

# Imagination unleashed

## Democratising the knowledge economy

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## Democratising the knowledge economy

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# Executive summary

**If economic eras are defined by their most advanced form of production, then we live in a knowledge economy – one where knowledge, embedded in people and things, digital infrastructures, networks, products, and intangible assets, plays a decisive role in the organisation of production, distribution and consumption.**

By many measures, the knowledge economy is booming. Where there is growth, much of it is coming from this economy. Its dominant firms are now the highest valued in the world. At its frontiers – on artificial intelligence, biotechnology – there is a feverish race to create new firms, and advance research.

But participation in this emerging economy is confined to particular firms, places and people. It appears universal but is not. This confinement helps explain some of the most visible pathologies of our era:

- **Stagnant productivity** – because although the knowledge economy is booming on the frontiers, the benefits of new methods are not spreading to smaller firms, and the gap between the leading edge and the average is widening.
- **Inequality** – as the gap between booming metropolises and the rest widens, alongside gaps in pay and opportunity.
- **Political disenchantment** – as voting patterns increasingly reflect how much people participate in the knowledge economy, with societies split between the fast and the stuck, the connected and the isolated.

The confinement of the knowledge economy also leads to the confinement of human potential. At its best, the knowledge economy gives expression to our distinctive human ability to reimagine the world around us. A knowledge economy in which many can take part holds the promise of advancing human freedom and realisation. But so long as the vast majority of people, even in the richest countries, are excluded from forms of economic activity which give adequate expression to their imaginative powers and humanity, their potential is denied.

In the face of these challenges, many governments and political parties are tempted to stick with familiar responses. One such response promises an ultimate trickle down from the frontier firms and places to the rest, despite evidence that this does not automatically happen – a triumph of hope over experience. Another promises a return to an earlier stage of economic life, with a revival of mass manufacturing jobs in largely closed economies. Yet another looks to new technology to advance productivity while using new forms of welfare to redistribute the proceeds. This is the strategy of extreme distributionism: that we should accept the possibility of mass job destruction, but reward the rest of the population with benefits such as a Universal Basic Income (UBI) as compensatory distribution. This position has been supported by some groups in Silicon Valley, on the libertarian right and the egalitarian left across Europe, and UBI is being piloted in various countries.

What's the alternative? Over the last year, Nesta has been working with Roberto Mangabeira Unger to convene discussions with politicians, researchers, and activists from OECD countries to explore the implications of his ideas for an inclusive knowledge economy. This report presents the results of that collaboration.

Its central argument is that the knowledge economy does not have to be confined and contained; that an alternative approach is in reach which democratises it. This alternative strategy we propose puts as much emphasis on widening participation in the knowledge economy as on advancing the frontiers. Rather than simply compensating the 'losers' of the market economy, it aims to transform its institutions, so that many more people, places and firms can take part in, and shape, the future knowledge economy. We argue that an inclusive knowledge economy requires action to **democratise the economy** – widening access to capital and productive opportunity, transforming models of ownership, addressing new concentrations of power and democratising the direction of innovation; to **establish a social inheritance** by reforming education and social security; and to **create a high-energy democracy**, promoting experimental government, and an independent and empowered civil society.

This is a broad-ranging agenda. In practice, it focuses on:

- **SMEs and their capacity and skills** – here the priority is to greatly accelerate the adoption of new methods and technologies at every level of the economy, including new clean technologies that reduce carbon emissions.
- **Transforming industrial policy to cope with the new concentrations of power** – here the priority is to prevent monopoly and predatory behaviours.
- **Transforming and disaggregating property rights** so that different stakeholders – private or public investors, workers, local governments, and local communities – can make partial claims on the same productive resources.
- **Reforming education to prepare the next generation for the labour market of the future, not the past** – here the priority is to cultivate the mindsets, skills and cultures relevant to future jobs.
- **Reforming social policy to respond to new patterns of work and need** – here the priority is more flexible systems that can cope with rapid change in jobs and skills, with a greater emphasis on reskilling.
- **Reforming government and democracy** to achieve new levels of participation, agility, experimentation and effectiveness.

These interlocking ideas feed each other. How they are to be implemented will vary according to national histories, cultures and institutions. But the broad direction set out is intended to be applicable to countries at different stages of economic development, albeit more challenging in some contexts than others.

Previous industrial revolutions led in time to a radical reshaping of economic, political and educational institutions, often as a response to the very uneven distribution of benefits from the first wave of change. Universal suffrage and universal education, rights at work, competition policies to break up monopolies, and welfare states: all attempted to mitigate the inequities of earlier industrial revolutions. A similar pattern is likely with the revolution we are now witnessing. The challenge for political parties, governments and societies is to shape a constructive and creative response today, or risk being left as bystanders as events take their course.

Moving to a democratised knowledge economy is partly a matter of technical design. But it also involves the stories societies – and politicians – tell. Our story is not simply about economic growth, but about the power and potential of the individual and collective imagination. It is a story of people taking control as makers, not just as consumers. Our contention is that this story will resonate and inspire far more than the alternatives of trickle down or retreat.

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# The character of the knowledge economy

**The economy of the 21st century has many names: knowledge, information, digital, data-driven. It is an economy in which knowledge plays a bigger role as both input and output; and where digital infrastructures, networks and products, and intangible assets play a decisive role in the organisation of production, distribution and consumption. Here we use the term 'knowledge economy' as shorthand.**

This knowledge economy is usually associated with high-technology industry. It is exemplified by dominant firms like Amazon and Alibaba that have transformed the nature of production and distribution using digital technologies. The knowledge economy is not, however, simply a new way of producing and distributing goods and services, with distinctive technological equipment. Instead, it represents a paradigm of production that keeps reinventing itself – one characterised by continuous innovation, not just in products and services, but in tools, procedures, and methods.

The knowledge economy is not intrinsically tied to any particular sectors of the economy, and, in theory, should be open to firms of all sizes and scales. Yet the paradox is that it is both everywhere and confined, universal and exclusive. In section 2, we explore this paradox. This section focuses on setting out some of the defining characteristics of the knowledge economy.

## 1.1 Production and management practices

In the 19th and most of the 20th century, the most advanced form of production was industrial – or 'Fordist' – mass production. This was characterised by the large-scale production of standardised goods and services, using rigid machines and processes, based on semi-skilled labour and highly specialised and hierarchical work relations.

But from the middle of the 20th century, a new set of advanced production practices emerged. In contrast with the era that preceded it, the knowledge economy combines large-scale production with decentralised initiative. Additive manufacturing (3D printing), robotics, and more generally flexible, digital machine tools make 'mass customisation' possible – products and services that are tailored to different consumers' needs but still produced at large scale. These technologies also shorten the distance between productive activity and experimental science. A 3D printer, for example, allows its user to move rapidly from conceiving a product to making it. Then, as the process of making the product brings new discoveries to light, he or she can quickly revise and refine it. Artificial intelligence goes further, enabling machines to do everything that we have already learned how to repeat – so that we can push ahead into the zone of the not-yet-repeatable.

Compared with the era of mass production, the knowledge economy also changes the way people work together. Firms in the knowledge economy have to maintain coherence and momentum, even as initiative is decentralised. But this cannot be achieved through a command-and-control approach. It requires a change in the way in which participants in the production process cooperate. Since there is less of a distinction between conceiving and making, fluidly organised teams replace individual specialists. And since production plans must be continuously revised as they are implemented, there cannot be a stark contrast between supervisory and implementing roles; instead, teams need latitude to organise their work.

## 1.2 Relaxing the constraint of diminishing returns

A deeper characteristic of the knowledge economy is the promise of relaxing – or even reversing – the constraint of diminishing marginal returns.

Diminishing marginal returns of production used to be an economic law – a fact of economic life. Over time, increasing the inputs to a production process – whether these are physical, financial, or made up of skills and activities – has less and less effect on increasing the outputs. Only a rise in productivity, generated by technological or organisational innovations, can temporarily overcome the force of diminishing marginal returns.

Yet the knowledge economy offers the possibility for increasing rather than diminishing marginal returns. This helps to explain why we are seeing monopoly and oligopoly emerge on a larger scale than ever before. A superficial reason for this is that the marginal cost of reproducing knowledge economy products and services can be close to zero. If reproduction involves simply extending access to an existing platform, there may be no reason for returns to diminish: no additional call on human labour, no extra physical device to manufacture. Network effects further amplify this phenomenon.

A deeper reason is the nature of knowledge and intellectual innovation. The more one knows and discovers, the easier it is to make the next discovery. If the process of production can be organised on a model of scientific inquiry and experimentalism, innovation can stop being episodic and become permanent. Continuous innovation undermines the basis for the constraint of diminishing marginal returns.<sup>1</sup>

## 1.3 The role of imagination

Another 'deep' characteristic of the knowledge economy is the way it changes the relationship between people and machines. Machines can already be much better at some tasks than human workers could ever be. But people have something that no machine can have: the power to imagine.

The knowledge economy signals a world in which workers and machines diverge, even as machines start doing more of what we used to do. In the age of industrial mass production, workers were in some ways the 'alter egos' of the machines they operated – complementing the formulaic activities that the machines carried out, with different, but also formulaic, tasks.

In contrast, the knowledge economy depends on the ability of people to be unlike machines. Rather than formulaic thinking, it demands foresight, vision and the ability to imagine what is not already there. In the knowledge economy, the growth of knowledge becomes the centrepiece of economic activity. New products or assets and new ways of making them are simply the materialisation – in goods and services – of our conjectures and experiments.



## 1.4 The importance of trust

The knowledge economy is also distinctive in the way it heightens the level of trust and discretion required in productive activity. Higher levels of trust enhance our ability and likelihood to cooperate and allow us to manage the conflicts between cooperation and innovation.

Mechanised manufacturing and industrial mass production, like the types of market order within which they flourished, demanded only a modicum of trust. The social theorists of the late 19th and early 20th centuries (such as Max Weber and Georg Simmel) had emphasised the moral presuppositions of the 'capitalist' economies of their day. Central to these was the need to overcome the sharp contrast, typical of earlier forms of social and economic life, between high trust shared by people tied together by blood and culture and the distrust shown to outsiders. They saw that the market economy required strangers to cooperate; strangers, therefore, needed to trust each other, but only to a low level.

Meanwhile, some participants in mass production had significant levels of discretion: those who, as the representatives of capital, oversaw production processes. But individual workers or teams had little autonomy, limiting the need to trust wage labourers or to rely on trust among workers.

Knowledge-intensive production thrives on continuous rather than merely episodic innovation: the constant introduction of new products and services we associate with firms like Samsung and Apple, Amazon and Tencent. It is characterised by cooperative competition. Because of this, it depends on higher levels of trust, within and between firms, as well as among other stakeholders, including government and consumers. Experiments and testbeds, for example, work best where there are strong relationships of trust between firms, government and the community. Good examples include Finland's circular economy projects and Innovation Norway's testbeds for autonomous shipping. By contrast, the recent problems of autonomous road vehicle experiments in Tempe, Arizona, where a pedestrian was killed by a self-driving Uber car, show how the absence of trust, and structures that engage the community, make creative experiments much harder and ensure that recrimination and resort to law are first rather than last steps.

2

# The confinement of the knowledge economy and its implications

The knowledge economy appears to be everywhere. Many of us use its products daily; worldwide, smart devices outnumber people by around three to one.<sup>2</sup> But the central fact of this advanced mode of production is that it is confined and contained, to particular firms, places and groups. Even though the boundary separating the knowledge economy from the rest of the production system remains porous, the gap between the frontier firms and the average has widened, as has the gap between the frontier places and the average.

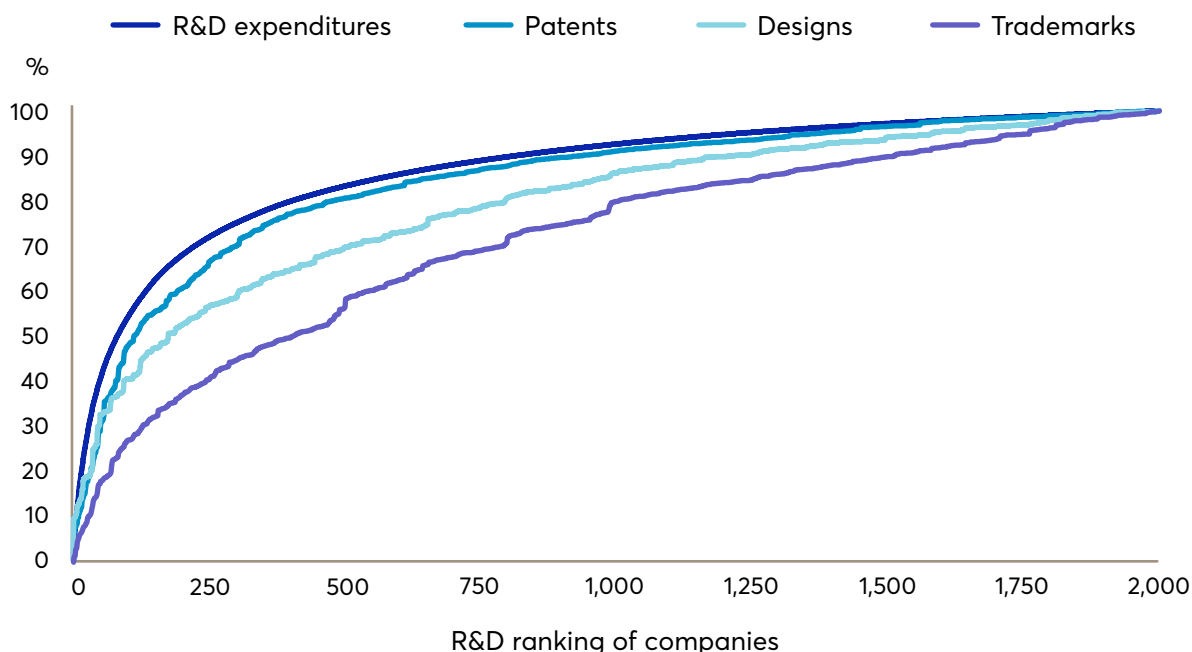
## 2.1 The dynamics of confinement

Mechanised manufacturing and industrial mass production rapidly influenced the transformation of every part of the economy, with the notable exception of traditional small business, which was inhibited by its limited scale from assimilating the scale-dependent technologies and procedures of mass production.

The same is not true of the knowledge economy. Even though its ability to produce goods and services at almost any scale could in theory open it to businesses of any size, in any sector or location, its confinement has stubbornly persisted.

