discounting concerns the valuation of costs and benefits occurring in the future relative to costs and benefits occurring now. That, inescapably, involves value judgements, but it is also an area where rigour and clarity are crucial. Unfortunately, economists have all-too-often either tried to avoid the issue or have confused it. The avoidance route is to suggest that the relevant values can be read off from markets. That is plain wrong. There are no markets from which we can read off considered social value judgements between generations, the relevant concept at issue here; markets generally reflected individual private choices. On top of that, capital markets are riddled with imperfections, implying that the signals they embody, even in relation to private preferences, are unclear. The various routes to confusion followed by some often involve the idea that the issue can be boiled down to a single rate of discount. That generally fails to

[24] See, for example, Stern (2015), Chapter 3 for further explanation and development of these arguments.

look carefully at the role of uncertainty, fails to recognise that relevant social discount rates will be different for different goods, that they are likely to vary over time, and that they will be profoundly sensitive to assumptions on future circumstances. It is disappointing that so much of the professional discussion amongst economists of this crucial set of questions has been so weak.

A simple way of crystallising some of the issues is to see discounting as arising from two basic sources. First, we may argue for the discounting of future benefits because we hypothesise that future generations will be better off than we are, and we make the distributional value judgement that a benefit to a richer person has lower social value. Second, we might try to argue that later generations should have a lower social weight simply because they are in the future and we are less concerned about future lives than the present lives, simply because they start later. This second argument is called 'pure-time discounting'.

Let us briefly assess those two arguments for social discounting. The first depends on the hypothesis that future generations will be better off. But if we fail to manage climate change they may be much worse off than we are. The second has little serious ethical foundation and amounts to discrimination by date of birth. The only argument with ethical foundation of substance concerns uncertainty about extinction of the human race. In my view, it is simpler to treat that kind of argument about uncertainty explicitly rather than to collapse it into a discount rate and, further, while we can deeply damage ourselves and kill many people with unmanaged climate change, complete extinction in the next century or two is probably pretty unlikely.

My conclusions from this analysis are first, that we should build our models and theories of choice recognising that there are major risks to future welfare and that future generations may be worse off than ourselves and, second, that we should include pure-time discounting only at very low rates. I set out much of this in the Stern Review and have elaborated in my 2015 book *Why are we waiting?* (Stern, 2015). Peter Hammond, Graciela Chichilnisky and I offer some formal analysis in our forthcoming paper (Chichilnisky et al., 2018).

Let me here recognise my debt on public economics to the wonderful Tony Atkinson, a close colleague and friend of half a century, whom we lost so sadly last year.[25]

Fostering and financing investment

I have emphasised that sustainable infrastructure investment, particularly in the next two decades is at the heart of an effective delivery of the global agenda and of whether or not this will be the best of centuries or the worst of centuries. Worldwide infrastructure investment is a little over $3 trillion a year in a world GDP of around $80 trillion a year. This will likely rise to around $7 or $8 trillion a year in the next 15 years or so, with an accumulated total in that time of around $90 trillion (see Bhattacharya, 2016; NCE, 2014 and 2016). At the core of our challenge of best or worst of centuries is making infrastructure investment in the next two decades sustainable, including close-to-zero carbon. That is unlikely to cost much more, may be adding $4 or $5 trillion to the $90 trillion. What is critical is changing the nature of the investment. For that we need incentives, examples, leadership and collaboration.

Let us begin with the incentives. The policies shaping incentives must first be sound, in the sense of dealing efficiently and equitably with key market failures (I listed six above) and second, they must be clear and credible. Sound incentives should give market signals that reflect real costs. Failing to price the greenhouse gases associated with an activity is, effectively, to subsidise that activity – costly emissions are allowed free of charge. At the same time we should recognise that sometimes standards and regulations can be more efficient than prices. They can give the clarity and confidence that can foster strong investments on scale in new ways of doing things. An important relevant example concerns lightbulbs where the banning in Europe of the very wasteful

[25] My paper in the issue of the *Journal of Public Economics*, 2018, a journal which Tony Atkinson and I co-edited for two decades, in honour of Tony is entitled "Public economics as if time matters".

incandescent bulbs brought very rapid technical progress and cost reductions in the much more efficient LED bulbs. With care, prices and regulations/standards can be used together in consistent and reinforcing ways. Thus, for example, to have a strong price for carbon, while simultaneously making it clear that vehicles driven by the internal combustion engine cannot be sold after a certain date, and cannot be used in certain cities, could give very powerful signals.

These signals must also be reliable. Government-induced policy risk is a huge disincentive to investment worldwide, whether it be sustainable or otherwise. In the climate case we have seen many unfortunate examples, such as in Europe, of the sudden removal of support for renewables. Policy must be what I like to call *predictably flexible*. Thus we may subside renewables because we want to promote powerful learning processes. Indeed, we have seen that in action with extraordinary falls in the prices of solar and wind power in the last decade. These are examples of successful policies and, as their success appears, they can begin to be unwound. But predictable returns are crucial for long-term investments and that unwinding should be done in an orderly way against pre-announced criteria, such as the extent of adoption and the achievement of competitiveness.

