

Transformations of advanced capitalist democracies in the digital era

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journals.sagepub.com/home/trs**David Soskice**

London School of Economics, London, UK

Introduction

I would like to start by thanking Martin Höpner for his superb review essay of *Democracy and Prosperity*, which Torben Iversen and I published at the start of 2019. Martin Höpner's review essay, published in *Transfer* 3/2021, is powerfully written and insightful, it covers much ground, it is sympathetic but critical, and it certainly pulls no punches in the critical sections.

This piece is not a direct reply to Höpner's criticisms. I want rather to put our position in a somewhat different – perhaps less bald – way than we did in the book (benefiting from at least three years of reflection, discussion and commentary by others since we sent the draft to the publisher). I would also like to use this essay to sketch out ways in which one might think about extending the argument. A fundamental starting point is Martin Höpner's perceptive comment that the book is a theory of advanced capitalism, not a development of our intellectual background in essentially static varieties of capitalism. As a theory of advanced capitalism our approach is Schumpeterian, dynamic and historical, rooted in changing technological regimes and hence also potentially unstable over long periods. We regard governments of advanced capitalist states as critical to successful technological regime-change and to innovation. By contrast with Marxist approaches, the driver of advanced capitalist democracies is government responsiveness to conflicts between progressive, aspirational and more highly educated and skilled forces in the electorate and conservative, reactionary and populist forces. We theorise why we believe that progressive democratic forces win out over the long run in a technological regime – here in the putative future Polanyian second movement discussed below, as graduate jobs and graduates become an increasingly large proportion of the workforce (and as in the Fordist regime throughout the *Trentes Glorieuses* an increasingly large proportion of the workforce had well-rewarded unionised employment).

But the ICT revolution also sharply increased market income inequality, as Piketty has notably pointed out (Piketty, 2014). It has been widely assumed that democratic governments are unable or unwilling to correct this through redistribution. This (as it turns out largely wrong) assumption has been justified by appeal to the political power of advanced capitalism or the wealthy, or to the

Corresponding author:

David Soskice, London School of Economics, London, UK.

Email: D.W.Soskice@lse.ac.uk

ability of footloose advanced capitalists to move to lower taxation regimes. An important argument in the book (and set out below) is that advanced capitalism is not politically powerful, even in the United States. Instead, as Elkjaer and Iversen have recently and very persuasively shown, democratic pressures in the advanced states substantially mitigate market income inequality through redistribution, for middle and also poor income groups (Elkjaer and Iversen, 2020; Elkjaer and Iversen, 2021).¹ The only exception to this is the United States. I want to argue in the second part of this essay that the United States is also exceptional as the driver of radical frontier innovations, and that this success may be linked to its failure in redistribution to the poor.

(Later in this short essay I explain how I believe ‘varieties of capitalism’ needs to be fundamentally reconfigured as an interrelated system of autonomous democratic states, in which the United States has a driving role as generator of radical innovations.)

Much commentary on the book has focused, unsurprisingly, on the deep problems of contemporary advanced capitalist democracy, particularly in the United States. I show how those problems are understandable as an integral part of the massive creative destruction caused during the opening decades of a new technology regime (the ICT revolution), just as it had been by the Fordist regime in the 1930s and 1940s.

In justification, the book covers the whole century from the end of the First World War. It poses what is still a remarkable fact in need of explanation, namely how the then (early 1920s) advanced democratic capitalist nations are still advanced capitalist democracies today (with the partial exception of what was then called Czechoslovakia) and with the addition of just four countries (South Korea, Taiwan, Singapore and Israel). Critically, this occurred during what has been the most turbulent century in recorded history with the exception of the fifth century CE and the collapse of the Roman Empire. For between the 1920s and the present day all the following occurred: a world war, the rise and fall of the Soviet empire, the rise of China, the changing roles of gender and higher education, decolonialisation, globalisation, and the rise of the EU. Underlying all these developments in very different ways have been the massive changes in technology regimes. These include the scientific revolution of the late 19th and early 20th centuries, then Fordism, and both the extended collapse of family/peasant agriculture in the first half of the 20th century and, since the late 20th century, the ICT revolution. They have all radically shaken established societies.

