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The State We Shouldn't Be In

Britain is beset by a crisis of purpose. We don't know who we are any longer, where we are going or even if there is a 'we'. The country is so passionately attached to past glories because there are so few to celebrate in the present. The crisis is compounded since we have been told for thirty years that the route to universal well-being is to abandon the expense of justice and equity and so allow the judgements of the market to go unobstructed. Private decisions in markets supposedly are morally and economically better than any public or collective action. As a result the sense of the 'we' that binds a society together and gives us reason to belong is being lost. We take refuge in looking after number one, because there is no sense in nor reason for doing anything else.

The inevitable consequence is a decline in public integrity and a new carelessness about others. This amoral deficit of integrity takes many guises. It is sky-high executive pay out of proportion to effort or contribution. It is the phone-hacking scandal. It is the too frequent lack of duty of care to workforces and customers alike, betrayed by cases of mis-selling or exploitative work contracts. It is the careless, indiscriminate

sale of so many our public and private assets – the great ‘cashing out’. It is the unwillingness to find ways of investing in ourselves, while we look so regularly to foreigners to revive our industries or build our infrastructure. It is the crisis of trust in our politicians. It is the uncontested acceptance that our children confront a worse world than we faced ourselves – from the size of mortgage they will need to buy a house to lower pensions. It is the new hostility to openness, and the zeal to blame so many of our home-made problems on foreigners, immigrant workers and the European Union. Perhaps the most dispiriting element in the campaign to persuade Scotland not to secede from the UK was that there was so little inspiring to associate with the union around which people could emotionally rally. A national community must offer reasons to belong or it is lost.

This is all the more tragic because if it were able to regain purpose and integrity, driving forward a cluster of feasible reforms, Britain could be one of the best countries in the world. There is a lot going for this country – from great universities engaging in important research to a deeply held belief in the rule of law, from a stirring entrepreneurialism to the fair-mindedness of our society. When there is some discovery of purpose and the unity it brings – as in the 2012 Olympics – we surprise ourselves with how good we are. There are great international networks, and much affection towards us: poor migrants and the super-rich alike want to live here. In a world where the so-called ‘intangibles’ associated with knowledge and knowhow are becoming ever more important, Britain is rich in both. Technological and scientific advance, along with the digital revolution, promises to transform the economic and social landscape. We – if that ‘we’ could be rediscovered – could seize and shape the future.

Yet Britain faces these exciting possibilities with a dysfunctional capitalism and democracy. Not only are we

failing to shape this future, our capacity to do so is shrinking before our eyes. A crisis of integrity straddles the country in three principal guises, throttling our vitality and inflaming the worst sentiments and prejudices.

The first site of the crisis is in the organisation of our business and financial system, along with the dominant values of many of those who run it. Britain's business culture, built on companies without engaged shareholders to assume the stewardship dimension of ownership and so myopically chasing short-term performance, is overwhelmingly about extracting value rather than creating it, with the focus on the next deal or risk-free government contract rather than innovation. These are 'ownerless corporations'.¹ Executive remuneration is blind to how profits are made: it simply ensures extravagant personal fortunes if any kind of profit is delivered that will boost the short-term share price. The reward system is meant to drive better performance. Instead it has grown into a Frankenstein's monster that gives business leaders the incentive to put themselves and their own pay first. And, given the numbers, they would need to be saints to do otherwise. Chief executives' pay has risen from 35 times average pay in the late 1980s to 180 times today, with remuneration in 2014 averaging £4.7 million for the CEOs of companies listed on the FTSE 100.² Adjusted for the size of companies they run, executive pay in Britain is higher even than in the US.

The lack of proportionality and the way pay goes up on average in both good times and bad has properly created enormous cynicism. The incentive for such executives is to wheel and deal their way to a dynastic fortune with little or no sense of obligation to the society of which they are part or the companies they lead. To build an enduring and innovative company, to accept a broad duty of care to those who work for you or even to pay the taxes that the state intends the company to pay

are now in tension with a business leader's prime incentive – to create wealth, defined as the share price and thus his or her own remuneration package. The financial crisis, which impacted more profoundly on the British banking system than on any other leading industrialised country's, was the most complete expression of British capitalism's dysfunctionality.

The second site of crisis flows from the first. British society is ever more fragmented and unequal; the mass of the population are more at risk and insecure than ever before – and this in a country that remains one of the richest in the world. It is true that the interaction of globalisation and new technologies is quickening the pace of change, requiring from workers, whatever their skills, ever faster adaptation and a constant readiness to change. But instead of reshaping the social contract and the institutions of society to allow individuals better to confront the risks of modern life – offering them the chance to build a career or even to have one at all, to buy a house, to face ageing and ill-health with confidence, to bring up their kids well, to enjoy a common infrastructure designed to support them – we seem resigned about the unprecedented fall in real wages for the typical worker, and grimly embrace the dismantling of the social settlement in the name of 'rolling back the state' and promoting self-reliance. Britain could, as I argue later, try refashioning its social deal both to provide business with flexibility and workers with more security. Instead the only discourse is about cuts, 'tough decisions' and the withdrawal of benefits. Extraordinarily the Coalition government has budgeted to reduce public spending on goods and services – in effect the state – in 2018 to the same proportion in relation to GDP as in 1948, despite today's complexities and extra demands.³ No additional tax is to be demanded of the propertied, the well-off, business or the elite to mitigate the impact. Justice is eclipsed. The vocal right and centre-right blame EU regulations and

immigrants as the cause of our ills, crowding out any arguments that genuinely address the origins of our malaise.