It is easy to miss this fundamental fact because of the ubiquity of products and the visibility of the leading firms. Yet a look at indicators of knowledge economy activity demonstrates clearly how this new economy is confined. For example, taking R&D as an (imperfect) proxy for engagement in knowledge economy practices provides an indication of how strongly concentrated they are. An OECD study of the world's 2000 largest corporate investors in R&D found that the top five per cent of these companies accounted for 55 per cent of their total R&D expenditure (Figure 1).<sup>3</sup>

**Figure 1: Cumulative shares of R&D expenditures and the intellectual property bundle within top 2000 R&D companies, 2014**



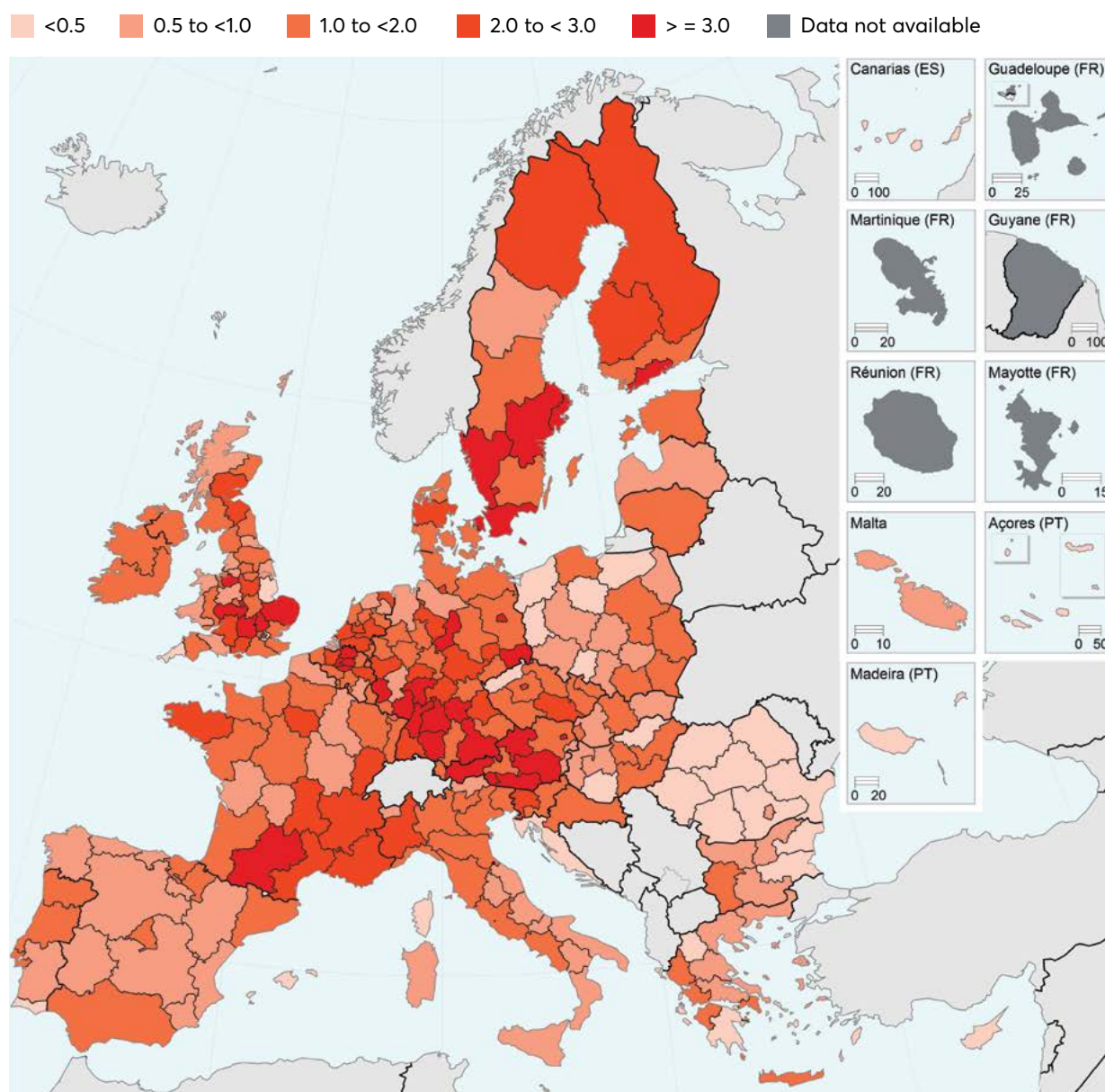
Source: OECD Science, Technology and Industry Scoreboard 2017 - ©OECD 2017.

The confinement of the knowledge economy is also manifest spatially. While consumers are spread around the world, and centres of manufacturing are found in many places, particularly in East Asia, it is the centres of highly dynamic innovation – such as Silicon Valley, New York and London – that reap much of the surplus.

This geography is very different from that of the previous industrial revolutions which spread steadily and provided a route for development for countries that had not initially taken part. Instead, this new economy is highly concentrated. Indeed, a crucial fact of this economy is that the more complex the activity, the more concentrated it is, with the already successful centres acting as magnets to pull in talent and capital. This is contributing to profound inequalities within cities, within nations and across continents.

In Europe, for example, R&D intensity is concentrated in a relatively small number of regions, mainly in Germany, Austria, the UK, the Nordic countries, France and Belgium. Moreover, there is considerable variation in R&D intensity not only between countries but within them. Capital regions usually perform better than national averages, and in ten countries, these regions see the highest levels of R&D intensity (figure 2).

Figure 2: Gross domestic expenditure on R&D, by NUTS 2 regions, 2015 (percentage of GDP)



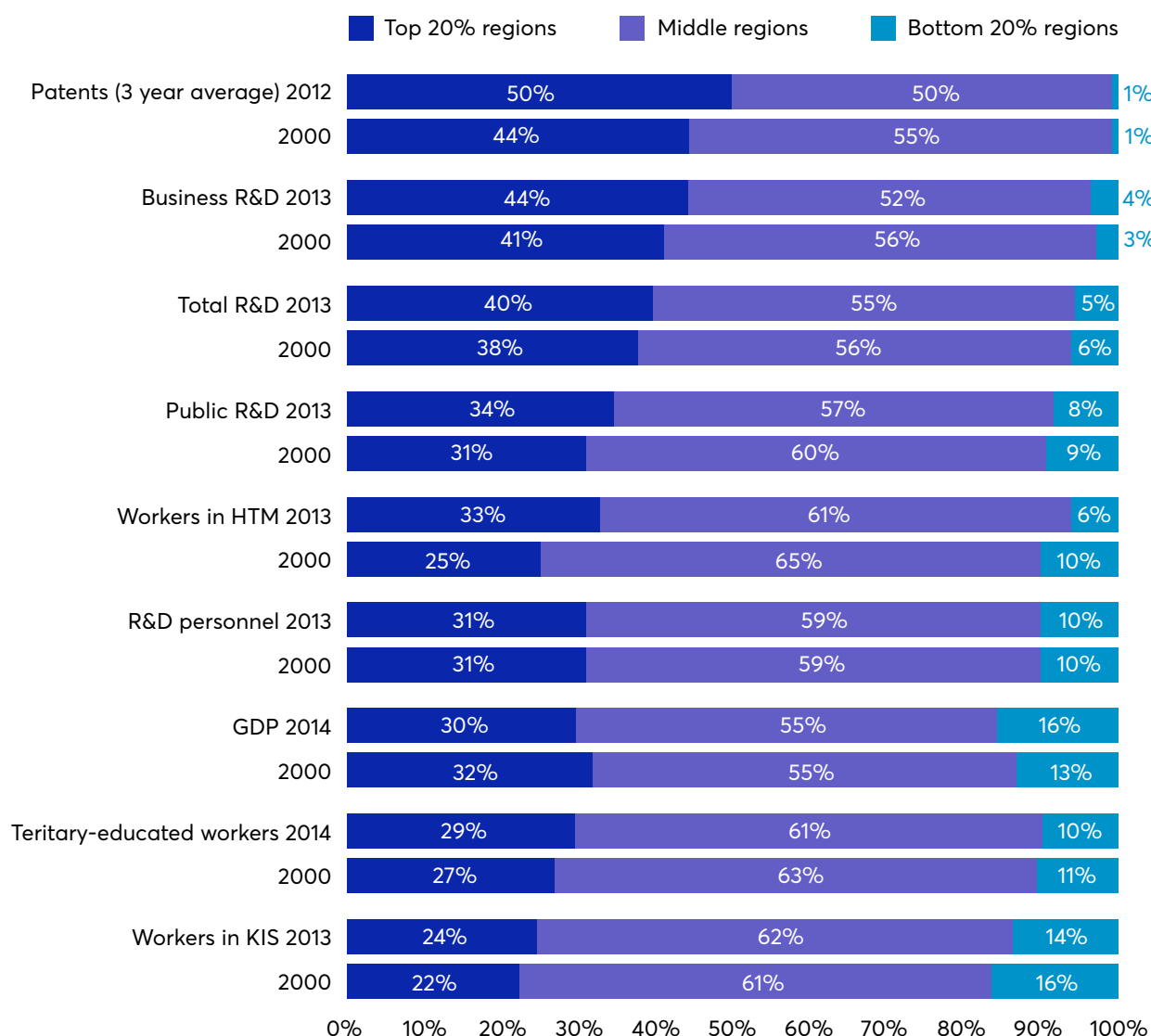
Source: Eurostat.

Another indication of the regional confinement of the knowledge economy can be provided by data on R&D spending and patents. OECD research shows that the top 20 per cent of regions across the OECD account for up to 65 per cent of total R&D activities (depending on the country). These regions also account for around half of the patent applications, and around 30 per cent of tertiary educated workers of their respective countries (Figure 3).<sup>4</sup>



It also appears that knowledge economy resources have become more concentrated in recent years. Looking at change within the OECD area between 2000 and 2013, the top 20 per cent of regions increased their share of workers in high-technology manufacturing from 25 to 33 per cent, and their share of patents from 44 to 50 per cent (Figure 3).<sup>5</sup>

**Figure 3: Changes in the share of knowledge economy resources concentrated across OECD regions**

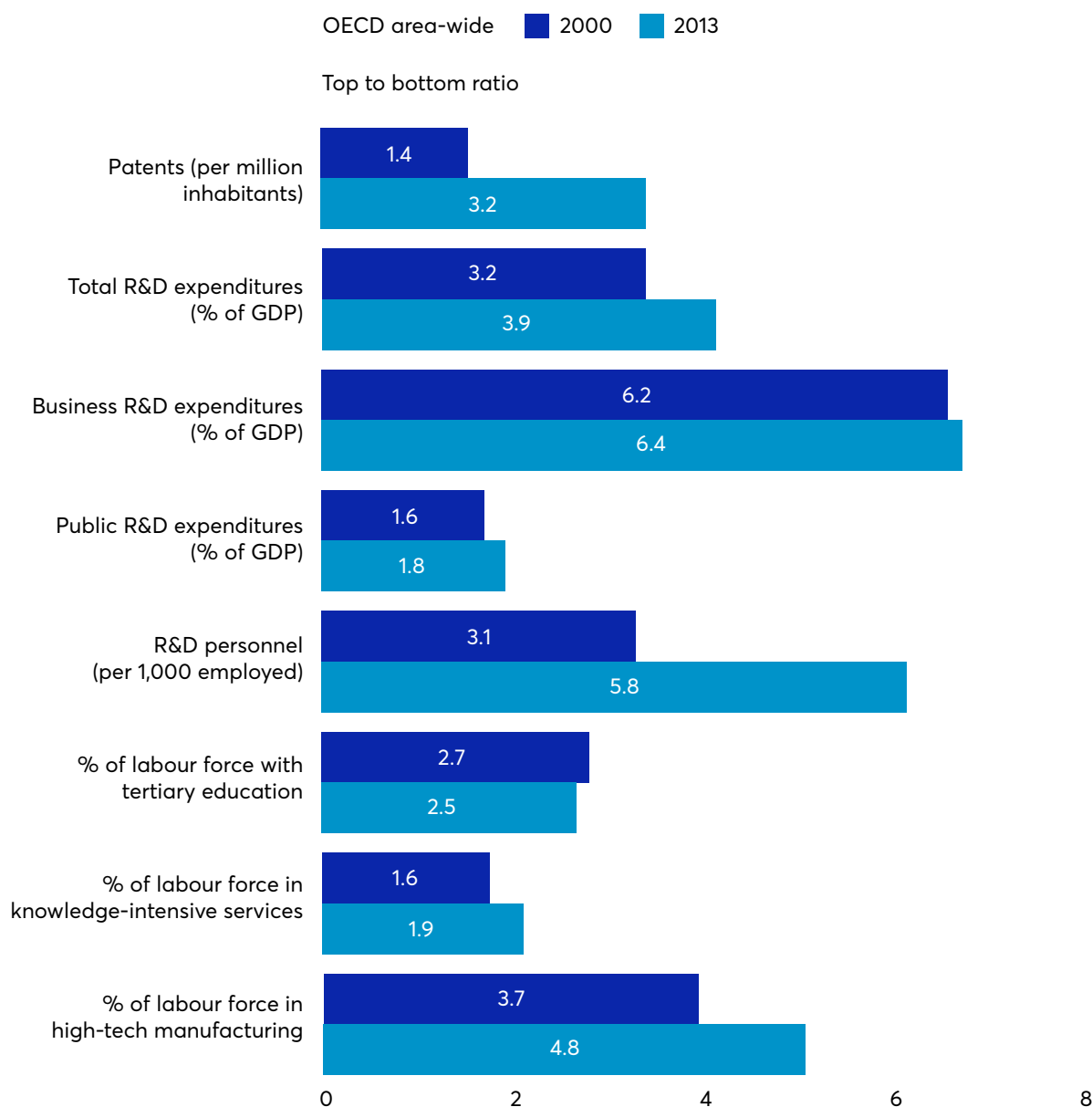


Note: HTM = high-tech manufacturing and KIS = knowledge-intensive services.

Source: Calculations based on OECD (2016b), *OECD Regional Statistics* (database).

The gaps between the top 20 per cent and bottom 20 per cent of regions (measured by ratio) have also increased at an OECD-wide level. The gap between the top 20 per cent and bottom 20 per cent for patents per million inhabitants, for example, increased from 1.4 to 3.2 between 2000 and 2013. The gap for R&D personnel per 1,000 employed increased from a ratio of 3.1 to 5.8 (Figure 4).

**Figure 4: Degree of interregional intensity gaps: Top and bottom 20 per cent 2000-13 (HTM and KIS 2008-13)**

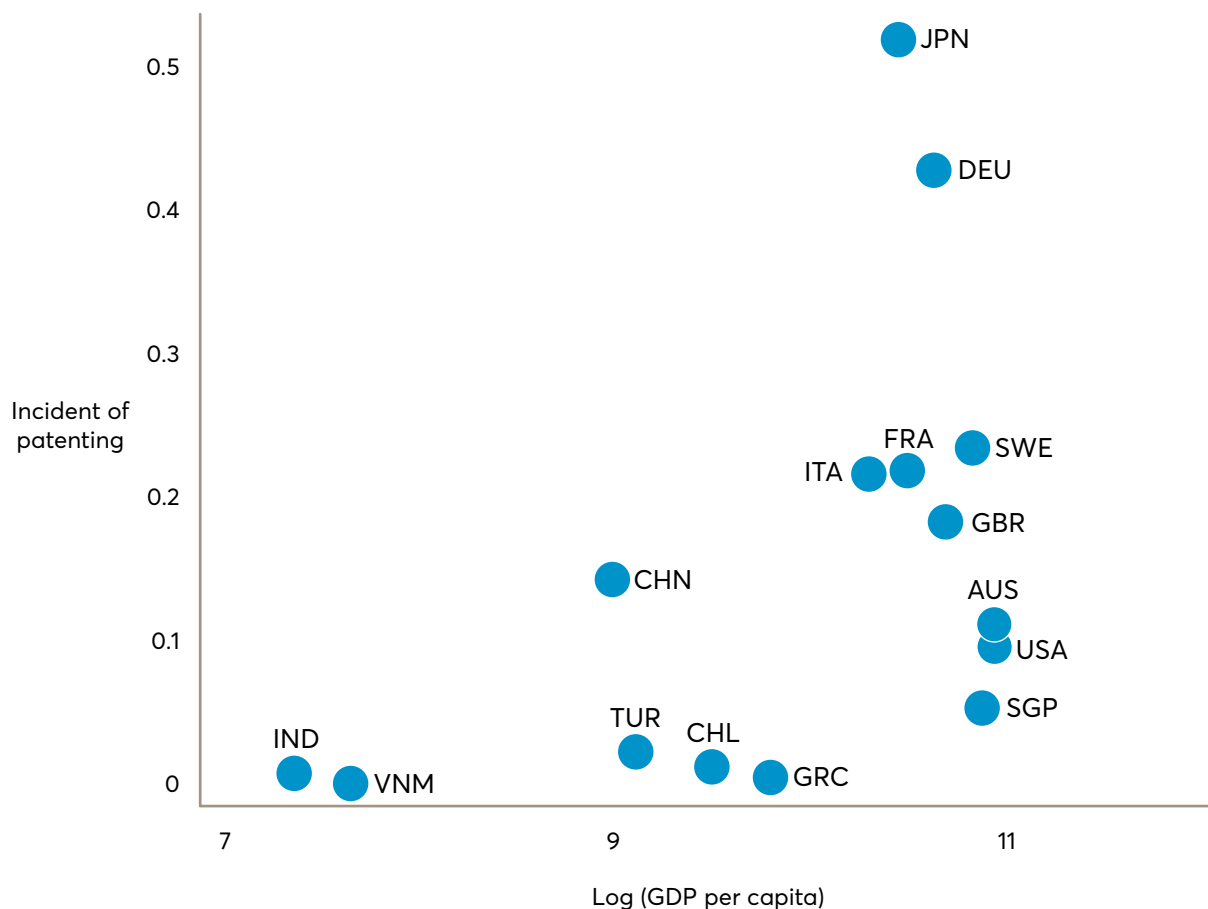


Note: Based on the population-weighted calculations of top and bottom 20%. For visibility with respect to other knowledge economy factors, patents are divided by a factor of ten.

