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The social imagination needed for an innovation-led recovery

Daniele Archibugi [a,b,*]

[a] Italian National Research Council, IRPPS, Via Palestro, 32, 00185 Rome, Italy
[b] Birkbeck College, University of London, School of Business, Economics and Informatics, Malet Street, Bloomsbury, London WC1E 7HX, UK

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ABSTRACT

In response to critical comments by Bengt-Åke Lundvall and Edward Steinmueller, I argue that we need to understand why the economic crisis has been so long, so deep and so wide. Even though it originated in the financial sector, a recovery has not yet materialised because existing and potential technological opportunities have not been exploited. An innovation-based recovery will need to take advantage of these opportunities and will also require a favourable institutional environment. Pro-active public intervention in science and technology will additionally be required, combined with new social imagination.

1. On the origin and persistence of the crisis

I am grateful to Lundvall (2016) and Steinmueller (2016) for commenting on *Blade Runner Economics* (Archibugi, 2016). Their remarks contain many fruitful insights and, even though we belong to the same neo-Schumpeterian school of thought, there are important disagreements. The first relates to the origin of the 2008 crisis and the reasons for its persistence.

Lundvall and Steinmueller rightly recall that the origin of the 2008 crisis was primarily due to unscrupulous behaviour in the financial sector rather than problems associated with the real economy. When interviewed by the House Committee on Oversight and Government Reform, former Federal Reserve Chairman, Alan Greenspan, was forced to admit he had been far too optimistic about the self-regulatory capabilities of financial markets.[1] Greenspan's admission validates those heterodox thinkers, including Lundvall, who already in the 1990s were warning of the impending instability of the economic expansion but who unfortunately were not taken seriously by policy-makers.

When in November 2008 Queen Elisabeth II visited one of the great temples of economic wisdom, the London School of Economics, she asked with regard to the crisis: "Why did nobody notice it?", expressing the puzzlement felt by many.[2] In a *Harvard Business Review* article I first read in 1999, the author claimed: "Many policy makers at the Fed contend that the new economy is a fragile bubble- and that with the 'irrational exuberance' of the capital markets, the sky is going to fall on the U.S. economy. That couldn't be further from the truth. As long as the government doesn't interfere the economy is sturdy, resilient, and raring to grow" (Sahlman, 1999). Such prophets of turbo-charged capitalism clearly over-estimated the stability of the system and overlooked the dangers ahead. Others were more cautious and far-sighted. As our mentor, Christopher Freeman, stated in 2001: "No one can predict the future course of events with certainty. Neither the evidence about long-term productivity changes. . .., nor the scale of corporate and household debt, nor calculations of the possible future rate of returns on ICT investments, can conclusively show that there will be a hard landing for the US economy. Nevertheless, taken together, they should give cause for serious reflection". Freeman (2001) concluded its article with a warning: "Fasten your seatbelts". The collapse of the dot.com bubble did not, unfortunately, lead to greater caution in subsequent years.

We have learnt from the history of economic crises that finance often offers both the match that lights the fire and the wind that spreads the flames (Kindleberger, 1978). But when the world economy goes into such a serious recession as we have experienced since 2008, it is difficult to believe that a combination of financial mismanagement and poor policies can explain everything: there

* Corresponding author at: Italian National Research Council, IRPPS, Via Palestro, 32, 00185 Rome, Italy.
E-mail addresses: daniele.archibugi@cnr.it, d.archibugi@bbk.ac.uk

[1] Edmund L. Andrews, 'Greenspan concedes error on regulation', *New York Times*, 23 October 2008.

[2] Andrew Pierce, 'The Queen asks why no one saw the credit crunch coming', *Daily Telegraph*, 5 November 2008.

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must surely be a large amount of inflammable material ready to catch fire and a lack of water to extinguish it. In spite of energetic public intervention to boost confidence and prevent the collapse of banks and companies, the economic recovery continues to be weak in much of the Western world. The United States is doing better than Europe and Japan, and some emerging countries have been doing well, but the ghost of the 2008 economic crisis is still affecting the real economy. In particular, the rate of investment continues to be disappointing in spite of the fact that interest rates are very low (for a European analysis, see Revoltella et al., 2016).