Which segues into the third dimension of the crisis: political philosophy, governance and democratic deliberation. Too many on the left still do not celebrate or believe in the idea of great companies or in the capacity of a reformed economic system with better checks and balances to deliver wealth and individual enfranchisement, although the best on the left are beginning to change. The right meanwhile so worship at the shrine of unalloyed capitalism, and are so dazzled by the fortunes of the new financial and corporate elite, they do not believe in the necessity of ensuring that capitalism operates fairly, building countervailing forces or social institutions to support the lives of ordinary people. There is no creative, democratic conversation about how to build a better capitalism populated by purposeful companies within an enfranchised, just society, or how to seek allies at home and abroad to do it. This is all the more extraordinary in the wake of a financial crisis that so nearly triggered a banking collapse and associated depression. The void is filled by a cacophony of opinionated voices and interest groups, so that before the simplistic, populist message from the UK Independence Party (UKIP) – it is Europe and not ourselves that is the problem – the political class cannot find the language to respond. Matters are exacerbated by a parliament that follows not leads, institutions of government that have lost their fitness for purpose and a media that preys on and distorts the national conversation.

If it could but resolve this triple-headed crisis, the country could take off. With reformed institutions it could build on its assets to become the richest and most dynamic country in Europe. After all, Britain has more world-class universities per head of population than any other country, and a strong scientific base. There are surprisingly vigorous and fast-growing

clusters of high-tech start-ups and small firms. The triangle bounded by the M3 in the south and M40 to the north and with Heathrow at its centre boasts the highest concentration of high-tech start-ups outside California and Massachusetts.⁴ The Internet economy is booming: e-commerce is expected to be worth £140 billion in 2016, proportionally among the highest of leading industrial countries. There is a growing awareness of the importance of innovation and entrepreneurialism. More multinationals than the rest of Europe put together choose to locate their headquarters in Britain, which along with the City of London, capital of world finance, provides not only jobs but also a rich market for business services.⁵ The manufacturing we still have is resilient and profitable. We speak the world's language, English. The values that would underpin a more inclusive capitalism – justice, fair play, respect for others' opinions, profound belief in democracy whatever the shortcomings in its delivery – are widely held and never far from the surface. These are some of the elements that could constitute a springboard for a national renaissance.

Apologists for the great neoliberal experiment of the last thirty years would argue that these successes are proof positive that it has worked; the task is to stick with it. Of course, in a rich and diverse country there are examples of success. The question is whether such examples are evidence of a wider system that works, and whether we can build on their success throughout the country as a whole. The verdict has to be No, with the minuses outweighing any pluses. Stable companies who can exploit the new technologies, achieve real scale and help the economy grow are conspicuous by their absence, making even more elusive the prospect of an era of stable economic growth following the so-called 'recovery' – which in 2014, after six years, had merely returned the country to 2008 levels of output, the longest recession for more than a century.

In the 1930s, after the Great Depression, Britain could point to major emerging global companies in chemistry (ICI), consumer electronics (Thorn Electrical Industries), cars (Austin and Morris Motors), aerospace (Hawker Siddeley) and so on that could drive growth forward and represent the new. The same cannot be said in 2015. It is telling that Britain can boast only one genuine new high-tech company of global importance: ARM, which provides chips used by 95 per cent of the world's smartphones and has a stock market value exceeding £10 billion. There are fewer than a handful of new high-tech companies worth £1 billion, despite London being the home for 3000 high-tech start-ups.⁶

Britain may have angel investors aplenty, but it does not have a financial and ownership system that enables enough of these start-ups to grow to maturity, especially when it is intellectual capital, frontier knowledge and unproven products and services that require backing. Short-termism, disengagement, lack of technical knowledge and demands for impossibly high returns over a very short period define our system. The chances of these hopeful, innovative start-ups being given the chance to innovate and invest to become the giants of tomorrow are close to nil. It is a scale-up crisis, beginning to attract more and more concern.⁷ Companies in the round are as ephemeral, focused on the short term and disposable as another reality TV programme. There is little chance of them stewarding and investing in their disposable workforces. Indeed their workforces are disposable precisely because the firms who employ them are. Britain is too often a world of throwaway companies and throwaway people.

Even in the gilded South East there are shadows of the ills that beset the rest of the country, and which explain the lack of any national belief that Britain is going to become a winner. Inequality is no longer a distant concept, the concern

of left-wing intellectuals or Labour people nostalgic for the glory years of the Attlee government. It is a lived reality for millions, disabling their lives, breaking down trust and deepening the fissures in our society. London has always housed both rich and poor cheek by jowl, but the disparity between the crowded flats where young people 'hutch up' to share rooms and the extravagant super-mansions with their underground floors of private cinemas and swimming pools is now approaching the grotesque. A class of workers with neither employment rights nor any means to ensure that their skills are not abused by cheap, untrained imitators has become the fastest-growing element in the labour market. In London their employers need them, at least offering some countervailing negotiating power to what would otherwise be a helpless economic position: in the rest of the country they are at the economic margins.

