

Using the history of technological revolutions to understand the present and shape the future

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The beginning of the year 2021 feels like a crossroads. We have now been through three major crises in the last 20 years, each worse than the last: the dotcom bubble of 2000, the Great Recession of 2008, and the global recession triggered by the Covid pandemic, bringing what might be the biggest economic downturn since the Great Depression of 1929. The reconstruction after this period will require an enormous global collective effort. Given its nature, and despite the orders of magnitude being completely different, it can be compared to the second world war effort of reconstruction. This comparison can be made because such moments reoccur in history, at least from the onset of the first Industrial Revolution. They are part of a pattern inherent in the development of capitalism, which advances by technological revolutions, each of which goes through two very different periods.

The first period is the **disruptive installation of a new set of ground-breaking technologies**. This is an era of unfettered markets and ‘creative destruction’ implanting the new and destroying the old. It is a time of new millionaires at one end and loss of jobs, incomes and skills at the other, of new industries, regions and countries rising and others declining and deteriorating. Finance takes over and controls the economy. The resulting bubbles end in collapse and the ensuing recessions reveal what was happening under the bright lights of the gilded age prosperity. Then the anger and resentment of the victims creates the perfect social ferment for the rise of populists offering heaven, and especially offering destruction and punishment for the culprits, whoever they may be: the Jews or the Muslims; the bankers or the imperialists; the politicians or the elites. The 1840s, the 1890s, and the 1930s have all been such times, and we are in one again right now. Traditional political parties divide, new movements and parties emerge, populists at both extremes thrive; the centre weakens and hollows. The political world is in tatters, the authoritarians take over, the anger can turn to violence and the mad leaders can turn to war, as indeed occurred in the second world war.

But what follows can be – and historically has been – the good times, the golden age: the Victorian boom, the Belle Époque; the post-war boom or *trente glorieuses*. The second period of each revolution is the **reconstruction of a stable society, recoupling finance with production**. It is the time when intelligent governments step in to establish a win-win game between business and society. It is when capitalism becomes legitimate by making the search for the profit of the few result in benefits for the many. It is when the potential of the new technologies is clearly directed by systemic policies towards the best possible ends. This is the task ahead for the progressive forces. This is the time to succeed. It requires as much boldness and imagination as was displayed by the creators of the welfare state.

It is not, however, about the bright ideas of some intelligent politician, nor about bringing the ‘good’ past back again. It is about shaping the new technologies to fulfil the needs of a newly defined ‘good life’ for the majorities, enabling the fullest use of the installed technological potential, with a new set of institutions and policies that can achieve these goals. It is about identifying the challenges recognised by society, as well as the trends already existing in lifestyles and in production methods, in order to accelerate them by tilting the playing field so that markets function with best results when following those directions.

Awareness of the planet’s environmental challenges has been growing amidst controversy for decades. Action has been taken at a pace not determined or fast enough to succeed on time. Ironically, in the midst of the pain that Covid-19 has brought us, the pandemic has also accelerated some of the habits that were previously propagating only slowly: online meetings avoiding travel; teaching online leading to changes in the classroom (lectures online and discussion and exercises in class); less commuting, working from home and so on. But there is also much other behaviour signalling this new green direction, and it is often found among the young, as is usually the case historically. Young people are thus increasingly showing their preference for natural vs. synthetic; ‘gourmet’, vegan and organic food vs. processed; exercise for well-being; intense use of the internet; anti-waste, pro-recycling behaviour; living as active ‘prosumers’ rather than passive consumers; choosing sustainably sourced products; favouring fair trade and social responsibility and so on. It is not by chance that many of these new habits depend on information and communications technology (ICT). And this is only a hint of things to come.

1. WHAT CAN PREVIOUS TECHNOLOGICAL REVOLUTIONS TEACH US ABOUT THE PRESENT CHALLENGES?

The shaping makes the difference

Each revolution has been shaped differently. Technology provides the options; society chooses the future and actively shapes it.