Source: OECD (2017) Making Innovation Benefit All: Policies for Inclusive Growth.

Hubs of knowledge-intensive industry exist in all regions of the world – from Johannesburg and Nairobi to Mumbai and Bangalore, São Paulo and Montevideo. Nevertheless, all available data indicates far lower overall levels of investment in innovation in poorer countries compared with richer ones. Figure 5 indicates, for example, far lower levels of patenting activity in middle-income countries.<sup>6</sup> Instead, where firms in these countries play a role in the knowledge economy, it is more likely to be in manufacturing or assembling products designed in high-income countries. While these dynamics are starting to shift – exemplified, for example, in the recent advances of China in fields like artificial intelligence, and of India in software – much of the value is still being captured in the rich countries. In low- and middle-income countries, therefore, there are far greater challenges in tackling the confinement of the knowledge economy.

Figure 5: Incidence of patenting in OECD countries



Source: Maloney and Sarrias (2017). 'Convergence to the Managerial Frontier'. *Journal of Economic Behavior & Organization*, 134, 248-306.

Meanwhile, we see the paradox of rising returns to land and other complementary physical assets as an effect of the rising importance of intangibles, leading to rentier rewards for owners. Indeed, paradoxically, some of the greatest beneficiaries of the growth of the knowledge economy are landowners in city centres. Sectors like software and design, fashion, advertising, law and finance tend to cluster, valuing proximity. And so, as a result, land values in the places they cluster tend to rise far above other places, delivering a windfall gain to owners who have often contributed nothing to the growth they benefit from.

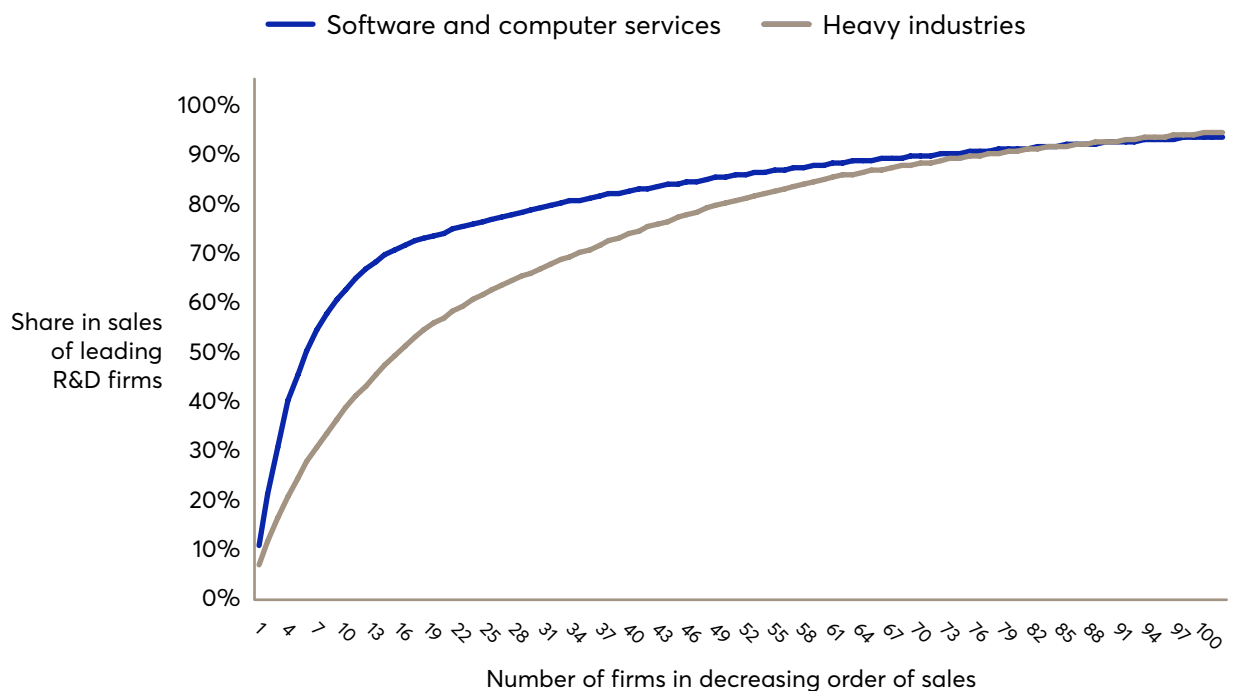
## 2.2 Understanding the confinement of the knowledge economy

The knowledge economy has failed to spread as mass production did. Why? One fundamental reason is that the knowledge economy is not formulaic: from its relatively superficial features to its deeper attributes, it cannot be reduced to a stock of readily transportable machines and procedures and easily acquired abilities. It thrives on the disruption of routine and repetition and introduces innovation into the daily habits and arrangements of production.

Another important set of reasons relate to market dynamics – the peculiar economies of scale and scope that drive monopolistic behaviour, and more recently a surge of mergers and acquisitions often motivated by reducing competition. As OECD research has identified, the low costs of implementing and diffusing new ideas – intangible goods – in comparison to the costs of implementing and diffusing tangible goods enable increasing returns to scale.<sup>7</sup> Digitalisation exacerbates this effect, as the marginal cost of production of digital products is negligible. The increasing returns to scale and network effects, in turn, lead to high market concentration and ‘winner takes all’ dynamics.

An (imperfect) indication of this process can be provided by considering the difference in market concentration between sectors with higher rates of digitalisation and lower rates, which shows significantly greater concentration in the software and computer service sector (Figure 6).

**Figure 6: Distribution of the 100 largest firms in terms of sales among the top R&D firms within the software and computer services and heavy industry sectors in 2015**



Source: Paunov and Guellec (2017) based on EU R&D Scoreboard 2016.

It is not only firms in the software and computer services sector which benefit from economies of scale in the knowledge economy. By managing information more effectively, mega-retailers such as Walmart have been able to develop efficiency-enhancing and capital-sparing practices such as the 'just-in-time' replenishment of inventory. Their large scale has given them a decisive advantage in dealing with the fixed cost of the required technological apparatus. Their successful use of that apparatus has, in turn, helped them grow yet larger, consolidating their market position.

Another feature of the knowledge economy which has been identified as a cause of its increasing confinement is the prevalence of 'spillovers'. As Haskel and Westlake have noted, intangible assets such as research and innovation, which play such an important role in the knowledge economy, can be appropriated by one firm from another in a way which is much more difficult for traditional tangible assets. However, leading firms enjoy significant advantages over small firms in the appropriation of spillovers, either through the acquisition of startups, or 'open innovation'.<sup>8</sup>

Tax also plays a part, as the most knowledge-intensive firms have remained relatively untaxed, reducing the scope for states to mitigate the new inequalities and spread access.

Finally, confinement reflects the inadequacies of other institutions in contemporary societies: education systems, legal systems, social security systems and models of democratic governance. Many education systems still prepare young people for an economy of the past, while many democratic models frustrate the potential of citizens to act as protagonists for more equitable and participative development, instead encouraging apathy. We will go on to discuss policy options to address this range of challenges in the final section.

## 2.3 The consequences for stagnation

The confinement of the knowledge economy has significant implications for productivity and economic growth. Haskel and Westlake point to the widening gap between frontier firms and laggards as a possible leading cause of secular stagnation. Leading firms that enjoy a high rate of return on investment in research and innovation stand to gain from investing more. The vast majority of firms, however, are disincentivised from investing as they are far less certain of being able to enjoy the returns on their investment. Aggregate levels of investment, as a result, remain low.

Michael Roberts has similarly argued that the rise in inequality between capitalists leads to a slowdown in the diffusion of innovation. Behind the frontier firms, increasingly, lie a growing mass of 'zombie' firms that are unable to expand or invest, impacting economy-wide productivity. As a result, the Solow paradox – that the computer age can be seen 'everywhere but in the productivity statistics' – has been repeated in new forms, this time with artificial intelligence (AI), data analytics and smartphones.<sup>9</sup> It is summed up in the well-known figures for jobs that compare the employment levels of the most highly capitalised companies today with those of the most highly capitalised firms 50 years ago.

There are also indications that the control of intangibles by a small number of firms weakens the ability to find new ideas. In the semiconductor industry, for example, Stanford and MIT research has found an annual decline of research productivity of around 6.8 per cent.<sup>10</sup>



## 2.4 The implications for social inequality

The consequences for inequality are no less important. The insularity of the knowledge economy, and its relative poverty of jobs, means that an increasing proportion of wealth is produced by a diminishing part of the labour force. The most highly valued firms on the planet – like Apple and Alphabet – now employ around 70,000 people. Their equivalents a generation or two ago employed at least ten times as many.

This takes us to the complex changes to labour markets across the world and new challenges for governments. In many economies, we see a minority employed in knowledge-intensive jobs, and in jobs with a significant level of creativity.<sup>11</sup> These remain relatively small as a proportion of the total.

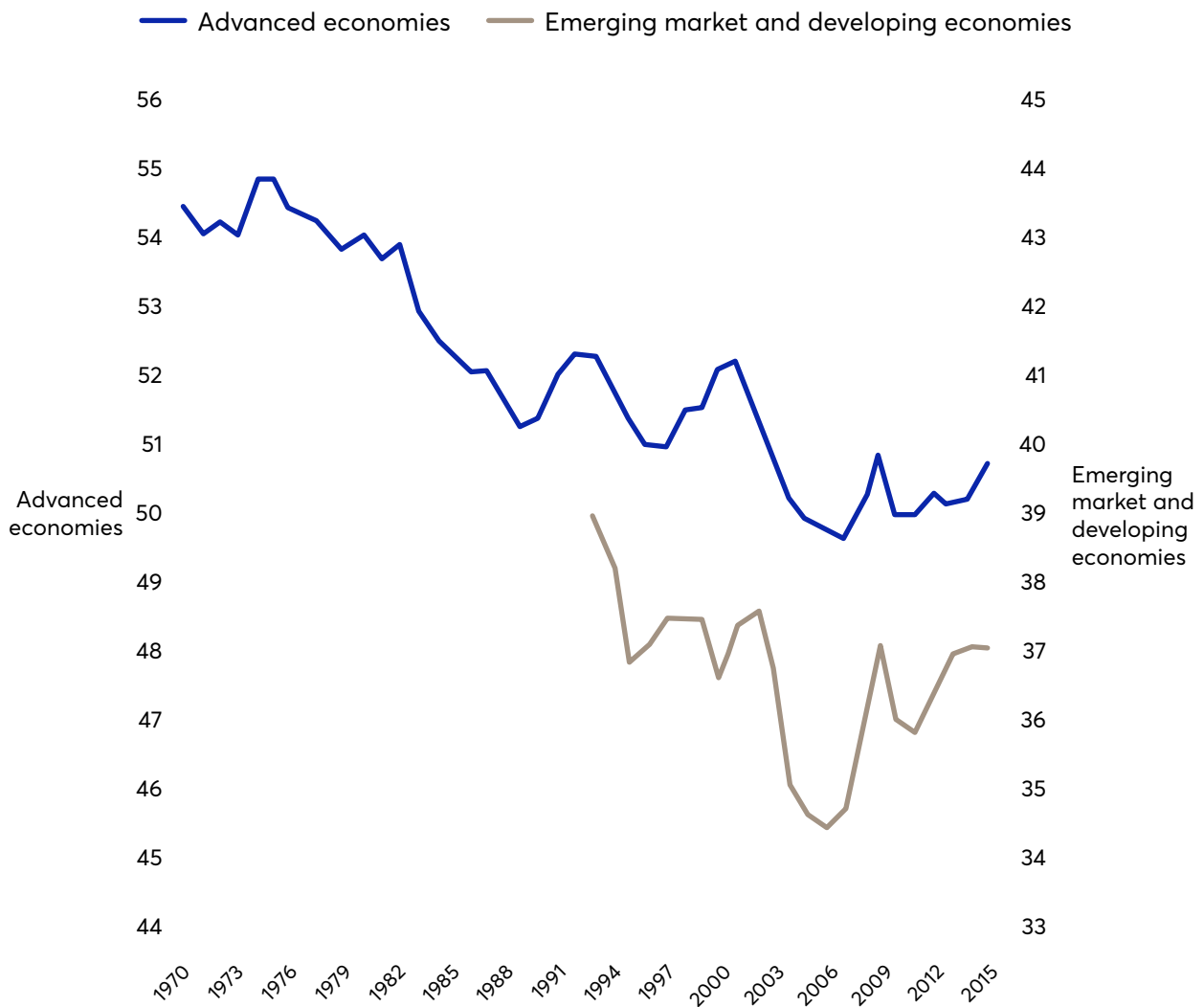
The largest group is employed in lower-wage services jobs and in conventional manufacturing work, increasingly carried out in countries that offer the cheapest labour and the lowest taxes. They may offer work in what remains of mass production, remaining viable only at the cost of low returns to labour and a low take. Or they may offer work in a variant of mass-production manufacture that has become the sidekick of the mega-firms of the knowledge economy, as they learn how to routinise parts of their production process and assign the commoditised parts of their business to the sidekick firms, often in faraway places. Nesta analysis focusing on the US and UK showed the likely patterns of job destruction and creation – with many repetitive jobs, and jobs requiring physical strength, highly likely to disappear, and a likelihood of growing demand for roles involving elements of collaboration, judgement and creativity. But the effects of these shifts on equity are hard to predict. McKinsey estimate that of the ten US sectors with the biggest forecast jobs growth between 2014 and 2024, which are expected to create nearly 30 per cent of new jobs, eight have pay below the median, suggesting a further stretching of the gaps in the labour market between the winners and losers.

Most forecasts anticipate a continuation of recent trends that have seen middle-level jobs experience the biggest losses, even more than the lowest skilled jobs. In the wake of the continuous decline of mass production, we have seen a 'hollowing out of the occupational structure'.<sup>12</sup>

While the middle 'hollows out', the knowledge economy is also associated, paradoxically, not only with an increasing share of low skilled jobs but also with increasingly precarious forms of employment.