The economic and social consequences of these failings were masked in the twenty years before the financial crisis in 2008 by borrowing and debt, not so much by the state but by companies and households. Households in particular borrowed to sustain their living standards (in part because of the squeeze on real wages caused by the collapse of trade unions, as I analyse in more detail in Chapter 5) and to share in the apparent never-ending rise in property values, and so simultaneously supported what would otherwise have been a very weak economy. But that safety valve is closing. The stock of debt, tribute to decades of excessive lending, has grown to hitherto unthinkable levels. Household debt was a tiny 15 per cent of national output in 1964: today that has increased nearly nine times to stand at 140 per cent of GDP, a third higher than the range in the Eurozone, the US and Japan. Ominously, two-thirds of British household debt is at variable interest rates, portending enormous financial difficulty when interest rates rise.⁸ In the US it is widely

observed that middle America, whose real wages have scarcely risen for a generation, has sustained its living standards by borrowing;⁹ a similar phenomenon has been at work in Britain.

On top there is now the international struggle to recover from the financial crisis, which in Britain, with the near-collapse of the entire banking system, was especially serious. Worse, the extreme sluggishness of the economic recovery, not just in Britain but in the US, the EU and Japan, suggests that something still more serious is afoot than the aftermath of stricken banks and the overhang of excessive private debt. Professor Larry Summers, former US Treasury Secretary, has recently revived the concept of 'secular stagnation' first coined in 1938 by Professor Alvin Hansen to describe the disappointing US economic performance of the late 1930s, after the initial recovery from the Great Depression.¹⁰ Secular stagnation is much more than just slow growth. It means that firms are insufficiently confident and consumers too cautious to create the investment and demand necessary to generate full employment unless interest rates fall below zero. In other words, unless firms are essentially paid to borrow money to invest, there will be such a shortfall of investment spending that both the potential of the economy to grow, and its actual growth, fall away. The cumulative loss of output of the recession stays lost and the economy gets trapped on a lower growth trajectory.¹¹

It was apparent that all was not well even before the financial crisis hit. Rather like a junkie needing ever larger doses of drugs to get high, the western economic system needed ever more credit and rising asset prices to keep demand going – but those very things created the bubble that led to the crash, Now the huge overhang of private debt, in particular between banks as much as between them and the ultimate borrowers, means that the same get-out cannot be used a second time. Meanwhile governments are convinced they should be

wedded to austerity; and firms continue to hoard cash. The US recovery has been much less vigorous than previous recoveries, creating fewer jobs than any since the war.

There are multiple explanations for what is happening.¹² Some stress that ageing societies need more saving, and this trend has coincided with a uniquely uncertain moment for firms as the digital revolution transforms business models. It is not obvious in what technology or for what market demand firms should be investing. Some argue that the impact of the excess of private debt is too easily underestimated: the scale of the debt has distorted company and household balance sheets, which both parties are seeking to restore to normality – thus constraining their spending. After all, Japan has suffered such a ‘balance sheet recession’ for twenty years. Others point the finger at austerity policies which assume an economic resilience that is plainly absent. Still others argue that the technologies of today are cheaper, need less costly investment and in any case generate less employment than in the past. Investment is no longer the economic motor it once was. Adair Turner, former chair of the Financial Services Authority, for example, remarks:

When General Motors was at its peak, it employed over 800,000 people. Microsoft employs only 100,000, Apple 80,000, and Google 50,000. Facebook has an equity value of \$170 billion but employs only 5000 people: and it has recently acquired Whatsapp for \$19 billion, a company that employs just 55 people. Information and communication technology is not pure magic, but in its economic effects it is far closer to it than were the technologies of the electro-mechanical age.¹³

What unites the above diagnoses is the role of uncertainty, the growing sense of risk and of the frailties of the post-crash

financial system – trends discernible not just in Britain but across the industrialised West. The reasons for secular stagnation are not hard to figure out. The financial crisis was ubiquitous. All companies are under more financial pressure from more disengaged owners. All countries have seen a growth in marginalised workers. Inequality of income and wealth is rising everywhere. All countries have seen an increase in the stock of debt and leverage. All countries are concerned to shrink the size of their public sectors, fashionably resorting to privatisation and contracting out employment. Societies are ageing and saving more. In an era of dramatic technological change, firms cannot be certain what the best technological bet will be. But the adverse consequences of these trends have gone further and deeper in Britain than elsewhere. This is why the country has endured the most protracted period of depressed output since the nineteenth century. The recovery of 2013–15 is more of a short-lived snapback to former levels of output, helped along by an artificial housing boom, than the portent of a sustained growth in output and productivity. On too many key economic and social variables, as I detail in the pages ahead, Britain is the worst in class, the principal exhibit for the prosecution. Partly because of our economic structures and culture, and partly as a matter of choice, these phenomena with few exceptions are more deep-rooted in Britain than elsewhere.