Why then have advanced capitalist democracies been so resilient? Our very broad answer was that governments in the advanced nations were: (i) autonomous; (ii) chose or underwrote broad policies that promoted advanced innovative capitalism, instead of either crony capitalism, as in Latin America and elsewhere (where capitalist groups exchanged profit-sharing with politicians for protected markets) or some form of state socialism. These policies included broadly open competitive markets, cooperative industrial relations, strong systems of education and training, and strong publicly underwritten research and higher education systems. These policies changed as technology regimes changed. Finally (iii) in order to be electable in democratic societies governments needed to be responsive to the ‘progressive’, more educated, more aspirational groups in society (often including unions). Our point here is not that these groups necessarily constituted electoral majorities, nor that they agreed on distributional or social issues, or voted for the same party; simply that they would not vote for parties or leaders whom they saw as incompetent at ‘progressive’ economic management.

1 One issue we need to resolve is how the progressive aspirational electoral forces promoting the broad conditions that enabled the ICT revolution to flourish aligned themselves on the redistributional issue.

Why were/are these electoral choices in the interest of the more progressive, educated, skilled and aspirational forces in these advanced capitalist nations? The fundamental reason (under a broadly Fordist regime or in the knowledge economy) is that skills and cooperation are complementary to more innovative, higher value-added activities. Thus (in the relevant world) we would expect unions to bargain for increased training in exchange for cooperative workplace environments, just as aspirational voters in a knowledge economy would be concerned that governments were promoting innovative capitalism.

These progressive electoral forces, as stated earlier, were periodically (and still are) in conflict with conservative forces of populism and reaction. We will explain later why, over the long run, we expect the progressive forces to win in most advanced capitalist democracies.

A Polanyian analysis of the ICT revolution as a technology regime: dynamic instability and democratic conflict

For many readers, the title of our book *Democracy and Prosperity* is utopian and over-optimistic. In fact, our picture is meant to be optimistic only over the long run. Indeed, the first major point to be made is that the ICT revolution should be seen as a very long-term process (and very much unfinished). Our approach is set within the intellectual framework of technological regimes (Dosi, 1982; Freeman and Louçã, 2001; Perez, 2010), with the ICT (or Digital or Information) revolution as the contemporary technological regime.

As Schumpeter argued with his notion of creative destruction, changes in technological regimes generate massive disruption to most aspects of the social economy (Schumpeter, 1942; Breschi and Malerba, 1997; Breschi et al., 2000).² Capturing ‘creative destruction’ the ICT revolution can be analysed, greatly simplified, in Polanyian fashion, as three broad (partially overlapping) phases – with the third phase (Polanyi’s *second movement*) very much unfinished.

Phase I

In the first phase governments adopt key elements of liberalisation designed to limit the ability of established institutions (notably the major corporations of advanced capitalism under the pre-existing Fordist technological regime, the associated unions, and many parts of the government and public sector) to block the ICT revolution. This includes opening up financial markets domestically and internationally, abjuring fiscal policy and allowing central bank independence over interest rates and inflation targeting; tightening anti-trust policy; denationalisation and opening up service sector markets; as well as enabling globalisation more generally. Also important is to allow higher education to greatly increase the supply of graduates and upgraded skills required for the ICT revolution. Importantly, as Perez notes, major new technologies require considerable risk finance, hence some financial deregulation, precisely because there is so much uncertainty.

Much of this reflects the collapse of manufacturing competitiveness in the advanced Western nations, as Asian markets (including China) develop. In our argument, progressive electorates accept the case (made by Thatcher, also by Gerhard Schröder and Nordic politicians) that major change was needed, and that protectionism and the creation of public sector employment were not

2 Though we do not share Schumpeter’s – or Hayek’s – doubts of a happy ending in an open democracy!

long-term solutions. This does not mean that a progressive electorate will detail the liberalisation changes set out above, for that is the role of parties and the policy-making process.