For instance, during the Age of Steel and heavy engineering, the UK relied on its global empire to persist in free market policies but was ultimately left behind by a cartelised and unionised Germany and by the protected America of the Gilded Age.

The mass production revolution, in turn, was also shaped differently by Nazi fascism, Sino-Soviet socialism, and the Keynesian social democracies, where suburbanisation and the cold war, with the welfare state and high taxes for the upper income brackets, gave direction to its most successful deployment.

Why do we have so much populism?

Populism is the harvesting of resentment. Installation periods destroy jobs, skills, industries and regions. Other, usually new, players grow, become rich and succeed. On the left the culprit is seen as capitalism, big business and the politicians. On the right the culprits are seen as 'the other countries' and the migrants, the Muslims or the Jews. Messianic leaders represent, stoke and attract real public anger and they resort to every tool available. Even if they cannot deliver. The polarisation of the economy and society leads to accumulating tensions, which ultimately lead to major crashes.

After that, the time is ripe for intelligent institutional innovation to set up a win-win game between business and society.

Every paradigm shift leads to a realignment of the political spectrum. Traditional parties divide and new movements emerge. There is a shift in culture, values and aspirations.

Yet this is not a matter of 'left' or 'right'. We are currently in the midst of a paradigm change, away from mass production to digital, green, dematerialised, flexible and decentralised production. Success, in business and in politics, goes to those who understand and shape the new technological potential.

How did we return to extreme free market ideas?

Technological revolutions also result in a changing historical pattern for economic ideas. The unfettered market inequalities of the first half of the revolution create pressure to bring back a proactive state in the second half; the exhaustion of a revolution, and the need for the next one, tend to reclaim the role of unfettered markets for the 'creative destruction' process.

In the 1970s and 1980s the mass production revolution reached maturity and exhaustion. The advanced countries began suffering from stagflation – inflation plus unemployment so they could not pitch one against the other!

Investment along the same mass production lines found limits and business looked for solutions. The stage was set for the neoliberal takeover and the time was favourable for the huge experiment involved

in the installation of the Information Revolution and of a new paradigm for investment and innovation. Governments therefore actively handed the economy over to the market, and the processes of polarisation and inequality took off undisturbed and were even facilitated.

Mergers and acquisitions stepped in and labour unions were hollowed out; planned obsolescence and import substitution were introduced to extend saturated markets; when cost reductions were no longer possible, either prices had to increase, or labour was outsourced abroad; the cumbersome data, size and structure of the new global corporations that were going global led to the use of computers and decentralised value chains; excess pollution and the energy crisis led to electronic controls of emissions and increases in efficiency; and as profits became narrower and narrower, finance became bolder and bolder, invented new tricks and looked for risky innovation and new countries to invest in.

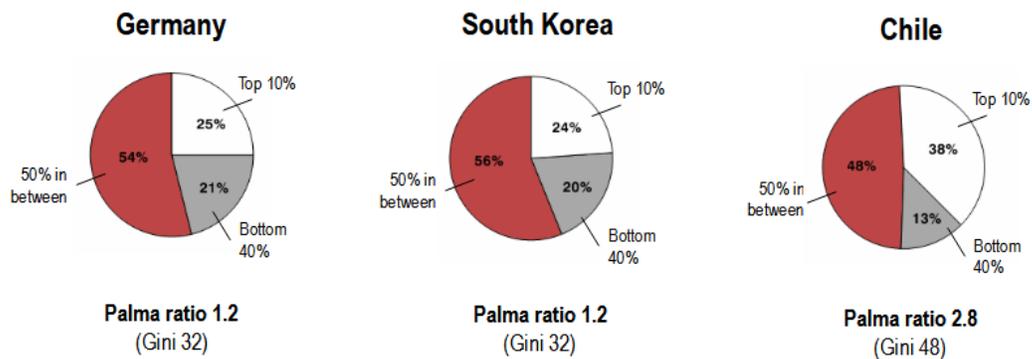
A revolution was dying and gasping for air in the global space, and the nascent information revolution – globalising by nature – was instrumental in moving production to Asia and shipping it around the world, while inadvertently establishing itself as the new paradigm and the most advanced set of tools for reshaping management production, trade and finance. Only governments – at least most of them – seemed to lag behind.