Above all it is a crisis of ideas. After the failure of twentieth-century socialism it is not possible to argue that the correct response to the failings of contemporary capitalism is to introduce a form of collectivism. But equally, after the financial crisis, to argue blindly for more markets, privatisation, flexibility, weakening of the social contract and roll-back of the state is no less implausible. Economists may place different emphasis on what lies behind today's secular stagnation, but all agree

that economic policies, priorities and indeed institutions need to be rethought. The truth is that it was the growing dysfunctionality of contemporary capitalism, a process most advanced in Britain, that in the run-up to the crisis was already weakening the propensity to invest and innovate – a fact that is now obvious to all.

Twenty years ago, in *The State We're In*, I set out a prospectus for the reform of British capitalism. It should become stakeholder capitalism – embedding committed ownership, the employee's voice, institutions to support innovation and investment, a recast social contract and the creation of a more deliberative, responsive democracy. All were interlinked. If the case was strong then, it is stronger now. What is locking our economy below its potential is that its fundamental structures force companies and individuals alike to manage risk by themselves – not to share it. If we want to benefit from the opportunities before us, we need a better-designed capitalism that takes fairness and justice as seriously as it does incentives and efficiency. Innovation and a spirit of risk-taking need to imbue our entire society; this is a goal we hold in common and perform in common, and it needs to be supported in common.

Secular stagnation, in short, is what happens to dysfunctional capitalism. It is neither transformative technological complexity nor growing longevity nor more saving that are at the root of our problems: indeed, framed correctly, all are rich with possibilities for offering us better, richer lives and increased well-being. At any stage since the Enlightenment two hundred and fifty years ago launched the modern era and its explosion of wealth and growth it has been possible to be pessimistic as old forms give way to new. Would jobs as, say, ostlers or sail-makers be replaced, asked anxious contemporaries, as the car and steam ship superseded horses and sailing

ships? Of course they were. The lesson of history is unambiguous. The capacity of women and men to use science and technology to master nature for human betterment is the driver of wealth and productivity. Human wants and ingenuity are infinite. Moreover the process is only in its beginnings and will only gain momentum over the years to come: scientists proclaim how little rather than how much they know. There are multiple transformations ahead, which will generate growth, investment, employment and opportunity. But it is those economies and societies with the best-designed institutions and most appropriate values that will fare best. The task in Britain is to recognise this truth – and reform our capitalism from top to toe so it becomes the servant of a better society rather than its master. To understand the opportunity better, I next want to examine General Purpose Technologies and their transformative economic and social role.

What really drives growth and well-being

General purpose technologies (GPTs) are the generic technologies that change the world. Digitisation – the capacity to turn disparate dimensions of reality into digits, and for computers to make instant sense of them – is set to become the defining general purpose technology of all time, trumping even the transformative impact of steam and electricity. It will create almost boundless possibilities and opportunities to reshape and improve our economy and society. There are accompanying new dangers about the amount of information that public and private organisations will potentially have about individual citizens and indeed each other – this is also a world of hacking, endangered privacy and vulnerable security. But that should not disguise the larger truth of the march into reality of what

used to be confined to the pages of science fiction – and nor will those risks stand in its way. With the right framework, policies, values and institutions Britain could become through such technologies a vastly richer, more enfranchised and fun place to live and work. The challenge is to shape this future rather than be shaped by it.

Innovation theorists have defined a GPT as a single generic technology that is developed through continuous improvement but which comes to have multiple and wide usage with many spillover effects.¹⁴ GPTs up until now have been largely confined to four areas – transport, power, communication and agriculture – but have had enormous ramifications beyond their particular provenance. So, for example, the first great GPTs – the domestication and cross-breeding of animals along with the cross-fertilisation and husbanding of plants, so vastly increasing their yields – may have been confined to agriculture, but by offering secure and plentiful supplies of food they allowed human beings to break away from being hunter-gatherers and settle in cities and towns. The creation of the three-masted sailing ship in the fifteenth century and the railway in the nineteenth not only revolutionised transport, but in so doing opened up continents, transformed trade, created maritime Europe and later invented the metropolis and suburbs. Latin American gold, shipped across the Atlantic in three-masted galleons, caused the great European inflation that was one of the causes of the Protestant Reformation.

Steam and electricity were forms of energy that would transform the economic base, creating first the factory and later universal cheap lighting and dense concentrations of industrial power. The printing press and the computer transformed the ability to communicate; the printing of books allowed information to be disseminated to millions quickly and authoritatively – it was printed books that spread the exciting news of untold

Latin American silver and gold to hundreds of thousands of Spaniards who became colonists, and printed bibles that spread the challenge of Protestantism – and the computer is of course the indispensable technology of our own times. In all these cases the GPT arose in one particular domain, but its applicability and many usages spilled over to others. It is not hyperbole to argue that it is GPTs, rather than the dynastic ambitions of monarchs, emperors and dictators, great wars or even the clashes of ideology and religion, that have driven the world forward.