Often the reliability that is necessary can come via legislation or institutions. Thus, for example, in the UK we have climate legislation (supported by all parties in Parliament in 2008) and the Committee on Climate Change. In the EU we have environmental regulation backed by European law. In China the five-year plan is integrated into law, gives very strong signals, and there is a record of delivery. The point is fundamental: predictability of returns is vital to long-term investment.

Sound and predictable policies reduce the cost of capital, and much of the necessary investment for sustainability is capital-intensive. If you halve the real cost of capital for an investment whose costs are 80% capital, then you reduce real costs by 40%. The cost of capital is in large measure about risk. Indeed, currently governments and large, strong corporations, can borrow against their balance-sheets at 2% or 3% real rates of interest, or less. But for project investments the cost of capital can be 8% real or more. If early-stage risks are well managed then those who have made the early investments and handled those risks can sell on their financial assets with good returns to those who seek more stable returns to long-term investments such as pension funds.

Infrastructure projects need the right kind of finance, on the right scale, at the right time. At the time of planning and construction risks can be particularly high. Equity capital can be important: so too political risk guarantees and long-term loans. A multilateral development bank (MDB) can supply all of these in combinations suitable for the project at hand. Its presence itself reduces policy risk and it can convene other partners to share risks (see below). Once the early risks are resolved or reduced it is much easier to bring in long-term private institutional investors and 'sell on' financial investments.

Building international collaboration: the examples of the MDBs

In discussing the fostering and financing of infrastructure investments, I have already emphasised the great potential strengths of multilateral development banks. Here I want to argue both that they are fine models of international collaboration and that their expansion could make a core contribution to the delivery of the global agenda. As someone who was chief economist of the European Bank for Reconstruction and Development (EBRD) for six-and-a-half years, and of the World Bank for three-and-a-half years, I hope I have some understanding of what can be done. As I have stressed, and this is crucial, such banks can work with governments to help build sound policies and institutions that can create an investment climate that enables investment ideas with potential to be transformed into real project propositions. In so doing, they help to reduce policy risk. Indeed, their presence itself reduces such risk since governments are less likely to be fickle if an MDB is present, both because they wish to advance their own infrastructure and because they have a long-term relationship with the MDB. MDBs can be trusted convenors to bring in other financial

institutions and spread risk; the invitation from a private bank to share risk may be treated more warily. They can develop strong areas of skill, such as in energy efficiency at the EBRD. And, if they are well designed, such as the EBRD or the AIIB, they can bring a whole range of financial instruments to manage risk from equity, to guarantees, to mezzanine finance to long-term loans. All these strengths arise from the way in which the institution is structured. This is not subsidy, it is institutional design. Indeed, the institutions must, and generally do, follow sound banking principles.

They must use these strengths for the purposes of advancing development, to pioneer, to innovate and to show how to take good ideas to scale. They must have operating principles and strategies that mean that their investments are on the frontiers, the investments move the frontiers, and their investment activities move with the frontiers. For many of the MDBs there is a key trio of operating principles that can help put this idea into practice. These are: sound banking (based on a sensible combination of risk and return); additionality (opening up and taking opportunities a standard private bank might not be able to pursue); and development impact (taking forward the SDGs). Because of the advantages arising from its institutional design, an MDB can be both profitable and additional and can use its ability to be additional to drive development impacts. I sat every Friday on the loan (or operational) committee of the EBRD, from 1994 to 1999, and those principles were followed rigorously and to very good effect.[26]

Their strategies must embody the same ideas of pioneering, innovating and taking good ideas to scale, again showing that the advantages they carry in their institutional design are used to advance their institutional purpose, economic development, in as strong a way as possible. This means constantly looking for powerful development impact and real multipliers, both in terms of ideas and in terms of drawing others, including the private sector. In 1993/4 I led a process at the EBRD under the outstanding presidency of Jacques de Larosière to construct such a strategy. It focussed on moving further east in its geography, using more equity in its instruments, doing more private sector investments, and doing more work in the financial sector. Recall this was a bank created in 1991 to advance the transition in eastern Europe and the former Soviet Union. The staff and board knew the operating principles and strategy; they were clear and not overly numerous. They were implemented successfully.

The best of our international development banks do all this well and I think that the EBRD is a shining example. National development banks have a powerful potential role as well. The China Development Bank is by far the largest development bank in the world, national or international. The BNDES has played a powerful role in the financing of infrastructure in Brazil. Governance problems and political interference can be issues, but that is also true of private sector banks, as we are frequently reminded. Here in the UK, the Green Investment Bank was very unwisely privatised and thereby lost many of the advantages just described. We need an infrastructure investment bank in the UK, particularly as we are likely to have reduced access to the European Investment Bank as we leave the European Union.

Core to my argument on how to deliver on the global agenda is a strong expansion in the system of the MDBs. This is a concrete and crucial example of the internationalism we now need. If we do this well, it could be an example and catalyst for other joint endeavours to rise to the major challenges on other dimensions, including pandemics, AMR and so on.