What have social democrats been doing and why is it not working?

Austerity and free market policies have not resulted in a fair society. If we compare inequality between two advanced economies, Germany and South Korea, and a developing one, Chile, we see that the first two show the same levels of equality, among the best in the world, while Chile has a very bad one (Fig 1).

Figure 1

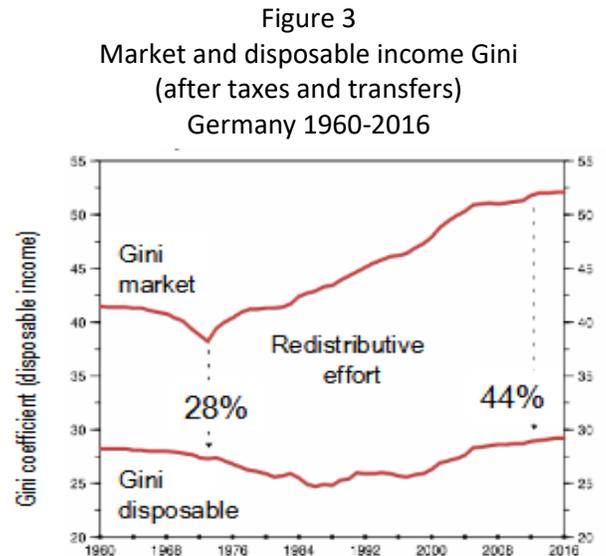
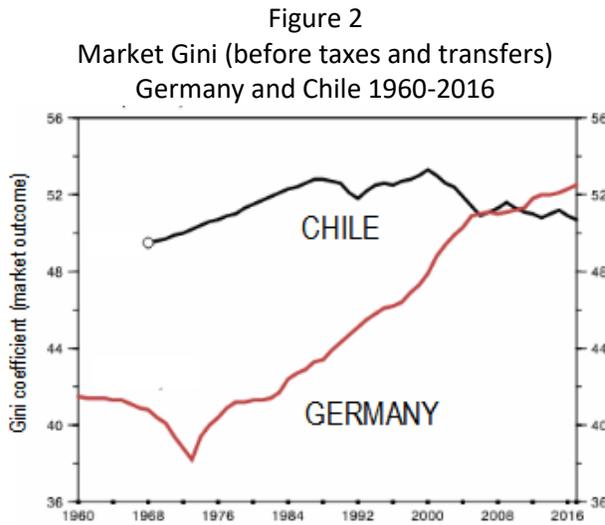
Measuring inequality in three countries with the Palma ratio



Source: Palma, Gabriel (2020) "Behind the seven veils of inequality "Development and Change" 50(5): 1133–1213

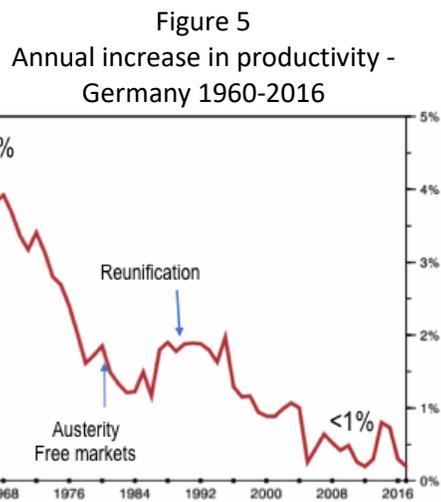
But a closer look reveals that by market outcome, that is, before taxes and transfers, Germany’s inequality index has become worse than Chile’s (Fig 2). Germany’s good equality levels are only attained

after massive redistribution. Social welfare policies can – and do – re-establish fairness, but at a very high cost (Fig 3). And note that it cannot be ascribed to the 1989 reunification.