What is becoming ever more apparent is that digitisation and explosive computing power affect not just a few areas of society from which their impact will radiate, but all of them simultaneously. We are living through an economic inflexion point like no other. What lies ahead will be more transformative than anything humanity has lived through so far because digitisation impacts on all human desires, needs and appetites; it encompasses communication, agriculture, industry, energy, education, health and transport. It is only possible, for example, to create the driverless car, train or plane – and to re-imagine transport completely – because of our new capacity to turn widely disparate dimensions of reality into digits. A driverless car works because images can be turned into digital representations which are then recognised and interpreted by computerised sensors; the car's location on the road, the varying obstacles in its vicinity and the actions of other cars are all understood by the vehicle as a thinking, sensing, interacting robot on wheels.

Equally words, numbers, images, sounds can be digitalised and then sent through fibre-optic cables and the air as wireless signals for our mobile phones, tablets and personal computers to process. Monumental amounts of data are held in digital clouds that can be networked simultaneously on a previously

unimaginable scale. Our smart mobile phones have become indispensable instruments of communication; on top of texting, emailing and old-fashioned phone conversations, they allow us without any fixed connection to be proactive members of myriad networks, paying our bills with them, watching TV and radio on them, using them to control the sensors in our houses and cars from afar.

Digitisation remakes the compass of our understanding and invents new frontiers of possibility, and in so doing promises to refashion the economics of almost everything. The understanding of our bodies and the varying molecules that constitute matter, whether human, animal, mineral or plant genetic structures, are being transformed by digitisation and computers. The potential to improve yields from plants, the efficacy of drugs and the capacity to release power are as transformative as any of the earlier GPTs. What is new is that these advances are not just happening in one domain but across all domains, with jumps in one area feeding back into others. Computers are now so powerful that vast arrays of data from myriads of sources (big data) can be combined and recombined through so-called machine learning to make new connections, new insights and new understanding.

Nor is this where the progressive scientific dynamic stops. Science marches on exponentially; we are forever – to adapt Isaac Newton’s famous formulation – standing on the shoulders of what others have achieved in order to see further. We may think we know a lot about nature and the physical world, our bodies and the universe beyond; scientists will acknowledge they are only scratching the surface. In every discipline knowledge is growing exponentially and each discipline is interacting with others; medicine, biochemistry, chemistry, engineering, physics, robotics, photonics, mathematics and computer science are all cross-fertilising, combining and recombining their

insights and advances. There will be new materials to build the artefacts around us; new ways of creating energy; the customisation of medicine to individual needs – and so it goes on, with digitisation allowing advance to accelerate.

If there were nine GPTs in the twentieth century, expect the number to double in the century ahead. It is a dramatic moment in world history. Nothing will be left untouched. We will live in smart cities, achieve mobility in smart transport, be powered by smart energy, communicate with smart phones, organise our financial affairs with smart banks and socialise in ever smarter networks. It is powering a new industrial revolution of localised micro-production – the new ‘makers’.¹⁵ Twenty-first-century life will be like none ever lived before.

Think through the implications of just one corner of the emerging future – the driverless car. One of the reasons Google is investing so much in developing driverless cars is that whoever owns the communications system that controls them will own the twenty-first century's equivalent of the telephone network or money clearing system: this will be a licence to print money. The benefits are endless. Roads will be able to carry more traffic while at the same time being safer. Personalised door-to-door transport will become hugely pleasurable: your car will deliver you to your home or place of work and then park itself without you. Road accidents will plummet. Energy efficiency will be transformed. Insurance rates will fall, even the need for insurance will decrease. Personalised transport, ordered by your mobile phone, will gradually replace mass transport networks.

Of course this future can only be disruptive – and with disruption comes not only opportunity and the new but dislocation and loss. One futurologist has suggested that taxi, bus and truck driving will become extinct occupations, casualties of driverless vehicles – along with traffic police, all forms of

home delivery and waste disposal, jobs at petrol stations, car washes and parking lots.¹⁶ The cars themselves will be made by robots in automated car factories. The only new jobs will be in design and marketing, and in writing the computer software that will allow the cars to navigate their journeys, along with the apps that will enable our mobile phones to use them better.

That is just one sector. The advent of thinking machines threatens routine work across the board. The automated check-out at supermarkets is becoming as familiar as the bank ATM. From staff-free ticket offices to students who can learn online without going to college, it seems there is no corner of economic life where people are not being replaced by machines – a trend that will accelerate. For example one important study, evaluating the impact of computers and robots on 702 American occupations, suggests that over the ‘next decade or two’ as much as 47 per cent of all US employment could be at risk of being automated and performed by machines; not only in transport and logistics but across a wide range of service sectors.¹⁷

But this is nothing new; the defining feature of modernity is that new industries and jobs replace outmoded ones. The question is whether modernity is now taking a darker turn. It is not just that Apple, Facebook, Amazon and Google are not mass employers as Tesco, Ford or General Motors once were. They represent a new world in which technology could remove the mass of people from worthwhile economic activity; good jobs and full-time employment could become the preserve of an educated, computer science literate elite. It is millions of low-skill, routinisable ‘lousy’ jobs that are under threat – the common expectation of those predicting that within thirty years robots and machines will replace half the American, and by inference other industrialised countries’, workforces.¹⁸ Such predictions about the growing importance of machines are

broadly right. The debate is whether the conclusion is optimistic or pessimistic: does the new technology, optimistically, create new vistas and new jobs or does it, pessimistically, presage a dystopian future of 'lovely' highly skilled jobs for the few and joyless unemployment and underemployment for the many?