I have argued that the nature of investments, particularly infrastructure investments over the next two decades, will determine the future of our climate, whether it is severely dangerous or not, whether this will be the best of centuries or the worst. I have argued that MDBs can and must play a fundamental role in this process. And, in terms of resources, it is so easy to expand what they can do. For a one-shot $50 bn of paid-in-capital, the system of MDBs could expand its lending from

[26] For the EBRD, whose mandate was to promote transition to the open-market economy in previously command economics, development impact took the form of transition impact.

around $70bn p.a. to around $150bn p.a. (see Bhattacharya, et al. 2016). With a modest relaxation of its gearing ratio – or level of debt allowed in comparison to overall capital – from 1 to 1.5, that could increase to around $220bn. Infrastructure lending is around 60% of the total. With a modest rise in that proportion, infrastructure lending associated with the MDBs could rise from around $40bn now to around $150bn, while providing substantially increased financing capacity for other vital areas, including health and education. With expanded private sector multipliers, the extra infrastructure financing could correspond to MDB involvement with over half a trillion dollars of infrastructure investment p.a.. In the context of current infrastructure investment of around $3 trillion p.a., rising to $7 or 8 trillion over the next 20 years, that would enable very powerful examples from MDB-sponsored investments.[27] Enough, in my view, to set examples, to pioneer, to show what is possible, how to scale up and to change the course of infrastructure investment across a whole range of activities and circumstances. We must recognise that country and sector situations do matter and they vary, hence a range of examples is necessary, requiring in turn a corresponding scale from MDB-associated investments to cover the range. The steps in the logic of this expansion are summarised in Box 4.

Box 4. Expanding the financing capacity of the MDB system

- A one-shot injection of roughly $50bn of paid-in capital could expand possible financing flows from about $70bn p.a. to about $150bn p.a. (see Bhattacharya et al, 2016).
- The big majority of the committed 'callable': this is a sum committed by shareholders to be made available should the MDB be in extremis and would be called to repay the outstanding borrowings. No MDB has ever 'called' the callable capital. Borrowers from MDBs prioritise their payments to MDBs. It is a long-term relationship.
- Most MDBs cannot lend more than one times their total capital, paid-in plus callable.
- Relaxing the gearing ratio from the extremely conservative 1 to the very conservative 1.5 could take the $150bn p.a. financing to around $220bn p.a..
- If the infrastructure proportion went up from 60% to 70%, all these changes together would allow total MDB financing for infrastructure to go from the approximately $40bn p.a. now to around $150bn p.a..
- If there were a private-sector multiplier which brought $2 of private finance for every $1 of MDB finance, that could associate the MDBs with an infrastructure project flow of around half a trillion dollars a year.
- That would allow a strong set of innovative infrastructure examples and path-opening investments across countries and sectors in a world where infrastructure investments are $3–4 trillion a year.
- A one-shot $50bn of paid-in capital spread amongst many shareholders and paid-in over five years would represent very moderate sums in relation to the public finances of the main shareholders.
- Stronger turnover of MDB assets (selling on equity or loans once difficult early stages were passed) could substantially increase possible flows by increasing headroom.
- Working more effectively as a group of MDBs could help increase private sector multipliers, including through work on policy environments which create greater confidence and clarity thereby helping build stronger investment environments in developing countries. On finance, they can work together on common financing structures to attract institutional investors. This draws on Bhattacharya et al. (2016) and NCE (2016).

[27] And there are other ways that could enable the expansion of scale still further, such as a more rapid turnover of the investments of the MDBs, by, for example, selling on loans or equity to other financial institutions after the more risky periods in an investment have been managed.

The role of the MDBs is way beyond the bringing of the right kind of finance to the right projects at the right time. Their role in helping build the policy and institutional environment for investments, and providing good examples is vital to unlocking potential and transferring good investment ideas into real demand for investment. This policy and institutional work is a key element in their role of establishing innovative ways of doing things and taking them to scale.

That we can do this major expansion with a one-shot paid-in-capital contribution of only $50bn is a testimony to the brilliance of Keynes, who was so influential in recognising the potential of these institutions and how they could be built. It was he who postulated the idea of paid-in and callable capital, whereby the nations who are members of the MDBs pledge callable capital, to be available only to cover circumstances where a very large number of loans go bad. It has never been necessary to call such capital, in part because borrowing countries or institutions prioritise their relationships with the MDBs, as those relationships constitute a precious asset in terms of future access to finance. The size of the callable capital, together with the very, very conservative gearing ratio has generated an ability to borrow very cheaply and to ramp-up the scale possible from paid-in-capital very powerfully. The sum of $50bn, if spread across many nations and spread across five years to pay it in, becomes a sum that is almost trivial in the public finances of a major nation: perhaps half-a-billion a year, on average, for five years for wealthy nations. This is small change in relation to the public finance. The UK's annual aid budget, for example, at 0.7% of GDP is around £13bn (or around $17bn) per year. The collective effect could be immense.

The economic, the development, and the environmental arguments for such an expansion are overwhelming. Further, it would be a wonderful boost to internationalism. And, while priorities should be for the poorest nations, we should recognise the importance of supporting all developing nations in the endeavour of promoting sustainable infrastructure. This is not a zero-sum game where resources assigned to one country are inevitably at the cost of another. The reasons include: (i), the future of Africa's climate and livelihood depends in large measure on infrastructure investment in Asia over the next two or three decades; (ii) infrastructure linking developing countries will play a vital role in their growth; (iii) lessons learned in projects and programmes in middle-income countries can inform activities in poorer countries; (iv) the potential profitability of MDB finance in middle-income developing countries can help them take risks in poorer countries. Thus priority for the wellbeing of the poorest requires investment across a range of countries.