Phase 2

In the subsequent decades these changes generate huge problems:

- (i) Most obviously for those who lose out because of the decline of whole sectors, in terms of lost employment and the disappearance of ‘ways of life’, as well as decline in status. This occurs in parts of manufacturing industry, public sector employment, routine clerical and much administrative work.
- (ii) This leads particularly to the development of ‘places that don’t matter’ (PDMs), where there are massive negative externalities in areas in which industry declines.
- (iii) The decline in the role of the state – if necessary to enable change – now limits solutions to the market failures that arise in the new technology regime; for example, markets will not build transport links to ‘places that don’t matter’ to connect them to expanding cities, because without such links, low private demand makes them unprofitable – in effect the links are public goods. Equally concerning, public R&D is complementary to private, but an ideological focus on markets leads to its reduction.
- (iv) The financial crash, as a result of the financial deregulation.
- (v) Decline in innovation and real wage growth, in part reflecting the decline in public R&D, in part the sharp deflationary response and fall in expected growth as central banks and government seek to restore low target public debt-to-GDP ratios.
- (vi) Globalisation.
- (vii) All this leads to a growth in populism, not among the ‘undeserving’ poor or immigrants, who are the object of populist hostility. Populists are opposed to public expenditure seen as benefiting the poor and are thus hostile to fiscal policy, which was arguably a key part of recovery.

Phase 3

Polanyi argued, as we argue here, that this second reactionary and problematic phase leads to a *second movement*. We now enter a less certain world, which we see as developing and continuing over many decades; and while we do not share Polanyi’s reasoning – the Great Transformation was about the conflation of at least two earlier technology regimes – we can see a similar broad process taking place over time (Soskice, 2020). First, it becomes increasingly clear to progressive electorates that austerity is the wrong solution, and that the state needs to reengage as key actor. That becomes equally clear to populist electorates. A very broad prediction is that populist policies have little to deliver once populist politicians are in power, and gradually their support ebbs.

Next, globalisation – above all direct and indirect Chinese imports – greatly benefits most of the electorate of the advanced nations as consumers. Protection, which might appeal immediately to a populist electorate, does not have wide attraction in the longer term.

Third, fiscal policy is likely to become more important, as monetary policy ceases to bite. As investment, private and public, declines, and as savings increase, especially to augment pensions, and arguably in relation to growing uncertainty, so the Wicksellian real long-run rate of interest declines. Eventually (over the past few years) with interest at the zero-bound and very low

inflation, and after the flirtation with quantitative easing has flattened the yield curve, there is a reversion to fiscal policy at least in the advanced Anglo-Saxon world, where raising long-term borrowing in world markets is not seen as a problem.

This goes with an increasing demand for public sector investment, as public infrastructure across the board – including in health care, education, transport and advanced research – is seen to decline.

Finally, and over time most important, the proportion of graduates in the electorate grows. This is in part (over, say, a 10-year period) because of the lower proportion of graduates among those who die; and in part a growth over time of the proportion of those going through higher education as the advantage of university education increases in a world demanding ever-higher skills.

This last point is key. To take recent OECD data (OECD, 2019, 1998), in 2008, 35 per cent of those aged between 25 and 34 were university graduates, rising to 44 per cent in 2018 (Table A1.2); in 1996, the corresponding figure (mean across OECD member states, Table A1.2b) was only 14 per cent.

So – albeit rather loosely – we can think of the development of the ICT revolution as a new technology regime as a very long period of *demographic or educational transition*, as the large majority of the working age population acquires the educational level ‘appropriate’ to the technological regime. This *transitional* concept is closely related to the (non-monotonic) development of electoral forces. Initially, the progressive, aspirational forces in the electorate support major change (liberalisation); how this is formulated politically, as Vivienne Schmidt and Mark Thatcher nicely show, will vary significantly between advanced nations (Schmidt and Thatcher, 2013). In this first period/phase of institutional change, the problematic consequences of neo-liberalisation will not yet have begun to generate populist opposition (and populist parties and politicians). Over this period, even predating it, the very long-term upgrading of higher education has begun (in some advanced nations more quickly than in others), and continues through the next phase of the accelerating growth of populist reaction. Then in what we have called the ‘Polanyian second movement’ populist reaction declines while the educational transition continues.