The future is bright – if we can seize it

Techno-pessimism comes if one shares the view of those who believe that while automation and robotisation are certainly coming, there are no new worthwhile transformational technologies to be automated. All the obvious human needs – to move, to have power, to communicate – have been solved through cars, planes, mobile phones and computers. These were the 'low-hanging fruit', and they have been plucked. We have come to the end of the great GPTs that changed the world: there are none to carry us forward even while the old activities are being robotised and automated.¹⁹

It is a view argued with some sophistication by Professor Robert Gordon. For him the most important event in the history of the world was the invention of steam power, followed by that of the internal combustion engine. But by 1970 the 'rainbow benefits' of the great inventions and their spin-offs of the second industrial revolution – steel, oil, petrochemicals and electricity – had occurred and could not happen again. As he writes, 'the spread of air conditioning, commercial air travel, and the interstate highway system represented the final implementation of technologies invented in the 1870s'. There was a surge of productivity growth in the middle fifty years of the twentieth century, he argues, as the great technologies were implemented, but productivity growth in the US has regressed

today to where it was in the early decades of the last century. He is not predicting a further slowdown, but rather sees the current low levels as the norm and the productivity surge of middle of the last century as an aberration. Add four great headwinds – inequality, an ageing population, the increasing ineffectiveness of education in delivering productivity and unmanageable public debt – and his case is complete.²⁰ This is why productivity has slowed down and will continue to stay low. American venture capitalist Peter Thiel is even more downbeat: ‘We were promised flying cars – we got 140 characters.’²¹

This techno-pessimism is an important dimension of the secular stagnation thesis – but the stagnationists and pessimists are wrong. Peter Thiel is already confounded. In the spring of 2014 there were the first prototypes of flying cars whose arrival he doubted. True, they are as clumsy as the prototypes of driverless cars assembled in March 2004 to show off their paces in the Mojave Desert in response to the first of the US Defense Advanced Research Project Agency (DARPA)’s grand technological challenges to American society – but today nobody would write off the notion of driverless cars. It will be the same story with flying cars.

The techno-pessimists are far too quick to set boundaries to human wants and imagination, too narrow in their understanding of what drives innovation and too crabbed in their view of human ingenuity and our desire to live better. As has been argued by others, the ‘innovation-as-fruit’ theory – that technology essentially presents itself as a harvest of intellectual fruit to be picked – does not capture what innovation has always been about. Innovators throughout history have ceaselessly rearranged and recombined what was currently known to throw up new insights, processes and capabilities: James Watt was a recombiner, creating a much more efficient steam engine, as was Steve Jobs with his brilliant recombining of the varying

pre-existent technologies to create the iPhone: 'Digital innovation is recombinant innovation in its purest form. Each development becomes a building block for future innovations. Progress doesn't run out: it accumulates.'²²

Precisely. The authors of *The Second Machine Age* (Eric Brynjolfsson and Andrew McAfee), from which that quote is taken, are right. Progress accumulates not only because of the recombinant nature of innovation – but because of the hunger of the scientist and theorist to quest for the new. The prominent economic historian Professor Joel Mokyr argues just this:

as science moves into new areas and solves issues that were not even imagined to be solvable, there are inventors, engineers, and entrepreneurs waiting in the wings to use the new knowledge and design new gizmos and processes based on it that mostly will continue to improve our lives. The interplay between science and technology creates a self-reinforcing or 'auto-catalytic' process that seems unbounded.

He singles out materials as just one area where there are giant jumps ahead:

what is happening to materials now is nothing short of a sea change, with new resins, ceramics, and entirely new solids designed *in silico*, being developed at the nano-technological level. These promise the development of materials nature never dreamed of and that deliver custom-ordered properties in terms of hardness, resilience, elasticity, and so on.²³

Just so. As I argued earlier, science is both developing explosively and jumping across old disciplinary boundaries to create new from the new – a process better enabled by digitisation.

Nor is this a recent development. Exploring the patent record of US companies in the nineteenth century, it is obvious that firms exploited a knowledge base far removed from their own fields of technological expertise to create new patents and thus new goods and services.²⁴ Innovation is socially created and grows exponentially.

It may take time for digitisation to work its magic; after all it was a full sixty years before the transformative impact of steam began to be widely felt. But the wave of transformation brought about by petrochemicals and electronics took only forty years. All the signs are that digitisation will work through the system even faster – within thirty years.²⁵ It is much more likely that what we are currently experiencing is a hiatus while the whole system adjusts both to the speed and possibilities of the disruptive change. It has been argued that one cause of the uncertainty besetting business is that at the moment the transformative possibilities are almost too wide-ranging. When disruptive change crosses company boundaries and there is so much uncertainty, there has to be an accompanying transformation in the way companies develop strategy and take decisions. There has to be more openness, more exchange, more iterative reciprocation if only to avoid costly mistakes. No single organisation can hope to get more than half the bets right consistently: the way to improve is to pool knowledge collaboratively with others in open exchange. This is ‘open innovation’.

