



TECHNOLOGICAL REVOLUTIONS AND POLITICAL CHOICES

A VIEW FROM PROFESSOR CARLOTA PEREZ

SINCE THE INDUSTRIAL REVOLUTION, EACH SUBSEQUENT TECHNOLOGICAL REVOLUTION HAS GONE THROUGH TWO DIFFERENT PERIODS.

The first is *installation*, when unfettered markets in a financial frenzy set up a huge market experiment to define the products and the companies that will be the winners for the future; when the new infrastructures (canals, railways and telegraph, ports and steamships, highways and electricity or internet) are installed; and when the new paradigm is learned and adopted by companies and people. It is a time of 'creative destruction' as the Austrian economist Joseph Schumpeter rightly defined it. But the process often leads to a major bubble or two and can end in a huge financial crash. The recessions that follow reveal how much 'destruction' had gone on under the shine of the boom, including how much inequality resulted from the success of the relatively few involved in the bubble prosperity.

It is by *coming out of those recessions* that past periods of golden age prosperities have been unleashed – bringing the second period of each technological revolution. They require government involvement to tilt the



playing field in a direction that will reduce the risk for all and increase profitability through generating synergies in common suppliers, skills, knowledge, and consumer requirements. This is possible because each of the installed revolutions provides an enormous potential for transforming the whole economy and changing lifestyles in many possible directions.



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For example, the mass production revolution of the 20th century was shaped very differently by Nazi Germany, the Soviet Union, and the Western democracies. The latter provided clear directions for innovation to serve suburbanisation, European reconstruction, and the Cold War. What became the all-electric home with multiple appliances for cooking, freezing, and entertainment, with innumerable plastic objects, often meant for disposability, and a car at the door gave a clear direction for innovation and a well-defined shape to demand.

Yet this was not achieved by markets alone but by a favourable context for markets to act. In the US and Europe, for example, that context included the welfare state, the consumer society, unemployment insurance (for uninterrupted payment of consumer credit), pensions (to safely spend monthly incomes without worrying about old age), and a progressive tax system able to fund the welfare state, the Cold War, massive state employment, education and health services, roads, and so on. And, while the income of public servants went into increasing demand, the publicly provided services freed income for consumption.

The world is now in a similar historical moment requiring equally bold and systemic institutional and policy changes to harness the true potential offered by the digital and IT revolution of the last two decades and to give a direction to innovation. It is not to be any direction but one that has roots in the nature of the new technologies and in the problems inherited from the old ones. That direction is “green growth,” widely understood as increasing the proportion of services and intangibles in GDP, world trade, and in lifestyles. Green growth involves reducing the amount of materials and energy in tangible products, decreasing or eliminating waste through reuse and recycling in the circular economy, making products really durable while moving to rental and maintenance, including 3D printing of parts for upgrading, and changing the ideal of a good life to one that involves fewer material goods, with an emphasis on exercise, creativity, preventive health care, unprocessed food (preferably grown nearby), community, communications activities, computer or smart phone-based music, films, books, education through a combination of online courses and face-to-face interactions, experiential entertainment, and so forth. All this requires a massive shift

Technological Revolutions and Political Choices Sources: Professor Carlota Perez is author of “Technological Revolutions and financial Capital: *the Dynamics of Bubbles and Golden Ages*”. Shell invited Professor Perez to contribute some thoughts on the economic and environmental transition and paid an honorarium for her time. The views expressed are those of Professor Perez and do not necessarily reflect those of Shell.

to policies of indirect energy conservation, contributing to reduce carbon emissions. Most importantly, it makes it possible for the people of the whole world to aspire to a good life that is viable on our single planet.

In addition to this change in consumer behaviour, many profound changes also have to take place in manufacturing, power generation, land use, and other aspects of production in order to make the best of the IT revolution. In the current playing field, such a transformation cannot be achieved by markets alone. The field has to be tilted by state action, and this time also at the global level.

Fortunately the transition to green growth has already begun to happen. The upper and educated layers of the population – together with many of the young – are adopting the ICT-intensive mode of living, together with health, exercise, adventure and concerts rather than purchasing commodities as entertainment. Imitation will follow as has happened historically – but it may not happen quickly or at an equal rate everywhere.

Each technological revolution provides a new space of the possible that is then shaped by socio-political choice in the deployment period. That is the choice the world has ahead now. We can continue to a “gilded age” with financial markets and the military shaping the playing field, and with growing inequality and environmental degradation for the new millions who will inhabit our planet. Or we can create policies that

encourage green growth, bringing social and environmental sustainability across the world with a rising standard of living even for the poorest. It is a task equivalent to what the welfare state and the new international institutions (World Bank, IMF, etc.) did for the post-war boom in the advanced countries of the West. It will require an equivalent amount of imagination and a huge dose of bold, collaborative political and business leadership.