Certainly, this is an optimistic take on the second movement, but the optimism is based on the arguments already presented. These arguments do not apply to all advanced economies: Japan is a case in point. Moreover, the potential conflictual role of China is still to emerge (though in my view the demonisation of China and the Caesar-God view of Xi is exaggerated for the purposes of US politics); China and the USA have too much to lose from serious economic conflict. Behind all this lies further radical change as the different components of digitalisation are put together (AI itself, cloud and edge computing, quantum computing, sensors and nano-technology, lithium-metal solid-state batteries). The most likely response to these changes, however, is further to incentivise raising educational levels, and probably at all ages.

In this section we present our argument as a theory of advanced capitalist democracies. Taking as its base the deeply disruptive long-term framework of changing technology regimes, with their Schumpeterian creative destruction, we argue that the outcomes of these changing regimes are driven in democratic environments by the conflict between the progressive aspirational components of the electorate and populist, conservative electoral reaction.

It is not an equilibrium approach. We argue here (in relation to the ICT revolution, or the information technology regime) that it can be usefully analysed in parallel with Polanyi, in terms of phases. Neo-liberalisation needed to undermine the institutional defences of the Fordist regime; this led to manifold problems caused over time by the dominance of markets and the retreat of the

state. Populist reactionary politics emerged. Finally, there was a Polanyian *second movement* reflecting the growth of the progressive electorate as a result of continued higher education, and the need to positively reconfigure the role of the state. While we believe that it will end well, it is not a painless story (though more so in some advanced nations than in others). And it is a historical story in which institutions evolve through these Polanyian phases.

It is also directly a story about power. But not – in a Marxist sense – about the power of advanced capitalism. This is because, to begin with, in its US heartland the massive powerhouses of the great Chandlerian Fordist corporations have been destroyed by the neo-liberalisation of financial markets. None of the top 20 US corporations of the 1980s now appear 30 years later in a newly constituted – and ICT-dominated – top 20. Poulantzas’s famous argument about why advanced capitalism was *politically* powerless when advanced capitalism is most technologically and innovatively effective is that this effectiveness depends on strong market competition between advanced companies; and that strong market competition makes serious collusion in the political environment almost impossible. He was imagining an investment strike (Poulantzas, 1973). Furthermore, as is argued below, advanced capitalist companies, whose value lies in the tacit co-specific skills and knowledge of their highly skilled workforces, cannot move these workforces around in a ‘footloose’ fashion; they can buy and sell financial assets, including ownership (shares) in other companies; they can buy or sell codified patented knowledge; and they can offshore production or services requiring lower or codifiable skills. Nor do we consider it likely that there will be a power conflict between capital and labour: in advanced sectors, on the contrary, capital and highly educated labour – and in particular their unions – are on the same side.

Our approach concerns a power conflict, but it is within the democratic arena and advanced nation states, between progressive and conservative forces.³ We argue that the progressive, aspirational, educated forces of the electorate will eventually win.

Geographically embedded knowledge: the dominance of the United States in a world technological system of advanced capitalist democracies (and China) and their specialised innovation regions

As I noted at the start of this short essay, Martin Höpner rightly says that *Democracy and Prosperity* is a theory of advanced capitalism, and not a development of our intellectual background in essentially static varieties of capitalism. I hope that was made clear in the last section. It will become clearer in the remaining sections.