Yet the current institutional structure is rooted in a predictable, less volatile universe that is more closed. What is required is a sharing revolution to drive forward the processes of open innovation – a reappraisal, as I shall argue in Chapter 5, of everything from the law relating to intellectual property rights to the exchange of data.²⁶ But learning how to do this will take time, even as the twenty-first century witnesses more

technological and scientific advance than in the last five hundred years.

This should not shake the view that digitisation is the most general purpose of all technologies. Moreover, human beings have an infinite capacity to create new wants to use the advances. In this respect I am as unashamedly optimistic today as Keynes was in 1930 when he wrote the 'Economic Possibilities for our Grandchildren', wildly predicting, as it seemed to contemporaries, that in a hundred years living standards would be four to eight times higher than they were at the time. He has been triumphantly vindicated.²⁷

If anything the disruptive drive is accelerating. The stock of intangible assets that in one way or another embody knowledge – from computer programs to intellectual property rights, training programmes to the value of brands – surpassed the stock of tangible assets (bricks, mortar and machines) some fifteen years ago, around the turn of the century. In 2011 (the latest year for which figures are available) the UK market sector invested £126.8 billion in intangible assets, 44 per cent more than the £88 billion invested in tangible assets.²⁸ The fastest-selling luxury car in the US, for example, is now the battery-powered, tablet-operated Tesla that is transforming consumers' notions of what a car should be. Yes, it is a recombination of existing ideas to produce an innovative first. But it is also even more of a knowledge good than the cars it is replacing: it is more 'intangible' than 'tangible'.

Nor is that where the transformation stops. The Tesla is creating new opportunities for the makers of batteries, new battery power stations, in fact the entire infrastructure needed to support electrical cars. What is happening is creative destruction: the elimination of the old and the creation of the new – and with it there will be many job opportunities. The Tesla story will be reproduced many times over. Jeremiah predictions of joblessness

overdo the losses and underestimate the possibilities. Growth and jobs will emerge unexpectedly and unpredictably, as they always have. Here is my own stab at identifying four broad areas of the economy where rapid change is taking place and large numbers of jobs are likely to be generated.

The first is the growth of micro-production, the death of scale and the personalisation of provision. There is going to be a huge growth in micro-producers – micro-brewers, micro-bakers, micro-film makers, micro-energy producers, micro-tailors, micro-software houses and micro-providers generally – who will deploy the internet of things (building artefacts – things – with micro-printers receiving digital information over the internet) and micro-production techniques to produce goods at prices as if they were mass-produced, but customised for individual tastes.

The second is in human well-being. There will be a boom in advising, coaching, caring, mentoring, doctoring, nursing, teaching, and general enhancement of human beings' capabilities. Medical provision will broach new boundaries, as replacement organs, skin and limbs open up new specialisms and industries. Taste, sight and hearing will be vastly enhanced. Deafness and blindness will be conquered. We will live longer, with old age advisers offering advice on how to live well in one's hundreds and memory enhancers alleviating memory loss. Mental well-being will become another growth industry. Geneticists will open up a 'live-well' economy. Instantaneous language translation will break down language barriers.

The third is in addressing the globe's 'wicked issues'. There will be new forms of nutrition and carbon-efficient energy, along with ways of using water more economically, to meet the demands of a world population of nine billion in 2050. Space exploration will become crucial to find new minerals and energy sources. New forms of mining will allow exploration of the earth's crust. The oceans will be farmed and seabeds mined.

And fourth, digital and big data management will foster whole new industries – personalised journalism, social media, cyber-security, information selection, software, computer science and the removal of digital clutter.

Doubtless futurologists will come up with different sectors, jobs and potential technologies: everyone is making what can only be informed guesses. What we do know is that two-thirds of what we consume today was not invented twenty-five years ago. The pace of change, obsolescence and renewal is accelerating, so in the years ahead even that benchmark will be surpassed. Firms and individuals will be on their mettle to open up, innovate and constantly reinvent themselves. The downside is that, unless we develop countervailing forces, there will be more inequality in incomes, life chances and opportunity as the gap opens up between routine and skilled work. There is also an ominous tendency in an information economy for the first movers if they achieve scale to grow to a position of monopoly; competition policy has to be faster, aggressive and more intelligent. Digitisation opens up extraordinary vulnerability over personal privacy, as exposed by whistleblower Edward Snowden's revelations about the scale of surveillance by the US National Security Agency; again this requires a new vigilance and entrenchment of citizens' rights. But the larger message remains. The economy is set to reinvent itself. The future does not need to be dystopian. There will be much work and many jobs to do.

Seizing the moment

The question is how to organise ourselves best to benefit. Traditional classical economics is not much of a guide. Centred on the conception that markets necessarily and always create

points of equilibrium, this brand of free market economics has neglected the restless, ceaseless, disruptive nature of innovation and the uncertainty and dislocation it inevitably generates. This has disabled understanding of the innovation process; for example, the impact of general purpose technologies on economic life has been abstracted away, as has the role of the state in ambitiously driving them forward, directly and indirectly.