Development and the pursuit of the SDGs will also involve strong investment in human capital. For education and health, private-sector multipliers will not generally be strong. And many infrastructure projects, such as rural roads, will not come from the private sector. Thus the expansion of capital cannot be seen as only for infrastructure.

There is much more to the building of a strong system of MDBs than expanding their capital, vital though that is. It is reasonable for shareholders to look for better performance as they invest more, including the expectation that the MDBs would work more cohesively as a group. They can do this in a number of ways. Importantly, they should harmonise their agendas around the SDGs and COP21. They can exchange ideas on operating principles and strategies and work for consistency and complementarity. And they can work with recipient countries to build common investment platforms and programmes, simplifying and harmonising standards, and sharing programme analysis and preparation.

There is also much to do in improving governance, in part by shareholders taking a stronger responsibility for overall strategic questions at a senior level and doing less micromanagement via resident boards. Keynes saw very clearly in 1944, before the MDBs were established, the danger of excessive interference in detailed decision-making by the resident boards.[28] Further, it is way past time to end the scandalous appropriation of the presidencies and top jobs by particular

[28] See Chapter 13 of the third volume of Robert Skidelsky's (2000) biography of Keynes.

shareholders. And it is time to move to shareholding structures which reflect the modern world and the rise of emerging market countries.

Many of these issues will be examined in the report of the G20 Eminent Persons Group on the international financial system, to be published later this year. I am a member of that group but I speak on these issues here purely in a personal capacity.

The two most important countries in the world by far, on the obvious and natural criterion of population, are China and India. I have worked on and in China for more than 30 years and on and in India for more than 40, witnessing remarkable change in both places and the extraordinarily rapid growth of China. India is likely to see more rapid growth than China over the coming two decades as China's process of catch-up becomes increasingly advanced. India has roughly one-third of the GDP per capita of China (depending, of course, on measurement methods) and China roughly one-third of that of the US, therefore India's catch-up has much further to go.

China's economy is already roughly equal in size to that of the US. It saves and invests more than the US and Europe put together (and its greenhouse gas emissions are also more than the sum of those of the US and Europe). It is unsurprising, therefore, that we see public discussion of the Thucydides Trap[29] and the tensions associated with the relationship between the rising power, China, and the pre-existing dominant power, the US. We saw the dangers and tensions in relation to Germany and the UK before the First World War. The lessons of history surely point in the direction of working for collaboration rather than conflict.

A key area for collaboration with China is through its Belt and Road Initiative (BRI), which is an ambitious plan to build infrastructure and connectivity with trading partners. It is also part of China's intended change in structure for its own economy: as it moves up the value chain, it envisages partnering with manufacturing sectors in economies with lower wages. It is also very interested in the supply of commodities and raw materials. The future of sustainability depends greatly on the quality of the infrastructure in countries associated with the BRI – there are more than 65 countries potentially involved, with more than four billion in population. If their infrastructure follows the same high-carbon and polluting path followed by China over the last three or four decades, the effects on the climate could be devastating. China itself is changing rapidly towards higher quality growth and stronger environmental practices. The world should collaborate with China as it works with other countries on infrastructure: the purpose of promoting a much cleaner and sustainable pattern of growth, with sustainable poverty reduction, is surely one we should share.

In this context, we should look further than the intense focus on the relationship between China and the US, which has dominated so much discussion. We should think of India, Europe and beyond. By taking a deeper, broader and longer view we are likely to construct a more collaborative system than that which might arise from seeing the world, misleadingly, as a two-horse race. In terms of population, although not one country, the growth of population in Africa will be the most important demographic phenomenon in the next three decades.

There is much, in my view, that Europe can and should do to create more constructive relationships in a world in which some countries appear to be toying with populism and protectionism. And it is striking that, as I remarked earlier, support for open economies is stronger now across many parts of the emerging market and developing economies than in some parts of the rich world. Taken with the attitudes to trade and collaboration of the current US leadership, this is surely a moment for Europe to take a lead.[30]

[29] See, for example, Graham Allison's 2017 book.

[30] The UK acted very sensibly and constructively in 2015 by joining the Asian Infrastructure Investment Bank (AIIB), notwithstanding pressure from the US to stay away from this multilateral, though China-led, initiative. For transparency, I am a member of the international advisory panel of the AIIB.

There are many ways of exercising that leadership. Europe can press for the reform of the MDBs along the lines I have described. Europe can set an example by giving up monopoly of the Managing Director of the IMF; that would be a symbolic gesture but one that could give a clear sense of direction in a changed world. It should press for the inclusion of India in the Security Council. It should champion the UN. It should help revive and protect the WTO and press for greater openness of trade in the service sectors. It should reduce its own barriers to trade, particularly in agriculture. It could help create new and strong institutions to manage pandemics. It can intensify still further its leadership in work on the transparency and responsibility of the collecting, holding and use of data, including by the very large international digital companies, and the major rights issues that are involved. And, above all, Europe should re-energise its leadership in the vanguard of nations building action on climate change. There is so much Europe can now do to take the lead in building a stronger, safer and more cohesive world. And I cherish the hope that the UK will play a major and European role in participating in and leading these endeavours.