Source: Palma, Gabriel (2020)

And as the gap grows wider, government has to concentrate on overcoming market inequality instead of investing and innovating. Yet the orthodox economic promise that extra income at the top would lead to more private investment has not held true (Fig 4). And as investment declined, so did productivity (Fig 5).

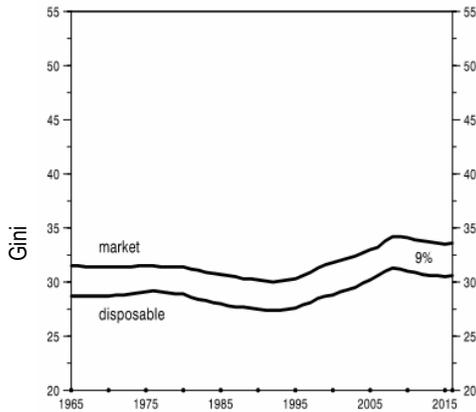


Source: Palma, Gabriel (2020)

Germany is thus left with a weaker economy having to maintain an increasingly expensive welfare state without increasing the taxes on the richest. And without providing directionality for investment and

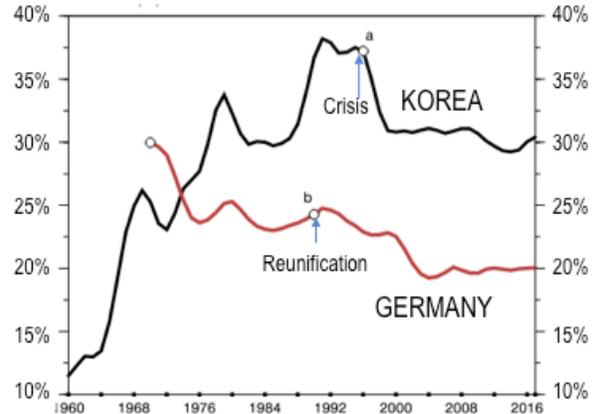
innovation. By contrast, South Korea kept inequality at EU levels with only a fraction of the redistributive effort (Fig 7). And South Korea's share of investment in GDP is therefore much higher (Fig 8).

Figure 7
Market and disposable income Gini coefficient
South Korea 1965-2015



Source: Palma, G. (2020)

Figure 8
Investment as share of GDP
Germany and South Korea 1965-2017



The question then is: what should we do now?

Golden ages are win-win games between business and society. One could say that such a formula is the definition of social democracy. And that is why social democracy is the way out! But it requires both an active state and dynamic markets with a consensus strategy and coherent policies in clear and stable directions.

So here's the deal:

The policies to be adopted must fit (and use) the current Information Revolution. Not the previous mass production one. It all depends on a powerful understanding of the new paradigm and its potential. That is exactly what the visionaries of the second world war reconstruction understood and acted upon (perhaps intuitively).

During the golden age of mass production we achieved full employment, universal education, healthcare, universal suffrage and security based on home ownership, car ownership and mass consumption. But at a high cost: we destroyed the environment and excluded the 'developing' world.

With a digital golden age we can have all of that, but in a different way: smart and green, with meaning, creativity, social networks, lifelong learning based on collaboration, access, rental, maintenance,

recycling and reuse. With an improving global society and profitable businesses, flourishing on a healthy planet.

2. INSTEAD OF ‘THE AMERICAN WAY OF LIFE’, A ‘GLOBAL SMART, GREEN AND FAIR’ WAY OF LIFE.

Why ‘smart and green’?