But that does not mean that advanced capitalism works in similar ways across the advanced world. ‘Varieties of capitalism’ (Hall and Soskice, 2001) was aimed at classifying how capitalism worked in different advanced societies. The simple distinctions drawn there (between coordinated market economies [CMEs] and liberal market economies [LMEs]) are no longer adequate. In response to the challenges of the ICT revolution individual advanced economies have responded quite differently, as Thelen argued in the sharp distinctions she draws between erstwhile CMEs, the Netherlands, Sweden and Germany (Thelen, 2019), and as will be

3 With low-skilled service sector workers, as well as the ‘truly disadvantaged’, either excluded or in the progressive camp.

shown below in terms of the distinctions between erstwhile LMEs, the United States and the United Kingdom.

Nor does it mean that advanced capitalism works in similar ways *within* advanced societies. Indeed, the forms advanced capitalism has taken have fragmented national landscapes between successful innovative urban metropolitan areas and much less developed exurban and many ex-industrial cities (often ‘places that don’t matter’ in Rodríguez-Pose’s memorable phrase (Rodríguez-Pose, 2018)).

At the centre of our approach to theorising advanced capitalism in the ICT revolution is our understanding of it as an advanced technological system of interrelated nations with different national strategies, and with ranges of innovative skill clusters within these national strategies. This is all associated with a great increase in high value-added and embedded specialisation. In addition, ICT has vastly increased the possibilities of linkages between advanced economies, enabling them to put these specialisations together in manifold ways, and in particular to incorporate the enormous skill sets and also markets of China and India. Thus instead of analysing individual advanced nation states, we see advanced capitalist democracy working as an *advanced world system of interrelating advanced states, as well as China and India, with many different research and value chains as connectors*. In particular, we argue in the next section that (for institutional and political reasons) *the United States dominates this advanced world system technologically as the driver of radical frontier research in ICT*. China is unlikely to challenge this leadership in the next two decades.

But how has the ICT revolution challenged advanced capitalist democracies? As John Zysman has forcibly argued (Zysman et al., 2011, 2013, see also Zysman and Breznitz, 2012; Breznitz and Zysman, 2013), the ICT revolution has changed the field of play in key ways:

- (i) it has modularised a large number of components in manufacturing, but critically also in services;
- (ii) it has greatly facilitated digital-based value chains, and this has relocated much manufacturing production to China, just as what Zysman calls the ‘algorithmic revolution’ has relocated modularised components of services in India;
- (iii) perhaps even more important the boundary between manufacturing and services is breaking up and giving way to ‘services with everything’; and this includes increasingly sophisticated knowledge-intensive business services (KIBS);
- (iv) hand in hand with this the need for graduates has increased massively.

These changes have led individual countries to reorganise their so-called ‘models of economic growth’ (Baccaro and Pontusson, 2016; Thelen, 2019). They are putting a lot of pressure on the advanced (and generally high-wage) economies to move up-market in terms of knowledge intensity and education levels; also to increase both high value-added services and ‘hybrid’ products, which merge manufactured goods with services, thereby centrally integrating ICT.

In the process, larger or smaller clusters of skilled educated workers have accumulated within specialised innovation areas. These have become highly productive as related technologies have clustered together. And as the value of individual workers with specific skills – including relationships throughout these clusters – increases, so these skilled educated workers become ‘geographically embedded’ and are reluctant to move. Typically with highly skilled workers working together there is no practical way to codify this knowledge.

This is reinforced by social networks: ‘assortative mating’, whereby graduates ‘pair’ with other graduates, massively reinforces geographical embeddedness; then the partners’ individual

occupational networks become integrated to form larger social networks. In practical terms, large education-based social networks – and the high productivity of knowledge in them – are very difficult for employers to relocate.

There are two transformative consequences in the future (already to some extent in the present) for more graduate and highly skilled intensive companies. We should of course be cautious about making future projections in such an uncertain world, but I will go ahead nonetheless.

First: to get value from graduates, and from graduates working together, they have to be given a lot of freedom to work out solutions, indeed to construct new innovative directions. Increasingly, work is organised in project groups. This has always been the case for highly skilled workers to different degrees. This in turn requires relatively high degrees of cooperation. The days of hierarchical management are limited, at least for the highly skilled. If we were to look at the next decade or beyond, the assumption that workplaces are going to become more graduate-dominated underwrite what is already evident, that many companies are moving more closely to co-management.