Building political will

Building political will to act, and act strongly, is fundamental to the change that I have examined in this lecture. I have concentrated on what we can and should do, why it is so important and why new paths could be so attractive; in other words, how we can make this the best of centuries. Showing what can and should be done is a basic precondition for creating the political will to do so. But without the political will, the good choices will not be made. They do involve radical change and politicians and political systems often find this difficult. Or worse, they are attracted by mistaken beliefs in radicalism of a destructive kind; at this moment, we are all too aware of the potential of this kind of response. Thus, while I am optimistic about what we can do, I am very concerned about what we will do, hence the great importance of creating and marshalling sound arguments and thinking hard about how we communicate.

Political will must be built across and within nations. In my description of the creation of the global agenda, and in the discussion of fostering sustainable investment just articulated, I hope I have given examples of how international collaboration can be built, primarily around climate change. But there is a range of important challenges for which international collaboration is essential for an effective response. We live in a time when it has never been needed more. Yet it is also under threat. Thus we must consider carefully how international collaboration can be created, fostered and sustained. I will draw on the lessons from the examples of the Paris Agreement and of the MDBs but also look beyond them. Thus our discussion of building political will begins with the challenges of building it across nations and examines a number of challenges, including climate change. I then examine the importance of managing change and fostering a cohesive society in the presence of dislocation or disruption from change. The mismanagement of such dislocation often translates into international hostility.

Building political will across nations and issues

Starting with some shared understandings and objectives is fundamental. After the Second World War, for example, the need for open trading relationships was very clear after the experience of the destructive consequences of protectionism in the 1930s. So, too, the importance of having a more stable set of financial relationships than the gold standard which had bedevilled the interwar period. The objective of reconstruction, particularly around infrastructure, was widely shared. These were the foundations of shared understandings and objectives for the success of the Bretton Woods conference in 1944. I have described the shared understanding of climate risks and of the potential of low-carbon growth that underpinned the Paris Agreement of 2015.

In the case of Bretton Woods, the world had learned from the bitter experience of the interwar years. But there was also some fine and fundamental academic work, particularly associated with John Maynard Keynes. And in the special case of Keynes it came with a remarkable ability to

communicate, with deep experience in the making and delivering of policy, and with close involvement in the real world of making, and indeed losing, money.

In the case of the Paris Agreement the understandings had to be built. For climate risks, we had the very valuable work, since 1988, of the Intergovernmental Panel on Climate Change on the underlying science. For the potential of low-carbon growth, I hope our *Better Growth, Better Climate* publication of 2014 was an example that made a contribution (NCE, 2014). At least Todd Stern, then the main US climate envoy, was kind enough to say that it had indeed helped him in building towards the joint announcement of Paris targets by Presidents Obama and Xi in November 2014, one year ahead of COP21 in Paris.

A spirit of internationalism is something that must be much more broadly shared than simply amongst the sometimes nerdy negotiators of international agreements, if such agreements are to be built and sustained. It has to be within the population as a whole. Hundreds of years of conflict in Europe, and the intense and bitter experiences of the two world wars, were fundamental to a general realisation of the importance of collaboration, mutual interdependence and mutual support, and thus to the building of the institutions of the European Community and eventually the European Union. The European project was led by politicians and technocrats but it was founded in the deep and bitter experience of the people of Europe of brutally destructive wars. It has been a success in avoiding the conflicts in Europe that had pervaded the previous centuries. But that direct experience of war is fading and with it we are losing some of the understanding of the importance of the European project. The crucially important example of the construction of NATO was a little different, but also very instructive, since it depended on the recognition of a common threat, in this case the USSR. That too was a success in avoiding conflict and protecting Europe.

Building a broad-based internationalism is not easy, as these two examples clearly illustrate. One would surely not seek to create world war or a threat such as the USSR as tools to foster international collaboration. This is why the Paris Agreement was so remarkable. Nevertheless, it is possible to create the understanding that can underpin internationalism and international action. The Montreal Protocol in 1987 was an agreement to protect the world from the degradation of the ozone layer by controlling ozone-depleting substances, particularly chlorofluorocarbons (CFCs). Scientists persuaded the world with hard evidence that there were risks of skin cancer and to eyesight and identified the causes of ozone-layer depletion. It was a danger that could be readily understood and alternatives to CFCs for refrigeration and other purposes were available. Kofi Annan observed in 2000, "perhaps the single most successful international agreement to date has been the Montreal Protocol".[31]

Other collaborations are based primarily on shared moral standards or understandings of human rights, such as international criminal courts or the Universal Declaration of Human Rights (UDHR), although the impetus to establish them was founded in the experience of human calamity, such as the Holocaust.[32] Further examples concern the idea of a shared heritage such as agreements to protect Antarctica and CITES on trade in endangered species.