In fact, the forms of representation and protection of labour, which have seemed natural to us, may turn out in retrospect to be only a relatively brief interlude between two periods in which labour was organised primarily by means of decentralised contractual arrangements, without economic security or citizenship. Before industrial mass production and contractualist and corporatist labour-law regimes, we had the putting-out system that Marx described in the early chapters of *Capital*. Now, in the wake of the decline of mass production another putting-out system is arising on a global scale. Many mass-production jobs are subcontracted to low-wage firms in poorer countries. Others are replaced by insecure piecework and temporary employment, especially in services. In the absence of an alternative legal regime for the representation and protection of labour and, more fundamentally, of initiatives that would move towards an inclusive knowledge economy, labour becomes defenceless, and its share in national income declines.

Figure 7: Share of national income paid to workers, 1970-2015



Source: IMF, *World Economic Outlook*, April 2017.

## 2.5 Implications for the environment

Shifting to a growth model that avoids an accumulation of waste, pollution and carbon emissions is one of the great challenges of the 21st century and an existential challenge for humanity.

In theory, the world could attempt to return to a pre-industrial subsistence economy. In practice, the only plausible option that can combine meeting human needs and living with planetary boundaries is to accelerate towards an economy making radically less use of materials and energy, and radically reducing emissions of carbon.

The challenge of achieving this goal mirrors that described earlier. It involves accelerating the use of data, information and knowledge in every part of the economy to enable reductions in resource use and move the world closer to the goal of a net-zero-carbon or circular economy.

That requires changes to the law, regulation, tax, business practice, reporting requirements and consumer behaviour. Here too, part of the problem is the gap between the frontiers and the rest. Some of the most advanced production systems have become very efficient in their use of resources. The most advanced buildings have very low energy usage levels. The most advanced production systems reuse materials. Each generation of digital technology sharply reduces energy use, and some of the most advanced cities recycle high proportions of key materials such as paper, glass and plastic.

There are exceptions to this picture: the digital economy is a heavy user of energy, with one estimate suggesting that communications technologies could use a fifth of all global electricity by 2025.<sup>13</sup> But as a general picture it is accurate, and many of the programmes promoted as clean growth, or green growth, aim to accelerate the diffusion of more efficient methods to the great majority of small and medium-sized enterprises (SMEs), while also transforming older, resource-intensive industries and advancing R&D to accelerate the frontiers of low carbon technology.

So, sustainability and the democratisation of knowledge economy go hand in hand. This becomes even clearer if we look at the related issue of the diffusion of different models of consumption and demand that they contribute to sustainability: leasing instead of ownership; greater use of walking and cycling as well as public transport in place of cars; local food sourcing; promotion of maintenance over disposal of products; neighbourhood energy and smart grids. It is encouraging to see the increasing momentum gathering around programmes under the label of the 'Green New Deal'<sup>14</sup> or 'Smart Green Growth',<sup>15</sup> which, at their best, connect the upstream supply side with this transformation of downstream demand.

3

# Understanding the impasse

**If we are to develop a serious alternative to the confined knowledge economy, we need a better understanding of the ideas that underpin it. A vital first step is to reject the assertion that 'there is no alternative'.**

The absence of an inclusive form of the knowledge economy has helped shape politics and policy. It has done so indirectly through its consequences for economic stagnation and inequality. But it has also done so directly, by its effect on assumptions about alternatives to the present course of economic policy and economic growth.

The lack of such an alternative in doctrine, as well as in practice, has exercised a powerful influence – as powerful as the dearth of alternatives to concerted corporatist action between government and business was in the crisis of the 1930s. While international institutions have long been committed to 'never again' permit the horrors of the mid-20th century, our present situation carries close echoes of the crisis which preceded those horrors. The failure to imagine an alternative represents an existential threat for the democratic and social achievements of developed countries.

But this is not just a question of political will. The problem goes deeper than this. We need to understand better why it is that political parties today have difficulty imagining or articulating alternatives. This is partly due to the intellectual resources that are most readily available to them.

Mindful of Keynes' observation that behind the assumptions of every practical man are the writings of some defunct economist, it is worth revisiting some of the ideas in economics which shape major alternatives available on the menu today. 'Neoliberalism' has become a popular target of criticism, and we do indeed need to be clear about the failures of 'trickle-down economics'. But the difficulty of imagining alternatives derives in part from blind spots that we have inherited from other traditions of economic thinking: not only neoclassical economics but also Keynesian and classical.

### 3.1 Neoclassical economics

The approach to economic thinking most commonly known as neoclassical economics<sup>16</sup> has been the focus of much penetrating critique. It has often been attacked for its simplifications, for using explanatory models that idealise the market order, and for depicting economic agents as utility-maximising automatons – the infamous *homo economicus*.

But such criticisms may miss the mark. Some form of simplification is always necessary when building theories, and this simple way of thinking made it possible to chart economic life (understood as market-based exchange organised by relative prices) with great precision. Neoclassical economics does recognise differences between its models and the workings of a real economy and has often aimed to explore the content and significance of these differences. The deviation of real economic behaviour from the script of the 'utility-maximiser' has been a major concern for economists for many decades.

In contrast to the most familiar criticisms, here we consider two blind spots of neoclassical economics which have perhaps been more significant in shaping contemporary economic regimes: firstly, its poverty of institutional imagination, and secondly, its inadequate attention to production.



### 3.1.1 The poverty of institutional imagination

The economics that the marginalists created often makes strong assumptions about the institutional and legal form of the market economy. At its most rigorous, neoclassical economics is agnostic about the institutional form of the market. But more frequently, the idea of the market is falsely equated with a particular, historically contingent set of market arrangements that developed, and came to prevail, in the societies in which this discipline emerged. This set of arrangements was associated with a particular institutional system, expressed for example by the 19th-century law of property and contract.

The clearest theoretical formulation of this, which we might call 'fundamentalist economics', was most comprehensively developed in the mid-20th century by Hayek. This line of thinking argues that spontaneous exchange among free and equal economic agents automatically generates the same market order; we, therefore, simply have to prevent this natural activity from being interrupted or distorted by governmental meddling. The same belief survives, with much less clarity but formidable tenacity, in the conviction of much contemporary 'practical' economics that a market is a market, contract is contract, and property is property.

A hundred and fifty years of legal analysis have shown the opposite to be true. From the middle of the 19th century to the end of the 20th, jurists discovered (often against their expectations) that there are in fact many choices to be made when translating general ideas about contract, property, and other aspects of market exchange into detailed rules, standards, doctrines, and practices.

Such alternatives shape arrangements for production and exchange as well as the distribution of economic advantages. The choices to be made turn on conflicts among interests and visions, as well as clashing assumptions about the consequences of different options. We cannot settle such disputes just by inferring a solution from the abstract idea of the market.

The fundamentalist thesis has striking implications: it prevents any attempt to reimagine and reshape the institutional framework of production. Yet reimagination and reshaping are essential to spread and deepen the knowledge economy, as we will argue in section 4.

### 3.1.2 The neglect of production

A second significant limitation of marginalist economics is its lack of an adequate theory of production. Its view of production is a straightforward extension of its theory of exchange. Mainstream economists are more likely to study hedge funds than to visit factories.

Ever since the marginalist turn, the main line of economic thinking has viewed production through the lens of exchange and of relative prices. This perspective was reinforced by the fact that in the economies with which the new economics dealt, labour stood at the centre of production, and could be bought and sold. When wage labour becomes the predominant form of free work, it is easy to see the arrangements of production as simply one more terrain for the operation of relative prices.<sup>17</sup> This intellectual limitation has also impeded imagination in relation to the circular economy and the shift to low carbon systems, which are only grasped in terms of shifts to prices.

### 3.2 The limits of Keynesianism

Among the many strengths of Keynesian economics are its emphasis on the importance of money and of attitudes to the use of money balances, and its introduction of the idea that supply and demand can come into balance at many different levels of economic activity, including at levels that leave activity lastingly depressed. Its justification of governmental action to prevent society from having to pay a terrible cost for the insufficiency of the self-restorative powers of the market was decisive in shaping the post-war order. However, despite its important insights, Keynesian thinking shares two of the significant important blind spots discussed above.

Firstly, it shares a blindness to the role of institutions in shaping the market. All the major categories of Keynes' theoretical system – the preference for liquidity, the propensity to consume, and the state of long-term expectations – are psychological rather than institutional or structural. They assume an unchanged institutional and legal framework of the market economy, except insofar as governmental activism in fiscal and monetary policy implies a reassignment of powers between private economic agents and the state. Institutional discussion in Keynes is almost entirely confined to particular corners of economic life (notably the stock market) and presented as ancillary to a larger view in which the great forces of fear, greed, illusion, and 'animal spirits' play the leading part.

The second failing of Keynes' economics is closely related to the first. Keynes dealt with the economy and with economic recovery primarily from the demand side, not from the supply side. Keynes' theory focuses on one circumstance in which supply and demand fail to adjust, where inadequate demand is driven by the diversion of savings into unproductive hoarding, and by the downward rigidity of the price of labour. However, recession may also relate to factors around supply, inadequate investment and forms of production – for example, as we have discussed, the way in which the knowledge economy becomes confined. Keynesian economics lacks a clear view of production and the possibilities for it to be reshaped.

### 3.3 Classical economics

In important respects, the economics which immediately preceded the marginalists – often known as classical economics – offers important resources. In contrast to the marginalists, Smith and Marx had a rich institutional imagination. The insight of Marx, in particular, into how the institutions that appear natural to us were in fact constructs, has been enormously important in the critique of injustices and the struggle for alternatives.

Likewise, the economics of Smith and Marx differs from neoclassical economics in being at least as much a theory of production as a theory of exchange. They did not treat the economy as if it were a trading house or a bank any more than they saw it as a large factory. Economics was not reduced to the study of the operation of supply and demand in a market. Rather it examined the relationship between how we cooperate and how we mobilise and change nature for our benefit.

Nevertheless, contemporary attempts to develop from this tradition – or at least from popular readings of it – present two notable problems: structural discontinuity in their view of change, and a particular understanding of the relationship between scarcity and work.

### 3.3.1 Structural discontinuity and historical change

The classical economists believed in a short list of alternative economic regimes, which they assumed would succeed one another in a predetermined order. The focus on structural discontinuity and progress served a well-intentioned vision of unrealised human opportunity. Its impulse was prophetic as well as explanatory. However, in doing so, they mistook the basic character of the economic regimes they were dealing with. The institutional and ideological framework of an economy exercises immense influence. It shapes the routines of both exchange and production. But it is not a natural phenomenon like the atomic structure of a cell.

No economic regime forms an indivisible system, there on a take-it-or-leave-it basis. Institutional and ideological orders are ramshackle constructions. They change, and we change them, step by step and part by part. Fragmentary, piecemeal, and discontinuous change is not only compatible with the transformation of such structures; it is close to being the only way in which they change.

### 3.3.2 Scarcity and work

Another problematic inheritance from classical economics comes particularly from Marx – or, rather, from a popular contemporary interpretation of his work. This is a particular line of thinking around scarcity, related to a particular vision of work.

In a popular contemporary reading of Marx, the development of the forces of production will conclude with the abolition of scarcity. This will spell the end of class society, which was necessary only to ensure the coercive extraction of a surplus over current consumption. Once the constraint of scarcity disappears, we will no longer be forced to devote the majority of our lives to a particular activity - wage labour - that only expresses one aspect of our humanity, alienating us from ourselves. We will make ourselves whole again.

However, there are reasons to be circumspect about this vision. We have no grounds to expect that humankind will overcome scarcity in any foreseeable future. At the same time, the necessity to continue working need not, necessarily, diminish our wellbeing.

Economic life, envisioned in this way, is always a terrain of constraint. Freedom comes to be defined as freedom from the economy, rather than freedom in the economy. No economic regime or practice of production offers freedom without constraint. However, the extent to which production can become a field of freedom as well as of constraint varies from one economic and political regime to another, and from one practice of production to another. A focus on the possibility of liberation *from* work risks becoming a substitute for closer attention to what it would take to provide fulfilment and decent conditions *in* work.

### 3.4 The consequences of these blind spots for present-day thinking

The significance of these blind spots becomes clear if we consider how they manifest in the responses that are most frequently offered to the challenges around the knowledge economy set out in chapter 2.

One major response – or perhaps, lack of one – promises an ultimate trickle down from the frontier firms and places to the rest, despite evidence that this does not automatically happen.

Another promises a return to an earlier stage of economic life, with a revival of mass manufacturing jobs in largely closed economies. It seeks to win the allegiance of a working-class majority whose troubles and aspirations have not been dealt with. From the social democratic left, the most typical response has been a form of distributionism, which emphasises the need to share the fruits of the knowledge economy more fairly.

Although their competing visions have been seen as a reflection of increasingly polarised societies, it is striking that both Left and Right share some important assumptions. Firstly, both continue to assume that the market economy, or 'capitalism,' has an in-built legal and institutional architecture, open to only a limited range of variation, such as those described in the literature about 'varieties of capitalism.'

Secondly, as contemporary progressives and right-wing populists envision no alternative market regime, they can have no transformative approach to the supply side of the economy. Progressives have largely abandoned the supply side to conservatives and have, at most, resigned themselves to the primacy of demand-oriented policies. Conservatives have been concerned with the preservation or restoration of a market order whose legal and institutional content they take to be self-evident. The long history of deep state involvement in science and technology – which required imaginative institutional innovation in Japan, Germany and the US – has been forgotten by many or seen as an aberration.

In the absence of structural alternatives, conservative populists resign themselves to defending industrial mass production rather than working towards its conversion to advanced manufacturing and its associated services – the form taken by the knowledge economy in those parts of economic life. Sweetheart deals with businesses that threaten to leave the country and restraints on trade form part of the same orientation.

However, while a return to industrial mass production is not an adequate response, neither is a reliance on retrospective redistribution. As we have seen, the contemporary knowledge economy generates inequalities that traditional devices – such as the protection of traditional small business and compensatory redistribution by tax and transfer, progressive taxation and redistributive social spending – are inadequate to overcome.

Progressive taxation and redistributive social entitlements can be effective in moderating inequality as long as inequality does not become too extreme. Beyond an ill-defined threshold, the structural realities overwhelm the corrective measures. Corrective redistribution on either the revenue-raising side of the budget (progressive taxation) or the spending side (redistributive social entitlements and transfers) would need to be massive to compensate for the vast disparities generated, among other things, by the chasm between the vanguards and the rearguards of production.

Such after-the-fact correction is likely to have only a marginal effect on inequality rooted in the organisation of the economy and especially in the structure of production. It only changes the demand side of the economy, leaving the supply side and the arrangements of production untouched. As a result, it cannot resolve inequalities without beginning to disturb established incentives to save, invest, and employ.

There is one alternative which has emerged which concerns itself with production. The advocates of what has sometimes been labelled 'accelerationism' look to new technology to advance productivity while new forms of welfare, such as basic income, redistribute the proceeds. Accelerationism can be understood as a kind of extreme distributionism: that we should encourage the maximum deployment of AI and automation, accept mass job destruction, and then reward the rest of the population with benefits such as a Universal Basic Income (UBI) as compensatory redistribution. This position has been supported by some groups in Silicon Valley, on the libertarian right and the egalitarian left across Europe, and UBI is being piloted in various countries.

In promising liberation from work, the extreme distributionist UBI solution certainly represents a more radical shake-up of assumptions about the labour markets. But it does so at a significant cost. Attention is shifted to the milk and honey of a promised future.<sup>18</sup> In the process, the question of how to reshape the market order in a way which democratises transformations in production, rather than simply accelerating them, is neglected.

Our era has been characterised as one of heightened social division, in contrast to the relative consensus of the post-war years. Yet the alternative solutions that have most frequently been offered, for all their divergence, share many significant assumptions. The next section sets out a vision for what is possible when these are abandoned.