Of course, this works itself out differently in different national systems: in German companies with predominantly highly skilled (and increasingly graduate) workforces, in part reflecting the expansion of Universities of Applied Sciences, the Works Council plays an increasingly important role. This is to some extent at the expense of unions (even if most works councillors are union members). In Sweden arguably, where unions play a larger part in direct representation in companies, co-management probably works more through union officials with special links to companies. And (again arguably) cooperation among relatively autonomous highly skilled workforces may be less a feature of certain countries such as the UK and France. If such cooperative autonomy is becoming more advantageous for companies in the more competitive innovation- and ICT-oriented world we are increasingly moving into, then Germany and Sweden and other northern European countries may benefit at the expense of the UK and France.

Second, advanced companies are retaining a lot of advanced capabilities in their domestic bases while being plugged into more and more sophisticated networks internationally.

ICT has played the central role in tying these areas of specialised knowledge together, linking them by various different value and/or research chains (it will be argued below that four particular types of chain are key).

Thus, instead of looking simply at the characteristics of individual countries, with their clusters of specialised knowledge competences and innovation, they are treated as part of a technologically interconnected system of advanced democratic nations, together with China and India.

To meet these challenges and to fit into this technologically interconnected system, over the past three decades there has been much reshaping of relevant institutions inside and outside companies, and inside and outside the social actors, as well as in the role of government at different levels. It might also be said that the neoliberal framework has given advanced economies – or groups of actors within them – space to experiment. As noted earlier, the old varieties of capitalism classifications may still be loosely recognisable, but Germany now functions institutionally quite differently from Sweden, Denmark and Finland, not to mention the Netherlands. The same applies to Switzerland and Austria. And while Singapore, Taiwan, South Korea and Japan still have powerful civil services, they have become increasingly (and very) different from each other. (In the longer term I want to develop our ideas about the solutions adopted by these advanced economies to the ‘challenges’ that Zysman poses; this article concentrates on the United States, with a few comments on China and the United Kingdom.)

Perhaps most importantly, the USA now stands out as the driver of radical innovation in this advanced world system and as the dominant country technologically. As will be argued below,

there seem good reasons why it is unlikely to be overtaken by China. The United Kingdom has often been compared with the United States in the CPE literature. And, drawing a sharp distinction between LMEs, the United Kingdom has been fairly unsuccessful at major radical innovation, probably even in finance. But what explains this US success, given the manifest and deeply unattractive US failure in many parts of its society, politics and geography?

The USA as radical innovation driver of the advanced world technological system

It will be argued that US success in innovation stems from two sets of institutions: one pertains directly to innovation, the other to politics. Both go back to the 19th century (and at least to the end of Reconstruction⁴ in the mid-1870s). Parenthetically, a strong historical case can be made for US dominance, referring both to the so-called Scientific Revolution of the late 19th century, and then the related Fordist revolution of the 1920s, including air flight and radio (Soskice, 2021).

These institutions have no parallel elsewhere in the advanced world, but there is a striking functional equivalent to contemporary Chinese institutions. Described in three words they might be: deregulated, decentralised, highly resourced.

Innovation institutions

We might mention three institutions of ‘innovation’:

- (i) *The link between top-level university research and start-ups.* Frontier research largely comes from top research universities, depending on the strong motivation of and the provision of resources for individual researchers, not to mention substantial research freedom. Top US universities cluster top researchers. While top UK universities are very good, even the best do not have remotely the same access to financial resources as the top (largely private) US ones. Furthermore, UK universities have been increasingly tightly regulated by the UK government. Highly flexible US researchers have substantial freedom to choose what they research and whom they research with. One major aspect of this freedom is the easy ability of top researchers to work privately outside the university, to found start-ups or to associate with them. The extraordinary success enjoyed by academics (by no means all of US nationality) at US universities can be seen in the Nobel prizes they have been awarded (Soskice, 2021), and in their widely cited patents.
- (ii) *High-level flexible labour markets for scale-ups.* Interacting at many points with universities, a high-level professional and technical software engineering labour market that allows easy movement across professions (via professional schools) enables talented individuals to start spin-offs from existing companies (anti-competition clauses are not allowed in Californian labour law), and makes it easier for individuals to recover work status rapidly after unsuccessful innovative projects (Klepper, 2009). And companies can scale up rapidly with access to such a relatively risk-averse high-level labour market. This requires much knowledge of reputations, capabilities and movability, existing in these established highly networked areas, so relevant teams can be assembled by rapidly growing companies. Success in scaling up can be measured by the number of US

4 When the northern US states de facto renounced the attempt to ‘reconstruct’ the former Confederacy as an effectively racially integrated region.

‘unicorns’, well ahead of the number to be found in China (China in turn is far ahead of all other countries).

- (iii) *Highly deregulated financial system.* The venture capital system and the ecology of patent lawyers surrounding it, as well as the systems of private equity and investment banking, with their ability to tap into multiple informal private sources of funding and their networks across innovation communities, are unlike what may be found anywhere else in terms of their ability to respond to supply start-ups with finance. The UK financial system is deregulated to an extent, but run overall from the Bank of England and Whitehall. It is not comparable to the decentralised US system.

Political institutions: the courts-politics-lobbying complex

Equally worthy of note is the role of political institutions. Collectively they might be referred to as the ‘courts-politics-lobbying complex’. This is at the heart of the Hacker, Hertel-Fernandez, Pierson, and Thelen (HHPT) understanding of US political economy. HHPT emphasise that it is decentralised, ‘multi-venue’ and business-porous. It is not so much deregulated as an environment of regulations that is highly – and profitably – open to re-regulation. We do not dissent from this view, but see its advantages as providing successful innovative start-ups with local, municipal, county or city support in whatever re-regulation they may need, especially in the areas of the United States that are successfully technology-intensive.

This complex employs an army of lawyers and lobbyists, engaging with courts, elections, parties, boards and agencies at each level. Hired by innovative companies these business-porous systems can be accessed at many points. The US economy is an unusual mixture of deregulation and business- and politically driven re-regulation. In such a system lobbyists, lawyers and politicians all benefit in enabling appropriate re-regulation for successfully scaling up start-ups as they develop into unicorns.

Conclusions about the United States

The first conclusion about the United States is that it has a remarkable set of institutions that are highly propitious to radical innovation. Almost all key advances in ICT and associated new technologies have come from the United States (with 5G being contested between the United States, South Korea and China, while China seems to be ahead on 6G).

There is clearly no agreed definition of radical innovation. But if we take it as loosely implying ‘disruptive’ innovation, a good measure of that is the number of unicorns created in any period. Measured in terms of unicorns, China is second behind the United States, and far ahead of any other country (Soskice, 2021).

It is interesting that the US ‘innovation’ institutions are close to being functionally equivalent to their Chinese counterparts, with the exception of the very intellectually open US university research environments. The politically decentralised Chinese system of cities and provinces has been propitious for certain cities (Shenzhen, Shanghai, Beijing) to become innovation centres, where mayors and CPC secretaries can make their fortunes and political careers from the economic success of their city (or province). They can make finance available in addition to the informal ‘money’ networks.

Moreover the key cities have well-endowed universities and research systems (albeit not politically open). And there are large flexible professional, technical and well-educated labour markets available to scale up start-ups. The decentralised, strongly motivated political deal-making systems

in successful cities are analogous to the decentralised courts-politics-lobbying complex in the relevant areas of the United States.

Some people have seen the United Kingdom, with its top universities, as a parallel candidate for radical innovation driver. But it should be clear how very different are UK innovation institutions: the rules governing institutions are still basically set in London; it remains a highly centralised polity and legal system; and the corresponding UK innovation institutions, while deregulated compared with the past, remain very much more regulated than their US counterparts.