We should recognise that the picture of the fundamental nature of human beings and of states driven by narrow and short-term self-interest is not necessarily a full description of our nature as humans and communities. We *are* capable of acting together around common causes, notions of common humanity, and a shared responsibility to future generations. That is not to be naïve and to pretend that internationalism and international action are the natural state of affairs and can be taken for granted. They have to be built and we have to analyse how they can be built. But to assert that they are impossible is simply wrong and often amounts to asserting the claim that narrow self-

[31] See the Report of the Secretary-General to The Millennium Assembly of the United Nations, available at http://unpan1.un.org/intradoc/groups/public/documents/un/unpan000923.pdf

[32] On the origins of the legal understanding of genocide, crimes against humanity and war crimes underpinning international criminal courts, see the remarkable 2016 book by Philippe Sands, *East-West Street*.

interest is both *the* key aspect of our identity as human beings and the foundation of morality. That, in my view, is both morally unacceptable and dangerous.[33]

Because of the importance of shared understandings, some agreements or coalitions will be more difficult than others. The advantages of open trade are not necessarily well understood, and protectionism can often seem attractive. When Paul Samuelson was awarded the Nobel Prize in economics in 1970, some physics Nobel laureates in MIT asked him, somewhat provocatively, to name an economic idea that was both important and not obvious; he replied "comparative advantage". As I have noted, the experiences and arguments around war and peace that persuaded the Europeans in the generations of the 1950s and 1960s to come together are less resonant to current generations who did not share these experiences. In such cases, leadership and advocacy, founded on sound argument, are especially needed. So too are economics and history teachers.

With all these difficulties and with all its serious flaws and inherent weaknesses, it is striking that the UN can bring people together around common goals. We have already emphasised the global agenda around the SDGs and climate. The UN has led the fight against HIV/AIDS. It created the MDGs. The nuclear non-proliferation treaty was negotiated under UN sponsorship between 1965 and 1968. UN resolutions are seen as the arbiters of whether or not military action is lawful, with real effects on some national and international decisions. These are achievements of real substance. Now is surely a time when we must speak up for internationalism in a clear and strong way and demonstrate why it is needed, why it is possible and what it has achieved.

Managing dislocation

Many of the problems of building internationalism arise from the temptation to blame our own faults and ineptitude on the behaviour or successes of others. Building collaboration requires recognising, welcoming and fostering advances in economic development in other countries. Progress in living standards has been, and should be, the whole point of investing in development. That has rightly been seen as a moral duty. At the same time, we can all gain from the international division of labour that comes with growth and expanding markets.

There are, however, real costs associated with change in the international division of labour as technologies advance and international markets develop. Both processes have moved rapidly, bringing substantial dislocation, particularly in the old manufacturing sectors of richer countries. Often globalisation has been mistakenly blamed for the dislocation that comes from new technologies, although both forces are at work. Many of the affected industries have been in relative decline for many decades as economies make the shifts towards the service sectors and more sophisticated technologies that are part of development and demonstrated in economic history. For example, in the UK in the 1960s, manufacturing was around 35% of GDP and it is now around 10% (Rhodes, 2018). On top of these secular changes in economic structure we have seen particularly rapid technological change in some activities, continuing globalisation and the global financial crisis. This major crisis was for many places and people a severe blow on top of the sectoral changes, technological changes and globalisation that were medium- and long-term trends.

It is unsurprising that there are geographical locations and segments of the population that feel ignored or badly treated. The lesson is surely not to try to halt technology, not to stop trade and to try to inhibit growth elsewhere in the world economy. This may seem attractive in the short term to some populist politicians, but it is a policy that would accelerate relative decline. The right reactions are as follows: to invest well in new skills; build on dynamic increasing returns to scale and the dynamics of learning to promote sectors with potential dynamic comparative advantages; create more attractive cities where the best of talent will want to come, including investing in culture and education; encourage universities, businesses and cities to work together. There is so much we can

[33] It is worth emphasising since there are some philosophers, such as Ayn Rand and Robert Nozick, still popular in some circles, who adopt something close to this view.

do that is positive, outward-looking and attractive rather than defensive, protectionist and hunkering down.

The rapid transition to the low-carbon economy which is so urgently needed will also involve some dislocation, as well as offering potentially a very attractive form of sustainable and inclusive growth. In some ways it can complement and fit well with other changes, particularly towards improved city management and design, the service sector, and the use of modern technology, that are already in train. We need to enable, foster or create a 'just transition'. The relevant policies on low-carbon also fit well in relation to these other transitions, and key elements have been described in the preceding paragraph. In addition, governments can transfer some of their own activities to affected regions. For example, the UK has moved some social security administration to the north-east of the country and the national statistics office to South Wales. There will always be some who cannot benefit from such measures and systems of social protection must be up to the task of giving them the support they need.

Building political will across society

Political will is built by processes and actors that go far beyond politics, narrowly conceived. Business groups, lower levels of government, NGOs and community organisations all have a strong role below. I comment briefly in turn.

Business leaders can play a powerful role. Increasingly, many more of them are speaking up for a long-term view of investment and outcomes and are becoming much more focused on their role in society and the environment. Many gave strong and vocal support for the Paris climate agreement and many are changing their policies and incentives, including using an internal carbon price. Many firms are aligning their actions towards participating in the attractive investments that follow from the pursuit of the SDGs (see, for example, the work of the Business Commission on Sustainable Development, 2018). More responsible and enlightened businesses attract much better staff; for example Unilever under the leadership of the splendid Paul Polman, one of the founders of the SDGs, attracts 1.8 million job applications a year. If you attract the best and the brightest to work in your business you have a great advantage. Responsible behaviour wins customers; irresponsible behaviour loses them. And care with risks, whether they be safety or elsewhere, is likely to be good for lowering costs and raising profitability. The evidence on the association of business success and responsible behaviour is growing strongly (see Lewandowski, 2017; Russo and Minto, 2012; Margolis et al., 2007; Orlitzky et al., 2003).