4

# Towards an inclusive knowledge economy

The central task for policy in the next few decades is to make the knowledge economy radically more inclusive. The previous chapter identified why the solutions most frequently offered are inadequate. We cannot have faith in a trickle-down economics that has repeatedly turned out to be a false hope. At the same time, we must also avoid the temptation to seek a return to an earlier era of economic life. Nor can we rely solely on retrospective redistribution if we want to build a more 'human economy'.<sup>19</sup>

If redistributing the fruits of the knowledge economy is insufficient to redress the harsh inequalities it generates, something more radical is needed: **transformation in the institutional framework of the market order itself.**

These changes require innovations to broaden access to the resources, opportunities, and capabilities of production – a new market order that can generate less inequality because stakes and capabilities are more widely distributed in the first place.

Unlike the familiar prescriptions described in the previous chapter, this vision of an inclusive knowledge economy places considerable emphasis on the organisation of production and the institutions which shape it. It does not rely exclusively on supply-side policies, which seek to influence private spending. It also seeks to expand demand by broadening access to the resources, opportunities, and capabilities of production.

An example of this approach, albeit from an earlier phase in economic history, can be seen in the institutional innovations that created the setting for entrepreneurial family-scale agriculture in the United States. In the first half of the 19th century, Americans resisted the idea that the formation of large landholdings, and the expulsion of smallholders from the countryside, was intrinsic to the development of 'capitalism'. Federal and state governments did much more than distribute public lands to families ready to till them. They organised the institutional machinery and economic instruments of efficient, market-oriented agriculture. Land-grant colleges helped to ensure that agriculture, even at relatively small scale, could benefit fully from the most advanced science of the time. Economic and legal tools, such as minimal price supports, food stockpiles, and crop or income insurance, were used to safeguard family-scale agriculture against price volatility and climate volatility.

In the same way that the French and Dutch refused to follow the English path of enclosure and land concentration, these efforts exemplified something different from the solutions to which contemporary policymakers have recourse. They did not regulate the agricultural market. Nor did they rely on retrospective correction in the forms of progressive taxation and redistributive social spending. They innovated in the legally defined institutional arrangements of the market economy. In doing so, they changed the distribution of economic advantage and powerfully contributed to the acceleration of economic growth on the demand as well as on the supply sides of the economy.

It is not only 'economic' institutions that require transformation. The power of disruptive imagination needs to be unleashed in every citizen. Education systems and participative democracy need to encourage a spirit of experimentation. Critically, these must be accompanied by the protection of vital stakes, safeguards, and endowments, making it possible for people to remain unafraid in the midst of quickened change.

The model we set out here does not make liberation from work the condition of a better future. Rather, it recognises that work, at its best, is a source of meaning and self-realisation.<sup>20</sup> Rather than holding out for liberation in a post-work future, the emphasis of our vision is firmly on the institutional transformations which can enable broad access to good, fulfilling work in the here and now – liberation in economic life, rather than liberation from it.

Finally, this vision rejects the assumption that systemic change must be either revolutionary or reformist. Structural change is almost always fragmentary and piecemeal. While this new market order would represent a radical shift, in practice it would result from cumulative changes: new institutions and new strategies in different areas of policy, affecting different aspects of contemporary social and economic structures.

Encouragingly, this kind of thinking is increasingly evident in debates about the political economies of the future. Think tanks have called for a 'hard-wiring' of equality into the economy,<sup>21</sup> building on the 'predistribution' agenda initiated by political scientist Jacob Hacker.<sup>22</sup> The idea of new institutions and arrangements as the best pathway to a more democratic economy is a core feature of the 'institutional turn' in the thinking of the UK Labour Party, as identified by Martin O'Neill and Joe Guinan.<sup>23</sup> André Gorz's concept of 'non-reformist reform',<sup>24</sup> and Ernst Bloch's concept of 'concrete utopias',<sup>25</sup> both close to our vision of cumulative yet radical institutional change, are increasingly present in debates about possible progressive alternatives in the USA,<sup>26</sup> the UK,<sup>27</sup> and Argentina,<sup>28</sup> among other places.

Our proposals contribute towards this line of thinking. This section sets out an emerging programme in three areas, which together could help move towards inclusive knowledge economies:

1. **Democratising the economy** so that many more people and firms have access to capital and other productive resources.
2. **Establishing a social inheritance**, to provide a secure basis for all to participate in the new knowledge economy.
3. **Building a deepened, hot democracy**, more dynamic and less vulnerable than current models to capture by the rich and powerful.

They represent the first steps towards a more far-reaching remaking of institutions to better ensure that many more benefit from the full potential of a wave of new technologies. For the sake of clarity, we present this programme in terms of different areas of policy. However, in the long term, these areas of action are not options on a menu, but dependent on each other.

## 4.1 Democratising the economy

What are the institutions that can shape a more inclusive knowledge economy? **Here we turn to the arrangements that can allow markets to serve people better, opening up participation in the creation of new knowledge and new wealth.**

At the core of what is needed is a different approach to the relationship between the state, society and the market. Rather than compensating the losers of the market by redistributing its fruits, this approach seeks to transform the institutions which shape the market. It includes:

- **Radically increasing, diversifying and decentralising access to productive opportunity** – capital, technologies and advanced productive practices – to create a wider base of productivity, innovation and entrepreneurship.
- **Transforming models of ownership**, both of capital and resources in the economy more widely.
- **Addressing the new concentrations of power and anticipating where future concentrations might occur** – to prevent monopoly and predatory behaviours, particularly with regard to the infrastructure of the knowledge economy itself, the internet, and its key resource, data.
- **Democratising the direction of innovation** by increasing opening up priority setting and decision-making.

A powerful rationale for a place for markets within economies is that experimental diversity is better than dogmatic uniformity, as a way of discovering what the economy can achieve, as well as of how to achieve it. However, this experimentalist impulse also needs to be applied to the institutions of the market. Rather than assuming that the market can only take one form, we must make discovery and reinvention part of its everyday business.

### 4.1.1 Transforming innovation, access to capital and productive opportunity

To create an inclusive knowledge economy, we need to sustain the dynamism of the frontier while at the same time spreading leading-edge practices, addressing the systematic under-representation of particular population groups in innovative occupations and ensuring that the benefits of innovation are widely shared.

This requires a wholesale rethinking of innovation policy. Innovation policy in much of the world is skewed towards the interests of the better off and those closest to power. It tends to focus on supporting the most innovative businesses and on prestige projects, rather than on helping the majority of firms to innovate. Meanwhile, a narrow definition of excellence leads to a concentration of resources in the most eminent universities, meaning that the already privileged are much more likely to benefit. Questions of distribution and inclusion have been left to other policy areas, and it is often assumed that the benefits of research and development will trickle down.

This approach has become ever more of a problem because of the characteristics described above. There is no guarantee of a trickle down, and instead the 'Matthew effect' leads the most advantaged places to become even more advantaged. Innovation policy has also been guided more by the interests of states than by the interests of societies more broadly – reflected in the longstanding focus of public R&D spending on defence and surveillance.

Turning this around is a major strategic task. It requires a change of thinking about what, and who, innovation is for, and designing innovation policies with different means and different ends. The long-term aim must be to democratise innovation policy itself. The ends should be in the interests of citizens, not only in the interests of states and business. The means must allow many more to take part in the process of innovation itself.

A crucial step is to improve the diversity of innovators. Current imbalances are stark. Worldwide, the Intellectual Property Office (IPO) estimates only around 10 per cent of patent applicants are women.<sup>29</sup> Recent evidence from Raj Chetty and John Van Reenen shows that children in the US with parents in the top 1 per cent of the income distribution are ten times more likely to register a patent than those with below-median income parents, and that white children are three times more likely to become inventors as black children. They estimate that if under-represented groups' potential was harnessed, the rate of innovation in America would quadruple. Through modelling the impact of possible policy interventions, Chetty and Van Reenen conclude that effective policies to grow the pool of innovators, from all backgrounds, would make a greater long-term impact on patenting rates than subsidising innovation through tax incentives for businesses.<sup>30</sup> Shifting some public investment 'upstream', to promote exposure to innovation among groups less likely to take part, must be part of the strategy to create a more inclusive knowledge economy.

Broadening participation in the knowledge economy is not, however, just about changing the demographics of people working in the small number of firms at the frontier, but – as we argue throughout this paper – vastly expanding this 'vanguard'. We therefore need to focus on spreading the advanced production processes that characterise the knowledge economy to many more firms. A crucial task in doing so is broadening and orchestrating access to capital, as well as to technologies and capabilities, markets, talent and skills, and infrastructure.<sup>31</sup>

The organisation of capital varies greatly around the world. But it has tended towards oligopoly; tended towards abuse of the privileged position that banks have in creating credit and money; and has often tended to harden divisions between insiders and outsiders. This is true at many levels: venture capital, heavily biased to well-connected social groups; funding for startups and small firms heavily skewed by class, gender and race;<sup>32</sup> capital management strategies increasingly based on the rent from accumulating assets, rather than new investment; and the often predatory siphoning off of surplus by banks that in many countries have successfully privatised gains and socialised losses.

An alternative strategy needs to deliberately counter these trends. Recent years have seen a renewal of interest in the potential offered by the public provision of additional capital through national funds, such as the state investment banks that already exist in several countries.<sup>33</sup> These structures have attracted interest for their potential to provide the 'patient capital' that existing private capital markets have often failed to deliver where it is most needed. (There are also proposals for other institutions, such as vehicles that would allow pension funds to pool investment in patient capital;<sup>34</sup> various pension funds in the UK are now exploring such a model.)<sup>35</sup> They also have significant potential as ways of shaping the 'direction' of innovation more intentionally, and addressing the regional disparities in investment which have become so significant.

To maximise such funds' potential to support an inclusive knowledge economy, they need to operate in a way which prioritises giving SMEs, social enterprises and cooperatives better access to productive resources; does not fall prey to capture; and follows a direction that is beneficial to society, subject to democratic deliberation. This suggests that they need to be run as wholesalers – channelling funding for example to banks, social investment finance

intermediaries and venture capital funds that are able to deliver their objectives. By using a decentralised model, they should facilitate experimentation with different sorts of finance, and develop relationships and expertise at a geographical level (for example, by investing in regional funds) and with specific sectors or forms of venture in need of finance (for example, 'platform cooperatives' – digital platforms that are collectively owned).<sup>36</sup>

Crucially too, access to capital needs to be combined with access to knowledge, capabilities and relationships. Finance providers dealing directly with firms, social enterprises and cooperatives should offer business support, in the same way that innovation agencies across Europe are starting to provide non-financial support alongside funding.<sup>37</sup> They could also curate data on investment patterns, technology trends and economic development and organise this as commons to promote a healthy mix of cooperation and competition within and across sectors.

This approach might be described as 'decentralised strategic coordination' – an alternative to the weaknesses of both top-down economic planning and its opposite, the assumption that markets automatically coordinate. It emphasises shared knowledge, underpinned by horizontal relationships, to make it easier for sectors to coordinate their behaviour. In these systems, parts of the state can act to push particular directions – but without a monopoly of power, money or knowledge. Institutions providing capital and support to businesses can also play a role of orchestration or stewardship, supporting the development of shared strategic agendas between different stakeholders, and mobilising technical and scientific knowledge, and tacit, local knowledge to advance regional economic specialisms.<sup>38</sup> Public sector, private sector, civil society and trade union stakeholders, therefore, need all to be involved to provide the necessary combination of different forms of knowledge – as well as the necessary democratic legitimacy. As research by the Finnish innovation fund SITRA has highlighted, this type of collaboration requires dedicated staff, and specific skills in relationship brokering, market knowledge and data collection and reporting, which are unlikely to be spontaneously provided by a private sector ecosystem.<sup>39</sup>

An example of the difference such orchestration can make is provided by the approach to SME growth taken by the regional government of Lombardy in Northern Italy in the 2000s. Rather than simply focusing on sectors, the regional government took the step of identifying 'meta-districts', territories containing all the activities involved in a particular supply chain. The meta-districts have been the focus of financial incentives to promote joint research and development projects by networks of firms and universities, to enable competitiveness and the challenging of incumbents across the supply chain. It has also enabled the development of linkages between specialised metropolitan producers and SMEs in less populated parts of the region.<sup>40</sup> As the 'civil economy' tradition in Italian philosophy has long recognised, there is no unavoidable trade-off between solidarity and cooperation on the one hand, and the quest for prosperity on the other.<sup>41</sup>

A parallel task is the promotion of alternatives to publicly provided capital. Peer-to-peer finance, mutuals and mutual credit, crowdfunding and other innovations of the last decade have shown the potential to offer flexible, low cost and responsive models of investment. At their best, these alternative models represent a means of democratising finance, challenging the mainstream banks and expanding access to credit for weaker sections of the economy. These forms of alternative finance have grown greatly over the last decade – when states and regulators have given them the space to do so.<sup>42</sup>

Elsewhere the priority has been to grow more local control of capital – reversing the tendency of recent years to consolidate capital at ever greater scales. Within industries, credit supply can be tightly linked to knowledge about how industries work – rather than mediated through financial institutions which often have much less detailed understanding

of the real economy. Further alternatives include more local banks; local systems of mutual credit; and local savings vehicles that reinvest in the local economy. These can all multiply the creativity, openness, responsiveness and resilience of the system.

The final step, paradoxically, may be to open up central banking itself. As Nicholas Gruen has argued, central banks have unique capabilities to provide credit at low cost and with the help of current technologies can open those up to citizens, running open public infrastructures for payments, rather than effectively subsidising retail banks as intermediaries.<sup>43</sup>

### **Promoting adoption and diffusion: a key priority for the next decade**

A crucial task for these capital sources is to improve the adoption of innovation among lagging firms, helping them identify and assimilate better practices and more advanced technologies. The continued advance of firms at the global productivity frontier suggests that there has not been a lack of productivity-enhancing innovations.<sup>44</sup> But the benefits of innovations are spreading at a slower rate, which widens the gap between those at the leading edge of the knowledge economy and the rest (at least, as captured in productivity figures). Increasing the rate at which new technologies and – just as importantly – new practices spread could deliver a significant boost to productivity and economic growth. It may also help improve wage equality, given the apparent positive correlation between productivity dispersion and labour income inequality.<sup>45</sup> However, many businesses and governments seem to invest little in adopting existing technologies despite the huge potential gains. The World Bank has referred to the current situation as the ‘innovation paradox’.<sup>46</sup>

Policy to improve the diffusion, adoption and spread of new tools and methods is not new. It has a long history – from the agricultural extension colleges of the US to the many institutions supporting the Mittelstand in Germany, to government programmes in countries and regions ranging from Bavaria to Korea. But these policies have generally been less favoured, in part because of an assumption that market forces will solve this problem automatically.

There is a range of tools available to governments that want to encourage SMEs to adopt existing innovations and catch up with the leading edge of the knowledge economy. Some focus on awareness and information, like Enterprise Singapore using benchmarking tools to help SMEs identify how they can improve. Others focus on management capabilities, drawing on evidence which has shown how consultants can stimulate SMEs to adopt modern business practices.<sup>47</sup> Another approach is to subsidise capital investment – like the Gigabit Broadband Voucher Scheme in the UK – to help SMEs jump to the leading edge of digital networks.

These policies are encouraging. But they face a major constraint. Despite the long history of policy in this area, there is a lack of systematic evidence about what works, especially in the OECD countries. This is at least in part due to the typically transient and limited scale of interventions in this space. Without good evidence, it is impossible to allocate resources to the programmes that can have the greatest impact.

Solving this problem demands an experimental approach. Governments should identify a range of new potential solutions and then assess which forms of intervention best solve the problem, for example comparing outcomes from different combinations of financial and non-financial support. The UK government has taken a promising step in this direction with the Business Basics Fund, which Nesta is helping to design and deliver.<sup>48</sup>



### 4.1.2 Alternative forms of ownership

The previous section discussed the need for innovations in institutions, financing models and support to businesses, to promote wider access to capital and technology. We also need innovation to change the rules of the game: the legal and institutional structure of the market, beginning with the property regime.