I am arguing that, even if finance is the single most important culprit with regard to its origin, this does not explain why the crisis has been so wide, so deep and so long. The basic reason why there has not yet been a satisfactory recovery is lack of confidence, which in turn leads to very low investment. Interest rates are at their lowest level historically, showing that the traditional tools of macro-economic policy have already been deployed but with limited effect. The lack of recovery, even more than the origin of the crisis, is associated with the fact that new economic, social and technological opportunities are not perceived by entrepreneurs and investors. The gales of destruction may have being blowing for several years but the creativity they should have liberated has not materialised.

If new technological opportunities had been properly exploited and brought to market, they could have contributed to boosting investment, creating new companies and new jobs, and mitigating the adverse consequences of the financial crisis. And, as has often happened previously, they could have also made up for misguided speculation, poor regulation and flawed government interventions.

2. Where are the new opportunities?

After a major storm, it is unlikely that investors will risk their money unless they see genuine opportunities. Some believe that the lack of investment is associated with an exhaustion of scientific and technological opportunities (Gordon, 2016), certainly not the first time this has been predicted. I disagree. I see this as a re-occurrence of the technological anxiety that has been disproved by history on numerous occasions (Mokyr et al., 2015). As the long-wave literature has indicated, a new economic phase should be based on a combination of new opportunities as well as the exploitation of existing knowledge. Biotech is the obvious candidate to become the leading sector of the next economic phase, and *Blade Runner* provides a powerful visual forecast. But there is still a missing link between new technologies and innovations which needs to be further investigated by science policy scholars.

3. Who is leading the dance?

I agree with Lundvall and Steinmueller that new technologies by themselves will not affect a change to society unless there is the infrastructure that allows for it. Any major general purpose infrastructure built during the history of capitalism needed the combined contribution of the public and business sectors, as the examples of electrification, air travel and internet navigation have shown. 150 years ago, Marx identified the relationship between the economic base and the cultural and political superstructure as a key component of capitalist development (Marx, 1977). Similarly, Perez (2002) stressed that economic crises are likely to be associated with a mismatch between the technological infrastructure and the socio-economic fabric, while periods of expansion are generally related to better coordination between the two. The long-wave tradition has further explored these insights, trying to create a periodization and associating with each phase specific dominant technologies, production modes, and social and political institutions (Tylecote, 1992; Freeman and Louçã, 2001).

Lundvall argues that the failure to achieve full recovery is mostly due to a lack of appropriate political conditions and that "politics and new forms of governance will matter more than the economy and technology for the eventual upswing and sustained economic growth". He suggests that political reform will lead the dance and that, in its absence, a new techno-economic regime is unlikely to emerge. I am not convinced. There is often a process of co-evolution between technological potential and politics that is difficult to predict. Marx was astute in terming the relationship between the base and super-structure 'dialectical', and perhaps we should continue to follow his lead: in most cases, we only manage to establish who has actually led the dance once the music is over.

Certainly technological opportunities need to be shaped to the social context and this is often associated with deliberate policy choices. In several cases such as with automobiles, the decision to develop adequate public infrastructure to allow cars to travel followed what the business sector had created: powerful lobbies of industrialists and motorists managed to obtain from governments what they needed. Indeed, the automobile technological paradigm proved so strong that neither the Soviet Union nor China managed to stop it.

However, I accept Lundvall's and Steinmueller's reproach for having somewhat overlooked the role of government in shaping opportunities. If we succeeded in landing on the moon but not in sorting out the problem of urban ghettos (to echo Nelson's (1977, 2011) metaphor), it is because political attention, knowledge and funding were directed towards one objective rather than another. My colleagues are therefore right to stress that public policies should explore which scientific and technological areas could be developed and how they may change our lives, as should scholars and policy-advisors in the area of research and innovation policy. Public institutions should be able to outline the desired outcome and to combine technological opportunities with social needs.

We need to revert to major involvement of the public sector in steering, selecting and assessing scientific and technological opportunities. Mazzucato (2013) has clearly shown the relevance of the public sector in shaping technological opportunities. In many cases, the public sector has opened up new areas that the business sector has been happy to exploit. The danger of a retreat of the public sector from knowledge creation is that scientific and technological opportunities will not be available as and when we need them (Archibugi and Filippetti, 2016).