Large parts of the financial sector are beginning to exert a strong and positive influence. They have recognised that firms which are irresponsible on some dimensions, such as the environment or safety or worker rights, may be irresponsible on others. They have understood that investing in high-carbon sectors is to risk the money of themselves and their clients, as the world rightly moves towards a low-carbon economy. And we have seen real leadership in this regard from central bankers such as Mark Carney in the UK and Zhou Xiaochuan in China. An important initiative has been the Taskforce on Climate-related Financial Disclosures. This was established by the Financial Stability Board, chaired by Mark Carney, Governor of the Bank of England, and led by Michael Bloomberg. It reported in the summer of 2017 and presented its conclusions to the G20 Hamburg Summit in July 2017. It identifies methods and requirements (voluntary so far) for reporting climate-related risk in financial portfolios. That risk includes risk from the stranding or marking-down of assets as a result of policies designed to mitigate and adapt to climate change and deliver on the Paris Agreement.

If change with the urgency and scale necessary is to be achieved, political leaders themselves must step up. They must show they understand both the magnitude and the urgency of the change necessary, and recognise the enormous opportunities of the new growth agenda. The leaders of our international institutions are speaking out in support of action and multilateralism, including Christine Lagarde, Managing Director of the IMF and Angel Gurría, Secretary General of the OECD:

If we are to grapple with more modern challenges, we need a renewed commitment to this tried-and-tested ethos of multilateralism. Think about the regulatory framework needed to manage the digital economy and financial stability in the era of fintech… Think about the efforts needed to fight climate change… All countries have a role to play, but I would argue that the larger nations have a special responsibility to be good global citizens.
Christine Lagarde, 25 May 2018[34]

Given the magnitude of the world's challenges, no country will get far going it alone – or even bilaterally. It is only in multilateral settings that we will find solutions for today's complex challenges.
Angel Gurría, 28 May 2018[35]

Many countries are showing their support for multilateral action and a rules-based system. The political voices are multiplying and momentum is beginning to build. In Europe, both President Macron and Chancellor Merkel have spoken up strongly over the last week. The EU is challenging trade protectionism in the WTO. Prime Minister Trudeau of Canada has been vigorous in his promotion of internationalism. President Xi Jinping, in a series of speeches, has been very strong on these issues, including in Davos in January 2017 and at the 19th Congress of the Communist Party of China, in November 2017. While these voices are encouraging, we should recognise that the idea of internationalism is under serious threat. The task is now to support further multilateralism to tackle these challenges and encourage others to take advantage of the opportunities that present themselves. Let us hope that the new growth story and the embrace of internationalism will be at the heart of the United Kingdom's strategy to reshape its role in the world.

Cities and towns and their governments are recognising that when capital is mobile, ideas are mobile and labour is mobile, then economic activity moves to places that are attractive to be. Where, for example, you can move and breathe and where culture and education are strong. The evidence from economic geography, epidemiology and economics is mounting here (see Burke et al., 2018; Casey et al., 2018). And city and town communities may find it easier than nations to recognise common interest and act together.[36]

Cities cannot only compete to make themselves more attractive: they can also collaborate, both for their own benefit and the world as a whole. We see that clearly in the C40, for example, and in Anne Hidalgo's leadership as Mayor of Paris in relation to COP21. If, for example, cities act together on the procurement of buses or the regulation of motor vehicles they can exert market pressure, incentivise action and bring down costs.

NGOs and community organisations can and should make their voice felt still more strongly. On the environmental side, organisations such as WWF and Friends of the Earth have played a very constructive role, as, I believe, have development NGOs such as Oxfam and Save the Children.

The potential contribution of academics and universities

The Fulbright programme has at its core universities and the education of young people in internationalism and mutual understanding. Universities and academics do indeed have a key role to play. We can and should do three things. We must do the research, build the ideas, characterise the risks and opportunities and show the options. We can describe and analyse different paths and set out their attractions or otherwise. That applies to us all, from the sciences to the humanities. There is no serious problem that I have touched upon here, or indeed facing humanity, which does not require the full range of disciplines working together. As President of the British Academy, I saw

[34] Address to St. Petersburg International Economic Forum, available at: http://www.imf.org/en/News/Articles/2018/05/25/sp052518-lagarde-address-to-st-petersburg-ief

[35] See: https://www.project-syndicate.org/commentary/improving-multilateralism-and-international-cooperation-by-angel-gurria-2018-05

[36] For a recent discussion, see the recent book describing creativity and entrepreneurship in US towns by James and Deborah Fallows (2018).

how strong the influence of the learned academies, including the scientists of the Royal Society, the engineers and those from the medical sciences, could be if we worked together. That was in part what raised ambitions for national research budgets in the UK and the commitment to overall national, public and private, R&D expenditure to rise from around 1.7% now to 2.4% over the next decade and onward to 3%, the EU target.[37] That would likely involve public allocation rising from around 0.5% of GDP now to around 0.8% in the next decade and onwards to 1%. The sooner the better. Such R&D drives a stronger, better and more sustainable economy and society. But our research must deserve that support; quality and creativity are fundamental criteria, but so too is the relevance for the global agenda.