The traditional unified property right joins all the powers that we associate with property – right to use, right to sell and command of the income stream – and vests them in a single right holder, the owner. The advantage of this is that it allows entrepreneurs to take risks. The disadvantage of the unified property right is that it fails to do justice to the wider social interdependencies which always, in reality, underpin ‘individual’ success. No entrepreneur or inventor could advance the frontiers of technology if it were not for the love, care and labour invested by other members of society in their health, education and nourishment. By establishing a protective barrier between entrepreneurial initiative and political control, the unified property right makes it possible for firms to avoid responsibility for wider social interests. Workers, local residents, and fellow inhabitants of the natural environment are all stakeholders to whom the unified property right denies a formal stake. Their concerns frequently figure as no more than ‘negative externalities’ to the equation.

In practice, property rights are sometimes more complex and layered than our dominant, unified conception of property rights would imply. In the UK, the owner of a building in a city centre, for example, might be a ‘leaseholder’, owning the right to use the building for a defined period of time (usually around 100 years), while another person or organisation owns the ‘freehold’ to the building, with the right to levy some charges and the responsibility to keep the building’s structure in good repair. The leaseholder can use the building in various ways but is also subject to constraints (such as on noise and light), as well as duties (for example around management of waste, water and energy). They might be part of a collective, such as a Business Improvement District, which levies its own charges and carries out public space improvements. The building might generate solar energy which contributes to a neighbourhood grid.

To broaden access to productive resources, we need to go further in ‘unbundling’ the unified property right – or, as some have put it, in ‘splitting the atom’ of ownership<sup>49</sup> – so that the different rights that we typically associate with ownership are more broadly distributed. The unified property right will still have a role to play; it offers a powerful means of prompting entrepreneurial initiative. But rather than being the default, it should become only one of several coexisting property regimes. These alternative regimes would involve more fragmentary, temporary, or conditional claims on property, substantially enlarging the number of people able to access productive resources or to exercise a say over their use. The experimental coexistence of different regimes would make it possible to compare their relative strengths in promoting inclusive economic development.

An important task, then, is to encourage various alternative property regimes to flourish. One set of approaches would focus on promoting more conditional and temporary forms of property rights, underpinned by stronger obligations of property ‘owners’ towards the wider social and natural environment. This would perhaps be better conceptualised in the language of **custodianship** than ownership. We are already seeing interesting experimentation in this area, with new legal forms in various countries that attempt to ‘lock in’ social value. In the UK, for example, the ‘community interest company’ model recasts companies as custodians, holding assets for communities, with limits placed on possibilities for private gain (although this is not completely ruled out). More recently the B-Corps movement has successfully promoted a model of governance that explicitly promotes social

and other objectives. 'Community land trusts' offer individuals with ties to a particular place or institutions the chance to buy an affordable home – with the condition that when they move on, they sell to fellow Trust members at a price set in line with local earnings rather than market rates.<sup>50</sup>

This logic of custodianship might be taken a step further. Take for example landlords. 'Unbundling' might in this case make the right to obtain revenue from renting conditional on the reinvestment of a part of that revenue in a way that creates public value – for example, increasing the energy efficiency of a property, or adding solar panels – as is already the case for many schemes requiring developers to contribute to public infrastructures. To take another example: the right of industrial firm owners to generate profits could be made more conditional on an obligation to invest in their immediate social and natural environment. This could include, for example, taking responsibility for the continuous training and development of workers (along the lines of Singapore's various productivity tax credits), and adopting environmentally-friendly technologies and practices (an approach increasingly taken with farming policies that support farmers both as food producers and as custodians of land).

Another approach to 'unbundling' might focus more on the distribution of control within firms – breaking up control over decisions about investment on the one hand, and decisions about the use of resources on the other.<sup>51</sup> While productive resources might be 'owned' by private individuals, control over the way in which production takes place might be more broadly shared out. Under such a property regime, the workers of a particular firm or industry might be entitled to a certain degree of participation in decision-making around the production process, without the private ownership of the means of production being removed altogether.<sup>52</sup> While such an order would not necessarily provide workers with an absolute or permanent right to job tenure, the owners of the company would, for their part, be denied absolute, permanent rights over the means of production.

A further promising field of experimentation – albeit focused less on the 'unbundling' of unified property than on 'shifting the bundle around'<sup>53</sup> – exists around models for the **collective ownership of companies**. The last decade has seen a renewed enthusiasm for cooperatives and mutuals, owned by customers or employees. More recently, the cooperative model has been applied to digital platforms, with examples of 'platform cooperatives' springing up across Europe and North America. A key question for policymakers is how to enable and incentivise growth of these models. The international Platform Cooperativism Consortium has proposed measures that the US federal government could implement, from public procurement incentives to 'virtual enterprise zones' with reduced federal tax rates. Meanwhile in the UK, the Institute for Public Policy Research (IPPR) has recommended a new 'right to own', giving employees the option to buy out a conventional business when it was being offered for sale.<sup>54</sup>

Another space for innovation is in **intellectual property**. The established law of patent and copyright is designed to provide incentives to innovation through offering temporary monopoly while requiring inventors to disclose their creations (although its success in doing both of these is regularly questioned: one study, for example, found that of innovations judged to be 'technologically significant' over a 27-year period, only around 10 per cent had in fact been patented).<sup>55</sup> In practice, patent law can also inhibit an inclusive knowledge economy, for example when rights holders demand excessive royalty payments for technologies that have become standards (such as wifi), or when patent owners try to block the sale of a product even when their rights only cover a tiny part of that product. This is a particular concern with products emerging from the knowledge economy – one study estimated that there could be up to 250,000 patents covering technologies within smartphones.<sup>56</sup>

Developments in copyright that make intellectual property more broadly accessible already exist but could be much more widely used. Creative Commons licenses, which allow licensors to specify conditions such as non-commercial use, are one such model. Open source software is another example, and a key opportunity for these to be used more effectively is in public procurement. Governments could, for example, move to a default of purchasing open source software wherever possible.

Other possible areas for experimentation include trialling different patent lengths to find an 'optimal' patent life that continues to stimulate innovation while also passing on benefits to society in the form of lower prices.<sup>57</sup> Potentially, different patent terms could be applied to different technology classes. The efficacy of innovation prizes, as an alternative to patents, could be tested.<sup>58</sup> Another possibility, while no doubt complex to deliver, is to create independent public trusts or foundations, empowered under rules and standards established in law, to organise special-purpose entities in which the many contributors to new advanced technologies would hold proportionate stakes.

#### 4.1.3 Opening up the internet and democratising data – the infrastructure of the knowledge economy

The previous sections have described the need to open up access to productive opportunity and promote new models of ownership. A crucial challenge is to apply these ideas to the core infrastructure of the 21st-century economy: the internet, and its key resource, data.

Internet pioneers began with profound hopes it would be an open democratic tool – freely available for everyone. But in its actual forms, it has become very different. Power is increasingly centralised among just a handful of large, monopolistic players. Google now has over 90 per cent market share in internet searches in some countries,<sup>59</sup> while Facebook has more than two billion users.<sup>60</sup> Google, Amazon, Facebook, Apple and Microsoft were in 2018 the five most valuable public companies in the world by market capitalisation.<sup>61</sup>

The disproportionate amount of power wielded by these tech giants means it has become very difficult for new players to enter the market. They have come to dominate their respective markets and wield disproportionate power, raising concerns about competition. In some cases, such as with Facebook and Google, their business model is based on what Shoshana Zuboff has characterised as 'surveillance capitalism'. They benefit from network effects and aggressive control over the data created on their infrastructures, making it hard for new firms to enter the market. While information remains by and large free to access on the internet, there are concerns that other features of the internet have not lived up to the democratised, level playing field for all as its early pioneers had hoped.

But it need not be this way. With the speed of technological developments, the internet will inevitably again be transformed in the coming years, offering an important opportunity for new, human-centric, narratives to replace the corporate values currently governing the network of networks.

A first challenge is to ensure **equitable access to the internet** in the first place. Half the world's population is now online, but growth in internet access has slowed down in recent years.<sup>62</sup> Getting more people online means addressing physical barriers – investing in broadband and infrastructure – as well as promoting accessibility for users with disabilities

and non-English speakers. However, not all types of access are made equal. Facebook's 'Free Basics' programme, for example, gives people in developing countries an opportunity to get online – but only to a small selection of Facebook-approved websites. Community-owned mesh networks are one way to provide access to the internet without relying on mainstream internet service providers (ISPs). Catalonia's Guifi.net, for example, provides internet access in rural areas that ISPs do not reach, while NYC Mesh was set up after the repeal of net neutrality laws in the United States raised the possibility that ISPs could block or slow down access to some services.

A second challenge is to **constrain monopoly**. Most of the issues the internet faces today are a direct consequence of the increased monopolisation of power over the internet, and the business models that sustain this dynamic.<sup>63</sup> The tech giants benefit from economies of scale and scope, and network effects. Their effect is potentially to restrict innovation, as smaller players are crowded out or acquired. They also act as gatekeepers to the online market and set the rules of engagement for consumers, workers and sellers – essentially acting like governments. Legal scholar Frank Pasquale calls this phenomenon 'functional sovereignty'.<sup>64</sup>

Several commentators have recently argued that competition policy has become too timid and has missed opportunities to constrain monopoly, particularly among the tech giants. Facebook, for example, has made 61 unchallenged acquisitions and Google has made 214, some of which took out major competitive threats (the purchase of Instagram by Facebook, or YouTube by Google, are key examples.)<sup>65</sup> One challenge for regulators in the knowledge economy is in interpreting the markets that the tech giants operate in to identify competition issues. In the UK, Facebook and Instagram were not seen as competitors, because Facebook did not previously have a photo-sharing app while Instagram did not rely on advertising revenue. Yet both are clearly in the game of 'connecting people' and creating online communities. Tim Wu argues that a narrow interpretation of competition law is also to blame. Since the 1970s, it has become accepted that a monopoly situation is a competition issue only if it can be shown that consumers are receiving a poor service or being charged excessively high prices. When services are free to access, and people are broadly happy with them, it is, therefore, harder to make a case that their providers are falling foul of competition law. Wu argues, however, that the original goal of the 'trustbusters' (the pioneers of competition law) in the US was not just to ensure consumers got a good deal, but that corporations did not accumulate excessive economic and political power.<sup>66</sup>

There is, therefore, a need both to apply existing competition law more robustly – for example, not shying away from blocking mergers or ordering break-ups – and to experiment with new practices. The UK's approach to market investigations, for example, is a relatively recent development that allows regulators to assess whether competition in a market is working effectively, where it is desirable to focus on the functioning of the market as a whole rather than on a single aspect of it or the conduct of particular firms within it.<sup>67</sup> Preserving net neutrality is fundamental. And there is clearly a need to find ways to tax platform companies more appropriately (for example, taxing by size of a company's user base or on revenue, changing the definition of 'permanent establishment' and cracking down on tax havens) to overcome the perverse situation where the biggest firms often pay the least tax.

### **New models of data ownership: a priority for institutional and legal reform in for an inclusive knowledge economy**

An inclusive knowledge economy requires changes in the forms of ownership not only of capital but of other strategic resources. Particularly important is the transformation of regimes around intangible property – notably personal data.

Currently, companies can exploit the personal data they collect in two key ways. Firstly, they can monetise this data through data brokerages and targeted advertising, often with little transparency for the user over which data is being collected, used and by whom. The financial returns can then be used to secure even greater market power through acquisitions or aggressive pricing. Secondly, businesses can use this personal data to gain a competitive advantage, by analysing it to spot opportunities for innovation and profit maximisation. Without access to this data, new market entrants are seriously disadvantaged and less able to design products and services which can compete for users.

The monopolistic approach to data control taken by the internet giants inhibits a more inclusive knowledge economy. It means that a handful of giant firms gain exclusive rights to crucial innovations. It also means that much of the potential social value of this data is lost since there is little incentive for these firms to use data other than for economic gain.<sup>68</sup>

It is, therefore, an important principle for a future knowledge economy that data should be under the control of the individuals who generate it. The fields of open data and government use of data analytics have established the huge potential for data to be used for social, economic or environmental impact.<sup>69</sup> Yet at present, for most personal data created on the internet, the decisions about which types of value to extract from data are taken by large internet companies that have little incentive to prioritise anything other than financial return. To change this, we need to give control back to the people who create this data in the first place.

The European Union is playing a key role globally, creating some of the first and most comprehensive data regulation to date. But even a policy as much touted as the General Data Protection Regulation (GDPR) suffers from significant time lags in implementation, and from too reactive and static approaches in its initial formulation, meaning that the ambitious data protection policy might not remain fit for purpose long as contexts and environments change. It may have the contradictory effect of benefiting bigger firms, which have more resources to devote to compliance.

Other emerging tools available to governments include opening up data and promoting data portability. The open data rules in banking, for example, require banks to give access to machine-readable, standardised data via open APIs and funding innovation processes to generate products and services that can use this data. This regulation opens markets up, reduces the gap between the big and the small, and accelerates adoption of new tools, such as AI-driven tools for managing cash flow, treasury or assets. These all form part of a wider set of tools for 'anticipatory regulation' that can play a big role in opening up the knowledge economy: testbeds and sandboxes to aid newcomers and entrants and using experimental methods to discover what works in assisting new industries such as drones, driverless cars or AI in health.

Data portability, meanwhile, is a right enshrined in the GDPR that means any individual can request that they be provided with their personal data in a machine-readable format so that they can take it with them to a new service provider, such as a bank, taxi app or apartment rental service. This is intended to address some of the problems created by network effects because it reduces barriers to exit for customers. It is hoped that this will make it easier for new market entrants to attract customers even where there exist network effects which give firms market dominance.

There are also a number of possible alternative institutional vehicles for increasing citizens' control over their data. 'Data commons', for example, seek to make personal data a shared resource that citizens can contribute to, access and use, as a common good. DECODE, a project involving fourteen organisations across Europe including Barcelona and Amsterdam city governments, is experimenting with a municipal approach to the data commons. It is developing decentralised technologies (including blockchain and attribute-based cryptography) which aim to increase citizens' control over data they generate, by establishing rules around who can access it, for what purposes, and on what terms. DECODE will also experiment with enabling people to share personal data for broader communal use, such as air quality or noise pollution data captured in the home, and in ways that are privacy enhancing and rights preserving.<sup>70</sup>

Another emerging set of approaches, 'data trusts', focus on creating legal structures to provide independent stewardship of data for the benefit of a group of organisations or people that wish to use it.<sup>71</sup> Data trusts respond to a clear institutional gap that is emerging, where there is potential for personal data to achieve public benefit. There are many categories of data (for example, urban data, ride-sharing data, or, in future, the data from autonomous vehicles) where there is a clear social need and value to be gained from widespread sharing. However, without new institutional forms, the existing options involve large, unaccountable companies being responsible for sharing this data. As Google's experiences with SideWalk Labs in Toronto has shown, there is insufficient public trust, accountability and governance mechanisms to enable this.

Data trusts are a potential solution to this problem. There is scope for a range of different types of data trust which can accommodate different types of data, different levels of individual control, and different circumstances for sharing. Work by Nesta and GovLab has been exploring these different options.<sup>72</sup> Pilots are being developed in various parts of the world, including by the Open Data Institute in the UK, and Canada's Centre for International Governance Innovation.

Finally, the principle of disaggregated property rights could be further applied through **different models of ownership across different 'layers' or component parts of the internet.** Parts of the physical infrastructure, such as cables, could be nationalised or owned at a community level (as is already common in some parts of North America and Europe); data could be held more often in trusts; while services on top of these could more often be provided by commercial companies, all supported by shared standards and protocols to ensure that systems are interoperable.