4. The changing geography of innovation

Often, a change in techno-economic paradigm is also associated with a change in economic and political leadership. Lundvall rightly points out that new emerging regions are gaining ground, eroding the privileged position of the triad of North America, Europe and Japan. As the founder and motivating force of Globelics, a highly successful network of academics and policy advisers, Lundvall is certainly ideally placed to observe how fast the world is changing and how certain regions are catching up (see Lundvall et al., 2009; see also Archibugi and Filippetti, 2015). Those predicting secular stagnation tend to focus on an American or Western perspective, not on emerging nations (Gordon, 2016). Yet given that China and India achieved average annual growth rates of 8.6% and 7.0% respectively in the post-crisis period 2008–2015, they can hardly be considered as stagnant.[3]

Nevertheless, one doubts whether a major new techno-economic paradigm will emerge from outside the triad. Emerging countries like China and India are certainly increasing their R&D

[3] Data drawn from the World Bank's World Development Indicators database (accessed on 3 August 2016).

spending, and already by 2014 Chinese R&D intensity had overtaken Europe and within a decade it may be higher than in the US (Battelle, 2016, p. 13). However, from data on the impact of scientific articles and on patents, it would seem that emerging countries are still catching-up with the triad (see Iammarino and McCann, 2013; Zhou and Li, 2015). Outside the scientific and technological domain, one has yet to see the emergence of significant social and political innovations that might offer an alternative path to the triad.

The next techno-economic paradigm will also need a new socio-political infrastructure. We are far from being satisfied with what, thus far, has been delivered under capitalist democracy. Indeed, in the search for a new model it will be vital to integrate other regions of the world, allowing them to become not just rule-takers but also rule-makers.[4] Many of us are eager to learn from new experiences in the political and organizational domains, but up to now, most emerging countries have apparently been merely adapting to what is offered in the triad. In the political domain, an alternative to Western democracy is yet to emerge, with the BRIC countries struggling to introduce (as in the case of China) or consolidate (as in Brazil, India and Russia) such a model. A new techno-economic paradigm as well as a new form of social organization is more likely to emerge in the West than in the rest of the world.

5. Social imagination and technological innovation

For several decades, the Schumpeterian school focused on *technological* innovations, particularly those in *manufacturing*. Only rather slowly has our attention (and our data) been directed towards the service economy (Gallouj and Savona, 2009) and non-technological innovations (Smith, 2005; Fagerberg et al., 2005; Filippetti, 2010). Technological innovations in manufacturing have often been the driver for larger social transformations, but the time is ripe to consider the wider context of innovation. Significantly, the Community Innovation Survey, the largest quantitative exercise to assess innovation, has dropped the qualification of "technological" and is now devoted to exploring "innovation" in all its forms, and has included the service sector on a par with manufacturing. It is equally becoming crucial to understand how innovations in technology are associated to organizational changes (Evangelista and Vezzani, 2010).

But it is time to go further. If we really wish to understand how changes affect society, and what are the main obstacles to their introduction, we also need to identify how the government and the non-profit sectors contribute to innovation and how social transformation is linked to technological and economic factors. A new stream of research is today devoted to "social" innovations, showing that many have been facilitated by the availability of new technologies (Moulaert et al., 2013). Take the case of what has been labelled the "sharing economy": exchanging homes, automobiles and personal services is largely possible because the Internet allows it to be done cheaply and quickly. This has generated new clusters of opportunities that both profit and non-profit organizations are exploiting. All this has often occurred in the absence of political interest and economic regulation.

The search for a new techno-economic paradigm is not a task for scientists, engineers and businessmen alone. New ideas often originate in other social contexts. Steinmueller, a true connoisseur of science fiction, rightly reminds us that most contemporary science fiction is dystopian rather than utopian: artistic imagination is more likely to be captured by the dangers associated with human progress rather than the opportunities it opens up. Italian teachers know very well that their students are fascinated by Dante's *Inferno* rather than by *Paradiso*, suggesting humans have an intrinsic predisposition towards pessimism. Despite the steady increase in life expectancy, the more extensive concerns about climate change suggest that film-makers and writers may be more in tune with the human psyche than politicians and businessmen. Perhaps it is time to challenge such pessimism and deliberately to go back to the original meaning of utopia of Thomas Moore, Tommaso Campanella and Frances Bacon; an exercise in which artists and engineers, film-makers and political theorists, architects and businessmen attempt to imagine how existing scientific and technological opportunities can be exploited and incorporated in the social fabric – in short, how another world is possible.

[4] As indicated by Lundvall, I am among those who strongly support such a goal from a normative viewpoint (see Archibugi, 2008).

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