Second, we can engage with the public much more clearly and intensively than we currently do. For understandable professional reasons, we academics spend a lot of time talking between ourselves. That is part of our work. We, as academics, are in a privileged position to spend much of our time explaining and discussing ideas, in a largely independent way. But we also have an obligation to share ideas much more broadly and engage with society as a whole: they fund us, after all. On engagement I believe we have done less well. From my own subject, in the past, Keynes has been a shining example. More recently, in subjects ranging from the humanities to the physical sciences, we can point to Mary Beard and Stephen Hawking. Martin Wolf is outstanding as a journalist who takes ideas, analyses and internationalism seriously and has championed many of the ideas expressed here.[38] It is possible to communicate our ideas much more effectively and we should give priority to doing exactly that. And we have much to learn from past and present political and religious figures. I would point to Mahatma Gandhi, Nelson Mandela and Pope Francis. They all conveyed or convey fundamental ideas in simple language that reaches out to people's lives and experiences. Take, for example, Pope Francis on the environment: "If we destroy creation, creation will destroy us."[39] You do not have to embrace the biblical idea of creation to understand: he is crystal-clear and well-focused. Gandhi and Mandela mobilised whole nations and movements with the directness and simplicity of their language, as well, of course, as with their dignity and courage.

Finally, we must live our values, nationally and internationally, and show openness to ideas and people in our daily activities. That means welcoming academics and researchers from many countries into our universities. It means making our student body still more international. It means teaching and researching still more on other parts of the world. It is remarkable that many school children and university students can go through their studies with only modest knowledge of China and India. It means, of course, making the formalities much easier for academics and students to come here, including taking overseas students out of any targets for immigration. One of our greatest strengths in the UK is our universities. They are strong because we can attract the best from across the world and the best come because we are strong.

One of the great privileges of being a university professor, being part of a university community, is that as you get older, the students stay a similar age. And you continue to have young colleagues. Our students and young colleagues give us hope. They take a longer view, look forward as well as backward and they take values seriously. They see the risks in continuing with the current structures of economic growth. And they can imagine, analyse and describe much more attractive paths of economic development, ways to wellbeing, and routes to better, more inclusive and sustainable societies, than we are following now. We must offer whatever wisdom we have gained from experience, we must work with them, we must support them and we must trust them. They are our future.

[37] While UK R&D spend is very productive, spending as a proportion of GDP is far below our comparator countries. See https://publications.parliament.uk/pa/cm201719/cmselect/cmpubacc/668/66806.htm

[38] See, for example, his piece in the *Financial Times* on 20 May 2018.

[39] Rome, 21 May 2014.

Concluding remarks

My examples on building institutions and international action to take on the great global challenges of our time have been drawn primarily from two areas where I have been directly involved, the Paris Agreement on climate change of December 2015, and the potential role of multilateral development banks in delivering the global agenda of 2015, primarily the Paris Agreement and the SDGs agreed at the UN in September 2015. I have argued, however, that those examples carry general lessons. In particular they show that internationalism and international action can indeed be created and sustained.

We saw that the international order built after the Second World War, that Bill Fulbright did so much to foster, created conditions for a remarkable advance in human welfare over the last seven decades. Internationalism and an international rules-based system delivered, big time. But we must also understand that the tremendous advance, including output rising in that period by a factor of around 12, and population by a factor of around three, has put enormous pressure on our global commons, the atmosphere, the forests and land, our oceans, and our ecosystems. There is now an intense urgency to act, and to act on scale as well as with speed.

We must begin by understanding the nature of our challenges and what it takes to respond effectively; these challenges include climate change, pandemics, AMR, cybersecurity and weapons of mass destruction. I concentrated on climate change in this lecture but many of the issues and necessary methods of working apply across all or most of the issues.

International action is an effective response to them all and must, in the first instance, be based on a shared understanding of the challenges themselves. Commitment to such action will also depend fundamentally on understanding that the responses to those actions are not only feasible and avoid immense dangers, but they also provide very attractive alternative ways of producing, consuming, behaving and living.

We have seen that, while for some challenges we will have to create new institutions and mechanisms, our existing institutions, if we invest in them and use them well, can achieve much of what we have to do. We have also seen the central importance of the private sector, of civil society and cities and of other levels of government.

After having studied these challenges and being directly involved in important elements of the response, I am optimistic about what we can do. Indeed, showing what we can do is a key necessary first step to action. I am, however, deeply concerned as to whether we will act on the scale and urgency required. That is, can we build, and quickly, the political will to act decisively? Political will can be built and I have tried to describe how it can be done. It is the duty of universities and academics, in my view, not only to study the major issues of our time but also to engage with society in discussions of the issues and how we can act. If Bill Fulbright had been here today, I am convinced he would have understood and led. He would have been in the vanguard of the drive to make this the best of centuries.

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