#### 4.1.4 Democratising the direction of innovation

Innovation has a direction as well as a rate. The idea that governments should be explicit and intentional about setting that direction has received welcome attention in recent years, especially in the work of figures like Tony Atkinson<sup>73</sup> and Mariana Mazzucato.<sup>74</sup> But how should this direction be chosen? Who should decide? And how should top-down missions, addressing vast challenges such as climate change, link to bottom-up missions that emerge from local concerns and deliberation processes?<sup>75</sup>

Many countries are trying to involve more people in setting research and innovation. In the Netherlands, policymakers have opened up policy processes which have been traditionally monopolised by the most successful companies and universities. The Dutch National Research Agenda was set following a bottom-up, open process through which some 12,000 questions were submitted by citizens and organisations. These were later distilled to 145 key research questions that are now setting the direction for government investment in research and innovation.

A danger of such exercises is that while they may provide greater opportunities for citizen input into innovation missions, they do not tackle the 'depoliticisation problem' of expert-led innovation policy. The preferences of individual citizens that are harvested may be somewhat 'pre-political', by contrast to the preferences of elected representatives who address the direction of innovation as part of a broader socio-political programme.

A recent analysis by the Joint Institute for Innovation Policy (JIIP) of 53 recent mission-oriented research and innovation initiatives in the EU and other mostly high-income countries found that most include information sharing activities, apparently intended to stimulate public buy-in.<sup>76</sup> But only a very few allowed serious citizen participation in the selection of missions. A few used open consultation methods which tend to favour the most vocal individuals; most simply provided the opportunity to refine or to provide feedback on already defined missions.

A far better approach must be to allow participation more upstream, shaping priorities in a more active dialogue of experts, citizens and democratic representatives.

#### Anticipatory regulation

A final strand of this new approach to economic policy is regulation. Regulation is in crisis all over the world, in part because of the pace of change in knowledge and technology. From personal data to drones and CRISPR gene-editing technology, the traditional rules are not working well, and nor are the traditional methods of making regulation. The result is a constant flow of problems, big and small.

The currently dominant models of regulation crystallised in the 1980s – with arm's length bodies and an emphasis on setting simple and stable rules to allow for predictability and competition. The main ideas came from the boundaries of legal theory and neoclassical economics. The role of regulation was to provide a predictable environment for market forces to function.

In some sectors these worked well, at least for a time. But they have largely failed to cope with the recent shifts in the economy, from the rise of platform giants using vast quantities of data to new technologies that require whole systems to change, like driverless cars or responding to climate change through creating a circular or carbon neutral economy.



To cope with these fast-moving technologies very different models of 'anticipatory regulation' are now springing up around the world that apply some of the methods of the digital economy to regulation itself. These aim to make it easier for regulations to adapt fast, allowing startups to influence the rules as well as big incumbents.

A first big shift has been in the use of simulations to work out how regulation can adapt to new products and services. Finance led the way with regulatory sandboxes that brought together innovators and regulators, and these are now being adopted in many other industries. Another shift is the use of live experiments to test out potential problems and issues. There are now dozens of testbeds for driverless cars, some for drones, and others for smart cities. Their premise is that real-life experiments are the best way to flush out potential regulatory problems.

Open data is then used to open up competition and strengthen the power of users. Here the UK is one of the leaders with rules on open banking that gave customers control over their data, and then involved the regulator – the Competition and Markets Authority – in requiring the big incumbents to finance innovations that could make most of that data. Many governments are now considering similar methods as a way to reduce the dominance of the big platform companies – allowing consumers more control over their data, and a bigger role for third parties to serve them.

Politicians in many countries now recognise that regulatory innovation is a critical aspect of national comparative advantage. Nations and cities that can get regulation right will tend to attract the frontier industries and technologies, from AI to autonomous vehicles. Dubai, Singapore and Canada are among the places seeking to earn a reputation for anticipatory regulation, and the UK last year set up a Regulatory Pioneers Fund that supports individual regulators to help them experiment in everything from the use of AI in law to automated boats.

But the regulators also need to address the distributional effects of new technologies. These questions were largely ignored in the dominant models of the 1980s and 1990s (though they had been very prominent in earlier periods). Now they are set to become much more central once again, precisely because of the very uneven impact of new technologies for mobility, medicine or education.

It is also clear that regulation can no longer be thought of as a purely technocratic exercise. If the public are not engaged actively, there are highly likely to be backlashes which will then make it even harder to deploy new technologies. This is what happened in past decades with nuclear power and GM crops, and it is easy to see how history could repeat itself with genetic modification, AI or drones. Uber's experiment with driverless cars in Arizona is a classic case – because there was no public involvement, a single accident, which was caused by human not machine error, led the whole programme to be shelved. Google's Sidewalk Labs made similar mistakes in Toronto, failing to see how vital it was to engage the public and grow their trust.

The shaping of markets cannot just favour the frontiers. It has to also put the rest of the economy and the rest of society in the frame too, not so as to freeze progress, but rather to bend it in directions where there are many more beneficiaries from the potential of everything from gene editing to cryptocurrencies.

## 4.2 Establishing a social inheritance

A more widespread knowledge economy rests not only on reshaping the institutions of the market economy. It demands an experimentalist impulse in every part of social life. To realise this cultural change, we need education that fosters an attitude of lifelong questioning, and social protections that make it possible for their beneficiaries to remain unafraid in the midst of quickened change.

### 4.2.1 Education

Education is one means to enable broader participation in the knowledge economy. But its importance is greater than this. We must **equip citizens not only to participate in the economy and society but to transform it**, through a lifelong education system that promotes cooperation and prioritises the power of the imagination.

The central question for education today is usually taken to be how to help many more people – both young and middle aged – to be ready for changing demands at work. Framed in this way, the policy challenge is to respond to new demands at the top end of the labour market for digital, science, technology, engineering and maths (STEM), and creative skills, while also preparing and adapting to the likely destruction of many middle-level, routine, physical and administrative jobs.

Compared with mass production, the knowledge economy requires its participants to have more advanced capabilities. Machines controlled by digital technologies, such as programmable robots or 3D printers, are not tied to particular lines of production or defined professions. The distinctions between inventing, reprogramming and using these machines have been blurred, so those using them must have some of the capabilities and attitudes of inventors.

The knowledge economy, therefore, calls for **education, both in youth and throughout life, that develops character, mindset, and non-cognitive as well as cognitive skills**. This style of education crosses the divide between general and technical education. Rather than emphasising job-specific and machine-specific skills, it requires a new model focusing on generic, flexible, high-order capabilities. Moreover, if knowledge is to be shared and used effectively, firms need to trust their workers and grant them greater levels of discretion. The education system, therefore, needs to teach people to exercise such discretion and to deserve such trust.

Yet as crucial as these immediate questions are, they also form part of a larger challenge: how to equip every student with the tools they need **not only to flourish within their societies as they currently exist but to transform them for the better**. Teachers and students must have the political, legal, and financial means to deal experimentally with the central tension in education under democracy: preparing people to flourish within present arrangements and assumptions while equipping them to defy those assumptions and arrangements.

Education for an inclusive knowledge economy – whether in general or technical education, young or in lifelong learning – therefore, demands four basic elements.

Firstly, it must give priority to **analytical skills**, and more generally to the powers associated with the **imagination**. Acquiring knowledge is necessary, but not sufficient. Students need to be able to critically evaluate what they learn and imagine ways in which their knowledge could be applied. In developing the requisite skills for participation in the knowledge economy, engagement in depth across disciplines, around themes or projects, counts for more than memorising facts.

Secondly, curricula should be **interdisciplinary and dialectical**. Students should have the opportunity to engage with different subjects and methods from contrasting points of view. University culture tends to marry method to subject matter. Thus, economics becomes not the study of the economy, but the study of a method pioneered by the marginalist economists at the end of the 19th century. In contrast, a dialectical approach to education would propose more depth and openness, jumbling up disciplines and methods. It would aim to form a different mindset: one that refuses to treat radical doubt and intellectual experimentation as the prerogatives of genius and turns them instead into a common possession.

Thirdly, education systems should promote **cooperation in teaching and learning** instead of the authoritarianism and individualism that has often characterised the classroom. There should be a wide range of experiments in cooperative practices, including the teaching of students by other students. A radically more inclusive form of the knowledge economy requires high levels of trust and collaboration, and how we teach and learn can help this culture to take hold.

Fourthly, education systems must give space for the **creativity of teachers**. This programme cannot advance if it lives only in the minds of a small coterie of visionaries, politicians, and civil servants. It also needs a pedagogic vanguard: thousands of teachers and educational activists committed to develop such a programme and to make it work. This, in turn, requires a strong, professional and accountable public sector, able to attract and retain talented and ambitious staff.

The style of education described above contrasts with the broad direction of education policy in some advanced countries, in a widespread culture of assessment of student and school outcomes that puts pressure on schools and leads them to 'teach to the test'.<sup>77</sup> However, there are examples and emerging practices that demonstrate how a different approach to teaching and learning might be realised.

South Korea's high-pressure education system is one of those known for a strong focus on exam results. Nevertheless, it has recently started to emphasise creativity and collaboration through a new curriculum that aims to prepare students with skills for a changing labour market and society. The revised national curriculum, which will be implemented from 2020, places a high priority on competencies such as self-management, knowledge and information processing, creative thinking, aesthetic sensibility, communication skills and civic competency. These key competencies will act as fundamental guidelines for the teachers in both teaching and student assessments. The curriculum also brings liberal arts and sciences together, instead of separating students into two tracks. This more integrated curriculum is specifically designed to help foster creative thinking and innovation.<sup>78</sup> (Whether this will reduce students' high levels of stress and anxiety remains to be seen.)

Singapore, which is consistently rated as having one of the most effective education systems in the world, is well known for promoting '21st-century competencies' through its school curriculum. The government's 'Desired Outcomes of Education' include a range of skills such as critical thinking and social competencies. They have also, crucially, changed their assessment system to incentivise teachers and students to care about these skills. The OECD's decision to start measuring collaborative problem solving as part of the Programme for International Student Assessment (PISA) provided the first internationally comparable dataset on students' ability to work together to solve problems. Its report on PISA 2015 noted that few countries teach collaborative problem solving directly. Singapore is an exception – its 'Project Work' programme was set up in 2000 to 'provide students with the opportunity to synthesise knowledge from various areas of learning, and critically and creatively apply it to real-life situations'.<sup>79</sup> Singapore came out top for collaborative problem solving in PISA 2015, with students achieving a mean score of 561 in the assessment, compared with an OECD average of 500.

Interdisciplinary learning is also being practised in some settings. A concrete example is phenomenon-based learning, a form of pedagogy in which students study concepts or topics rather than specific subjects. Finland, another high performer in international education rankings, made phenomenon-based learning a mandatory part of the curriculum in 2016, alongside traditional subject-based learning. Phenomenon-based learning takes real-world topics (such as 'water' or 'immigration') and lets students study them from different, sometimes overlapping perspectives. The Finnish education system is also distinctive for the level of professional autonomy it allows teachers: 'a system based on trust, rather than control', according to the Finnish National Agency for Education.<sup>80</sup> Schools in Finland are not restricted by high-stakes national testing: just three per cent of students are in schools that publicly report achievement data.<sup>81</sup>

Lighter touch versions of project-based learning, which aim to deepen students' knowledge and skills through focusing on a 'real-world' challenge or question for an extended period, are also becoming more popular in the USA and UK, although evidence of effectiveness is still relatively limited.<sup>82</sup> Models of interdisciplinary learning are also emerging in the university sector. For example, the Norwegian University of Science and Technology runs a 'Masters in Teamwork', in which students from different disciplines work together to address a specific challenge, as well as benefiting from close collaboration with the university's R&D partner.

#### 4.2.2 Social security in an inclusive knowledge economy

What kinds of welfare state are now needed to support and sustain a more inclusive knowledge economy? One possibility is an extreme version of redistribution. In this view, the new economy is irredeemably unequal. It therefore follows to encourage the maximum adoption of artificial intelligence and other advanced technologies, to tax them and use the proceeds to finance universal basic incomes of one form or another.

Clearly, redistribution is necessary to create an inclusive knowledge economy, and an important debate is now starting on how the winners from new waves of AI can compensate the losers. In a recent paper, for example, Anton Korinek and Joseph Stiglitz discuss the role of wage subsidies and tax credits, as well as measures to incentivise resource-saving innovation (e.g. carbon taxes) and capital-augmenting innovation (e.g. eliminating tax reductions for interest and introducing capital taxes) instead of labour-saving innovation.<sup>83</sup>

Yet, an inclusive knowledge economy cannot be created through redistribution alone. Social policies which deny large parts of the population a chance to make and shape the new economy – as well as the chance to directly take the share of its wealth that they deserve – are both morally and politically dubious. Instead, we must provide a secure basis for all to participate fully and develop their capabilities.

Welfare states in developed knowledge economies should help people adapt to change: promoting cooperation, addressing precarity, and providing support with new skills. They should promote agency, so that people can determine their futures, transform their skills, and navigate their way through a constantly changing array of opportunities.

To do this, we need to establish a **social inheritance**. We define this as the inheritance of vital resources by everyone from everyone. The goal of this is to allow all to remain fearless in the midst of surrounding change, uncertainty, and conflict – not just a moneyed few.

There are many possible forms these safeguards and endowments could take, but they must share some key characteristics: they should be vested in every individual, independently of holding any particular job, and they should be universally portable, moving with workers from job to job.

This is widely accepted in relation to early childhood – and many countries have built up provision of care, rights to time off, and developmental support, knowing how crucial the first few years are in shaping future life chances. These need to be matched by stronger rights **to improve and update skills throughout life**. Lifelong learning has been talked about for many decades. But in the great majority of countries it hardly exists, and certainly lacks the resources, structures and political influence of traditional primary, secondary and tertiary education. A more comprehensive approach would combine rights to learn (including credits and rights to time off), systems to help people navigate, and widely accessible provision.

We can see some of the elements of a future system already. One model is to offer adults personal accounts with which they can buy training. The concept of individual learning accounts has been around for some time; the UK piloted a version in the late 1990s, but abandoned it soon due to mismanagement and fraud. However, there is a resurgence of interest in these models, and countries now considering them have the opportunity to learn from earlier experiments,<sup>84</sup> as well as to test different models, such as crediting accounts at particular ages or after life events such as redundancy.<sup>85</sup> Singapore and France are among countries that have recently put such policies in place. SkillsFuture in Singapore offers 'study awards' of S\$5000 to early and mid-career employees to help defray the costs of learning (although numbers of awards available annually are limited). In France, the Compte Personnel de Formation (individual training account) credits full-time workers with 24 hours of training per year worked, up to a maximum of 150 hours. This model could be extended beyond providing funding to cover fees; potentially, accounts could instead provide stipends to support learners, allowing them to work part-time (or not at all) while they update their skills.

A social inheritance could also include rights to income that can be freely used rather than restricted to certain purposes. Basic income experiments, to date, have shown that recipients often use their income to help fund learning, early-stage entrepreneurship, or time to care for family. Current experiments need to be extended, not ended; different models could be tested, recognising that a one-size-fits-all solution to welfare is unlikely to be effective for widely varying needs. It should complement, rather than completely replace, other safeguards.