It may be true, for example, that the empirical evidence is that the public sector has played a key role in every GPT in the twentieth century in which the US is globally competitive, but economics ignores it.²⁹ One famous example is the technologies, ranging from micro-processors to liquid-crystal displays, from lithium-based batteries to the internet itself, that were incorporated into Apple's iPod, iPhone and iPad, as detailed by Professor Mariana Mazzucato. All were seeded by public sector research spending, not only in the US. The genius of Steve Jobs and his co-founder Steve Wozniak was to see how the results – of DARPA's and NASA's sponsorship of ever smaller silicon-based microchips, of Europe's state-backed CERN programme and federal-backed university research into emerging touch-screen capacities, of the Department of Energy's sponsoring of lithium-ion batteries, and, of course, of the internet itself, the DARPA-initiated decentralised control network that would allow the US air forces communication systems to survive nuclear attack – could be integrated into Apple's handsome, well-designed devices.³⁰ But the state in economics is portrayed as a problem, getting in the way of the market. The idea that the state might be an essential part of the innovation process, designing institutions, sharing risk and frequently spearheading risk-taking itself by spending money and commissioning new ideas has been foreign to the economic canon. Trying to promote the market as the solution to lifting research and development neglects the reality that the rate of return to society from R&D

is up to twice as high as private returns from research: more reliance on private research in free markets in reality means less frontier innovation than society needs.³¹ Necessarily the state has been involved, in one way or another, in all the great GPTs over the centuries – whether it was the Pentagon initiating the internet or Protestant princes in Germany placing large orders for the bible to fund the new printing presses.

Breaking out of the risk of secular stagnation and taking advantage of the opportunities offered by new technology thus demands a wholesale rethink about how capitalism is structured, how it relates to society and state and how all three can be reinvigorated. This is what this book will attempt in the chapters ahead. As matters stand Britain is incapacitated. The country is 159th out of 174 countries in the international league table for investment; business investment has been on a downward trend for the last fifteen years.³² Germany, Japan, France and the US all outspend Britain on research and development (R&D).³³ Exports languish far below what we need them to be – standing at half the £1 trillion target for 2020 – while the trade deficit, at 4.5 per cent of GDP in 2013, was the highest for twenty-five years.

Britain does not have the structures to support innovative risk-taking on the scale that is needed to provide a vibrant economy for all. The necessary interdependencies between public and private to change the calculus of risk and reward that would unleash more investment and innovation are simply not understood in the national conversation. The call for 'open innovation' induces bewilderment. In any case, even if the wider systems were more supportive, there is such a shortage of trust and integrity that it is hard to build the relationships between firms, and between firms and government, that might allow us to figure out what to do, how to react and in what to invest. Government is portrayed as intrusive, a burden, a

source of mistakes and a crowder-out of private initiative. It is true that government makes mistakes, but its mistakes do not trump the need for it to shape and design markets to stimulate more innovation and to ensure that the gains from the new are shared round equitably. Such propositions remain a source of controversy rather than being understood as a necessity. Rather than no government we need smart, agile government.

But there will be no change until our business, financial, official and political elite start to recognise these shortcomings and take the lead in demanding smart collaboration between public and private – along with some sacrifice of their own interests and wealth – to recast corporate and financial relationships to deliver a high-growth, high-innovation, high-wage Britain. To do that demands a sense of a shared destiny and a shared belief in what Britain can become, underpinned, as I will argue next, by a shared belief in justice, in openness, and that the objective must be to create a society in which everyone has the opportunity to secure their well-being.

This would entail a recovery of the open Enlightenment values and spirit that so animated the first Industrial Revolution – a belief in the future, underpinned by reason, that is collectively shared and expressed, a sense of fairness and open access to all. Thus could Britain attain the audacious goals around which the nation can rally. Britain should aim to be, say, Europe's innovation leader so that, in every field from smart cities to smart health, we are the number one. We should be a beacon for how to live well. At present our aim seems little more than to reduce public debt, submit to whatever the financial markets wish and keep out as many foreigners as possible – unless they want to buy our homes or our companies. It is a dispiriting, shrunken and defeatist view of what being British can and should be.

In the absence of inspiring goals, we have what we have: a

first-order banking crisis, whose legacy will extend for years; widespread, sullen disaffection represented by influential political movements in England and Scotland – UKIP and the Scottish National Party (SNP) – that want fundamentally to recast the basic political settlement that shapes our lives. It may be that the Scots voted to retain the union with the rest of the UK, but 45 per cent of the electorate voted for secession; equally, any vote to stay inside the EU will be won, if it is won at all, by a small margin. Economy and society are not working, and the answer – wrong in both Scotland and the rest of the UK – for too many citizens is Scottish independence and leaving the EU. The right answer is much more uncomfortable and harder to accept: it is that by allowing our dysfunctional capitalism to develop as it has, there are too few checks, balances and outright obstacles to a significant part of our business and financial elite choosing to plunder our companies and our country rather than invest in it – and too feeble an attempt to allow the mass of our people to flourish.

The themes of *The State We're In* are no longer the musings of an interested if maverick outsider. If they are not addressed, in twenty years' time I will be writing an even more mournful tract – a requiem to a once great country that refused to confront the truths about itself, allowed its elites to continue with their wanton progress, shrivelled the imagination and aspirations of its citizens and, surrendering to right-wing populism, disintegrated as a coherent economic, social and political whole.