Finally, what has driven this US success in ICT and associated technologies? Evidently, as we have been arguing, their fundamentally decentralised and deregulated ‘innovation’ institutions have been responsible. Moreover, these institutions have not changed massively over time: indeed, the US has arguably been the driver of radical innovation since the last third of the 19th century, through the three waves of technological regime: the Scientific, the Fordist and now the Digital. The institutions appear different in these technology regimes. But what has happened is that the institutions have adapted to the different technology regimes, allowing initially small players to enter and eventually scale up, whether in the form of technology start-ups, or financial breakaways – such as Michael Milken using junk bonds to break up the huge Chandlerian conglomerates of the late Fordist era and their great company research laboratories. This sometimes occurs in defence research with government help, or with active intervention from the academy in the case of Stanford. One might mention Terman the key Dean of the Engineering School, with his links to Hewlett and Packard, and the whole history of Silicon Valley replete with spin-offs from Shockley, through Fairchild, then Intel. Isaacson’s account is well worth reading (Isaacson, 2014). As noted earlier, all through this history of the development of the ICT revolution the pre-existing great corporate centres of advanced Chandlerian capitalism could do nothing except attend their own funerals.

Thus these innovation institutions ‘evolved’ to work with massively changing technologies. The evolution was more dramatic on the surface than Thelen’s seminal account of vocational training (Thelen, 2004). But allowing for the more informal nature of the innovation institutions, it can be seen as a similar process.

We suggested above that US exceptionalism in terms of its failure to redistribute effectively to the lowest income groups (unlike the other advanced countries) may be explained in terms of the very conditions that foster its radical innovation (Elkjaer and Iversen, 2021). This is, a whole range of public policies operate in a democratic but highly decentralised way. This includes zoning, policing, K-12 public education, health care for the uninsured and aspects of welfare payments. This has the effect of privileging middle-class home-owners, especially in the big northern ex-industrialised cities in which there is a lot of racial heterogeneity. Home-owners wanted to be zoned off from the poor and to minimise their city- or schoolboard-imposed property taxes by keeping expenditure on the poor as low as possible (Lacey and Soskice, 2015).

Conclusion

The major point we wanted to make in this essay concerns how one should further develop a dynamic theory of the ICT revolution in the advanced capitalist world, including the conflicts involved at its different stages. Key to this was the centrality of the United States to what was labelled a ‘world technological system of advanced capitalist democracies’, together with China and India.

Because I have taken up so much space already in the focus on the United States, I only hint at the next two major steps. The first is to set out the multiple research, product and service chains

linking the different nations. Most interestingly, US MNEs have dominated the ICT-based offshore R&D networks, largely oriented towards China and India (Branstetter et al., 2018; Branstetter et al., 2019). Then, major largely western European MNEs (big pharma and Siemens, Bosch, Ericsson, among others), with multiple investments in US radical innovation across ICT and biotech, have transferred radical innovation from the United States to western Europe. The ICT-intensive research, design and production chains link western European companies with Central and Eastern Europe, as well as China; as well as the similar US research and design chains to China (via, for example, Foxconn, as well as TSMC, but also with a great growth of FDI). Then largely within western Europe the research-intensive networks of giant MNEs, such as Unilever and Phillips, are creating and globally marketing new products. Finally with all these – and often closely interrelated – developments there is a plethora of academic science based networks, and doctoral student exchanges.

We have also hardly discussed what may be some of the most important developments of the near future, namely the interaction of financial markets and macroeconomics. Future productivity growth is arguably tied up with this, as, going back to Kaldor and Schumpeter, a major factor here will be growth expectations, and the need for both China and the United States to hold their monetary and fiscal nerve in the face of inflation worries (Carlin and Soskice, 2018).

Precisely because of the massive involvement of both the United States and China in these networks, as well as their mutual interest in macroeconomic developments, the most interesting developments of the next decade will concern their joint capacity to resolve their disagreements. Clearly, much rides on the nature of that resolution.

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