Endowments are another part of the answer. The UK was an early experimenter here, trialling a Child Trust Fund, which granted all children born between 2002 and 2011 a cash endowment of £250, held in a savings account. Drawing inspiration from the range of countries with established sovereign wealth funds, UK-based think tank IPPR has recently suggested setting up a Citizens' Wealth Fund which would pay out a dividend, in the form of a 'universal minimum inheritance' of £10,000, received at age 25. This line of thinking has been pushed further by Martin O'Neill and Stuart White, in their exploration of possibilities for a Citizens Trust: a portfolio of income-generating assets, acquired by the state, that could be used to generate a social dividend shared between citizens.<sup>86</sup> Similar proposals have focused on providing citizens with endowments of equity in innovative companies – after all, if robots are taking jobs, then it makes sense to broaden ownership of the robots.<sup>87</sup>

To ensure these endowments have the right effects, they need to sit alongside safeguards, such as new rights for employees. For example, in 1999 Austria introduced a right to request training leave for all workers who had been in a job for more than one year, and it also offers the equivalent of unemployment benefit to people who take time out to re-train. Deliberate policies to reduce working time – where desired – are also part of this story. Examples include measures for spreading work (long part of Germany's mechanisms for responding to recessions), rights to time off and reducing the length of the working week (as in the Netherlands where the typical working week is now 29 hours according to the OECD, the lowest in the world).<sup>88</sup> The role of collective power and trade unions in achieving these new rights is also likely to be crucial (see section 4.3.3).

For those rights to be useful, there needs to be support and advice. There are many tools to help people assess their skills and discover what skills they need to get a new job. But a much bolder, comprehensive and publicly-supported solution is needed, providing information and advice as a commons rather than a private service, and combining online help with funding for mentors and coaches. This is the basis for the 'Open Jobs' idea – a public pooling of data about current skills, a job's demands and likely future trends to underpin a series of services helping people navigate through a potentially turbulent labour market.

## 4.3 High-energy democracy

To take charge of the knowledge economy, we need to spread the habits of creativity and agency into democracy itself.

The establishment of parliamentary democracy in much of the world over the 19th and 20th centuries has been hailed as a great achievement. But too often, democracies, in reality, allow for only a pale political rendition of the contending forces in society. When there is an impasse, they fail to resolve it quickly and decisively. They treat strong central initiative and devolution to local government as if they were inversely related, when in fact we can and should hope to have more of both. With rare exceptions, they keep citizens at a low level of engagement in political life. As a result, they are easily captured by organised interests. Radical reform is near impossible, except in circumstances of economic crisis or military conflict. The current institutions of parliamentary democracy are not strong enough to resist unequal economic orders; neither can they compete with populist movements that claim to have an answer to the problem.

There is a pervasive assumption that politics must be either institutional and cold, or anti-institutional and hot. Building a truly inclusive knowledge economy, however, requires that we work towards a politics that is both vibrant and institutional. To do this, we need to foster



what might be called 'hot constitutionalism': a democratic order that is more dynamic, with much higher participation and a more active civil society. Democratic practices and values need to become a more prominent feature of everyday life, and not just confined to occasional elections.<sup>89</sup>

#### 4.3.1 Hot constitutionalism

Hot constitutionalism requires a substantial heightening of the level of organised popular participation in political life. A range of institutional innovations could transform the temperature of politics.

To work, we first need to ensure that power in the economy is not reproduced in politics. This has been a constant struggle through the era of democracy and has led many countries to introduce restrictions on private finance of political parties, public funding to replace it, and other measures like mandatory voting to prevent the disenfranchisement of the economically marginalised. Measures of this kind need to be strengthened and kept effective.

Then **representative democracy needs to be enriched with, but not replaced by, elements of participative democracy**. Some existing experiments to insert participative democratic processes into representative democracies show how this might be done. Such experiments have aimed to open up opportunities for making legislative proposals, shaping the spending of budgets, and participating in democratic deliberation.

For example, Barcelona and Madrid are showing how new platforms can be integrated with city government, allowing citizens to propose policies, comment, deliberate and vote. 'Decide Madrid' and 'Decidim Barcelona' emerged from the political transformations in Spain following the 2011 'Indignados' movement, which decried austerity and demanded greater democratic accountability. The 2015 municipal elections saw substantial changes in the composition of major city councils, with the rise of parties that had emerged from the Indignados movement, such as Podemos. These changes led to the launch of online participatory processes in Madrid (from 2015) and Barcelona (from 2016), using the open source software CONSUL.<sup>90</sup>

While Decide Madrid has primarily served as a tool for sourcing proposals and participatory budgeting, Decidim Barcelona has been used to support the drafting of the city's 2016-2019 strategic plan. Both initiatives have attracted widespread attention, and there are indications of success in terms of increasing democratic participation. Decidim Barcelona has increased transparency and led to citizens making a number of proposals that have gone on to receive widespread legitimation and be incorporated into the city's strategic plan.<sup>91</sup> Ninety cities across the world are now using CONSUL for participatory processes inspired by those of Barcelona and Madrid.

Another example, similarly emerging from a moment of wider political ferment, is vTaiwan, a consultation process born out of the 2014 Sunflower movement, in which peaceful protesters occupied the Taiwanese Parliament in response to a proposed trade deal with China. Following the landslide defeat of the ruling party, the new digital affairs minister proposed the development of an online consultation process by g0v, a group of digital activists who had played a leading role in coordinating the protests. The platform was designed to be independent of government, with the consultation process facilitated by g0v.<sup>92</sup>



To date, the vTaiwan process has been successfully applied to a range of issues. Results include a crowdsourced bill on Closely Held Company Law successfully passed through parliament, the ratification of six laws regulating ride sharing (addressing fair competition, taxation and insurance), and new regulatory agreements around the local operations of Airbnb.<sup>93</sup>

Most of these cases combine direct and representative, digital and non-digital forms of democratic engagement. They show in practice that the idea of a hot democracy is no longer utopian. The institutional forms useful to achieve this hybrid form of democracy depend on the circumstances and history of each country. Attempts to uncritically adopt 'best practice' from other countries are unlikely to succeed. But these practices show a variety of paths that could inspire a wide range of adjacent possibilities and are far preferable to authoritarian populism or a return to plebiscitary rule.

### 4.3.2 Experimental government

**The corollary of hot democracy is hot government.** The idea that governments should experiment is not new. China has a very old tradition of testing ideas out before taking them to scale. 19th-century reformers in the West, inspired by the achievements of science, often advocated a deliberately experimental approach too.

But this idea has rarely been enthusiastically embraced. The public are not keen to be guinea pigs. Politicians fear being crucified for the failures and given no credit for the successes. Others worry about the ethics of experimental methods like random assignment – if a new approach looks promising, shouldn't everyone have a right to benefit from it?

Yet the benefits of experimentation are huge. They allow governments to mobilise knowledge, to tap into the creativity of their civil servants and the public, and to avoid the vice of believing that they have a monopoly on wisdom. A government that is fully open and experimental unlocks its imagination.<sup>94</sup>

During this decade, a few governments have started moving in this direction as a deliberate alternative to authoritarian and dogmatic approaches to policy. Finland, Canada and others are committing to experimentalism as a norm, and applying it in areas from new models of welfare to teaching, health provision to transport. They recognise that it is far better to test ideas out on a small scale rather than on a whole nation and better to let promising ideas improve before they are imposed on everyone. Nesta's Innovation Growth Lab now runs experiments with governments in many countries as does the Behavioural Insights Team – and have found that initial resistance in government quickly fades away as the advantages become clear.

There are many ways to experiment. Randomised controlled trials (RCTs) can be immensely useful, particularly in fields where they are uncommon. They are now being used in education, in business support (including the Business Basics Fund mentioned in section 4.1.1 above) and in welfare. But as medicine and healthcare have discovered, RCTs are far from being panaceas and are often most useful in combination with other kinds of evidence. They are only one tool, they are not always the best tool, and they are not well suited to testing many types of policy.

The experimental mindset tries ideas out as a matter of course, ideally fast and on a small scale, before generalising.

Experimentalism does not work in every field. No amount of experimentation will persuade people to change their minds on issues like same-sex marriage or whether bankers' bonuses should be taxed. These, and many other choices, have more to do with values. Other areas are just too messy and systemic, like wholesale banking reforms, to be easily testable. There is also a challenge of timing. Governments often do slowly what should be done fast, and fast what should be done slowly. Ill-thought-out reforms are rushed into implementation at great cost. The experimental method offers a reasonable compromise – fast action, but on a small scale, leading to phased adoption at a larger scale. That gives politicians plenty of examples to point to, but at less risk. But that may not always be possible, and there is an unavoidable tension between the demands of the public, as represented by politics, and the ideal of cool and calm experimentation. The public understandably want problems to be solved and are frustrated by inaction. Telling them that a useful pilot is underway that will provide lessons in five years' time is unlikely to be very satisfactory.

However, this shift in the everyday habits of government is hugely important and affects everything else in this paper, which should be amenable to testing and improvement rather than dogmatic imposition. Humility is the starting point for good government.

### 4.3.3 An empowered, independent civil society

A hot democracy should reflect a hot society, able to imagine and reinvent itself. That requires a healthy, confident and strong civil society. Within this, we include the many institutions of charity, community and social enterprise, as well as trade unions.

During past periods of economic change, the quality of civil society has had a huge influence on growth. The classic (if contested) example is the different patterns of development in northern and southern Italy. While the north has a civic tradition that has underpinned a collaborative approach to economic development and the development of regional specialisms, in the south a different kind of network – closed and familial – has been associated with economic capture and stagnation. The work of Ferragina<sup>95</sup> and others has usefully cautioned against simplistic assumptions of causality here – the underdevelopment of the south might convincingly explain its lack of social capital, rather than the other way around. They also warn against an over-deterministic view of particular historical events as an 'original sin' that will forever condemn a region to low trust and low development. However, the core insight that certain kinds of networks and associational life can underpin innovative economic initiative remains powerful.

A strong civil society rests on legal foundations – legal forms that guarantee independence and freedom from manipulation from the state. It also rests on economic foundations – flows of money and capital that in the past were mainly gifts, and now include capital, crowdfunding, and public contracting. But these foundations need to be reimagined for an era when knowledge in all its forms is so important.

The core concept we need is the idea of **social innovation** – the idea that societies themselves should have the means to imagine, experiment and create their own futures. In its minimalist versions, this means a more active world of Non-Governmental Organisations (NGOs), experimenting with new models of social care or recycling. In its more maximalist versions, it implies the deliberate prefiguring of different ways of ordering society itself.

The infrastructures of social innovation have advanced greatly over the last decade with new government programmes (in countries such as Korea and Canada), new funds, new legal forms, new tax treatments and radical new approaches to capital, like mobilising unclaimed bank accounts to support new social banks.

Social innovation still receives only a fraction of the support for more traditional innovation in hardware.<sup>96</sup> But a more inclusive knowledge economy must be one in which civil society is able to shape the fourth industrial revolution – with access to skills, finance and influence. Currently, it is playing a small role in the fourth industrial revolution, whether as a user of technologies, a shaper or an influencer.<sup>97</sup> This means that opportunities to harness new technologies for public good are being missed, and also that the voices of those most at risk of losing out as a result of technological developments are going unheard. To address this, funders need to invest in upskilling civil society to use digital tools, as organisations like cibervoluntarias in Spain and CAST in the UK are doing, and to actively support digital social innovations and initiatives that apply digital technologies for social purpose.

The recent EU Declaration on Social Innovation represented a major step forward with a comprehensive set of proposals covering everything from public funding to R&D.<sup>98</sup> It also addressed the need to provide resources for social imagination and activism on the part of the excluded, recommending that stipends be offered for grassroots activists and leaders, which would enable them to devote more time to organising and orchestrating associational life.

The corollary of a vibrant civil society is a more porous and open state. This is the model taking shape in cities like Seoul or Barcelona where the machinery of the state is being opened up to allow for more engagement and participation in everyday decisions, or in the experiments using public funds to support social movements directly.

One approach that has been able to breathe life into the existing structures of local and national democracy is broad-based community organising. This brings together organisations in a city, district or region that may have substantial ideological differences – churches, mosques, unions, schools – around issues by which their members are commonly affected, such as low pay and inadequate housing. Such broad coalitions, often using imaginative and theatrical methods, have enabled typically marginalised groups to place considerable pressure on employers and local and national governments. A notable example is the Living Wage Campaign, in which members of the Citizens UK alliance put public pressure on a wide range of employers to voluntarily pay a 'Living Wage' (the minimum income required to afford an acceptable standard of living, calculated against the cost of living). The campaign involved large numbers of ordinary citizens not engaged in traditional politics. Beyond direct benefits for over 70,000 families who have been lifted out of working poverty by the Living Wage since 2001, the campaign influenced national policy debates, and played an important role in the UK government's announcement in 2015 of the 'National Living Wage'.

These face-to-face models need to be connected with the potential of digital activism, particularly around the crucial battles of the next decade, like the shaping of AI, the future of work or privacy. Without 'vertical integration',<sup>99</sup> grassroots associations risk remaining marginal to struggles over the shape of the fourth industrial revolution, while high-tech activists risk becoming a narrow cadre whose preoccupations do not become the object of mass anger and concern until it is too late (as is the danger with such issues as data sovereignty and algorithmic justice).

The potential of such alliances between grassroots and digitally-savvy actors has been demonstrated by various initiatives in the field of accountability. An example is P-tracking (participatory tracking), developed by the World Bank Social Observatory to help monitor a poverty alleviation programme in the Indian state of Tamil Nadu. Members of a village women's self-help group are trained to carry out tablet-based surveys measuring various dimensions of wellbeing and empowerment that they have identified as significant. But rather than just being transmitted to managers or external researchers, this data is turned into a tool for local action. To make it 'legible' in a context of high illiteracy, the data is visualised in a graphic display, which allows a village to compare its performance with that of its neighbours. The self-help groups are trained to use the data visualisation to take problems to local political assemblies, in order to shape the programmes of local decision makers and to hold them to account on commitments made.

Finally, this vision for a more empowered civil society must encompass the world of work, ensuring both a sense and a reality of power for the citizen as a worker. In some countries trade unions are responding with energetic innovation, rethinking what their role could be as champions of skills and retraining; organising time in more progressive ways; and moving into the most precarious fields. There are some big examples like the Freelancers Union in the USA which has successfully agitated for more timely and consistent payment at state and city government level, as well as for rights to healthcare access; and some much smaller ones like the partnership between Community (a UK trade union) and the Welsh social enterprise Indycube, which gives self-employed workers who join access to legal advice and representation as well as specialist support on matters such as contract disputes, copyright law, intellectual property, and shareholder agreement.

5

Conclusions:  
unleashing the  
imagination

**The confinement of the knowledge economy contributes to stagnation and inequality. But it also contributes to the confinement of the human spirit.**

The power of the human imagination is its ability to see beyond the limits that appear natural and ordained in the world around us, and to push forward into the realm of the adjacent possible. At the heart of the knowledge economy is the reshaping of production, so that it comes to resemble the workings of the imagination more closely. A knowledge economy in which many can take part holds the promise of advancing human freedom and realisation.

But so long as the vast majority of people, even in the richest countries, are excluded from forms of economic activity which give adequate expression to their imaginative powers and humanity, they are belittled. Their innate human worth and potential is denied.

To change this, we need to unleash our collective political and institutional imagination. This paper provides a sketch rather than a detailed programme. It points to the actions in the present which contain the seeds of more ambitious actions in the future.

Its central argument is that the knowledge economy does not have to be confined and contained, and that an alternative approach is in reach which democratises it. This requires changes in many fields, from education to regulation, social security to ownership.

That is partly a matter of technical design. But it also involves the stories societies - and politicians - tell. Our story is not simply about economic growth, but about the power potential of the individual and collective imagination. It is a story of people taking control as makers, not just as consumers. Our contention is that this story will resonate and inspire far more than the alternatives of trickle down or retreat.

# Endnotes

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