Whereas the energy intensive, unavoidably wasteful, mass production revolution is the main cause of climate change and resource depletion, the Information Revolution, with the intangible nature of software and internet ‘mobility’, provides the best set of tools to turn products into services and generally reverse the old trends. With its networking, platforming paradigm, the Information Revolution can completely change our forms of work, interaction, consumption and resource use to preserve and to ‘enhance’ the environment, enabling us to live better and healthier lives.

Smart green lifestyles and production methods must lead the way, and we are already on it. Some examples are streamed music and films, online news, digital books, rental and maintenance of truly durable goods, car sharing, mixed mobility, computer guided hydroponic agriculture around cities and healthier regenerative agriculture in the countryside, interactive smart electric grids, massive open online courses (MOOCs) and other online teaching and learning, virtual events, online meetings.

Why ‘fair and global’?

Because we are all in this together! If the rise in violence, desperate migration, and populism had not convinced us, the pandemic certainly has! So, it is for fundamental humanitarian reasons as well as practical ones related to peace and profitability.

The boom in the advanced world after the second world war was the result of a fair income distribution in the North that created dynamic demand for profitable business. But in order to pay high salaries and invest in equipment, oil and materials were kept cheap, which held the underdeveloped countries back.

Today, the global economy needs expensive fossil fuels and materials to make conservation, dematerialisation and sustainability the more profitable direction for innovation. Many consumer goods have become cheap commodities so that, despite no longer being very profitable, their consumption continues to overuse materials. Planned obsolescence continues to discourage maintenance. We need legislation that will make producers or sellers responsible for the whole life (and death) of each product in order to encourage products of high quality that last 100 years – extremely high quality and expensive at first, and cheaper as they age, but with continuous maintenance and upgrading, electronic diagnosis, 3D-printing of spare parts and so on – until they are disassembled and recycled. A shift from possession

to rental with upkeep and disassembly would create hundreds of thousands of jobs and allow those emerging from poverty to access refrigerators and other life improving products at an affordable cost, all without an excessive use of natural resources. And the rental business would be profitable and local everywhere, no matter where the goods are produced.

Other future profitable innovations would be in services, new materials, sustainable mining and agriculture, food, and so on. Development in the Global South will improve the lives of millions, reduce local wars and desperate migration. And it will create demand from the Global North for engineering, education, adapted capital goods as well as other products and services. In short, full global development is the best way to create employment by expanding demand for the advanced world, and expanding production and innovation in the countries currently lagging.

And intelligent globalisation is intelligent specialisation and ‘glocalisation’ with a balanced distribution of production across the planet

Global governance will be needed to shape direction through taxation or price structure. For instance, higher prices of fossil fuels and raw materials would encourage innovation to increase efficiency and saving, and would also encourage the use of biomaterials and other solutions, while funding sustainable development in the producing countries. If we want investment in productive areas and away from finance, a global financial transaction tax could fund a ‘Marshall Plan’ for development in the South that would encourage investment and an innovative sector in sustainable capital goods adapted to local conditions.

And what about social fairness?

In this context, the welfare state has to be completely transformed and government has to become as agile as Amazon. The gig economy is here to stay and a universal basic income, handled with artificial intelligence (AI) and to be returned as tax by those who earn enough not to need it, could provide the necessary stability to households, and with them, to the economy.

The pandemic has also proven the importance of essential service workers. Good wages for workers, unlike those of CEOs, have a multiplying effect on demand and encourage investment.

Progressive taxation and the elimination of tax avoidance and tax havens are obvious though extremely difficult tasks. Perhaps the Covid rescue packages, which showed that when business is in trouble it runs to government for support, have created a favourable political climate for improving tax fairness. But it is not only a question of quantity because taxes are also the most powerful instrument for giving directionality. At present, capital gains are taxed much less than salaries or corporations. And this is part of why finance can happily set up ‘high frequency’ transaction systems and maintain a short-termist behaviour that decouples the financial world from the real economy of production.

The other huge problem to be addressed is achieving agreement for setting up global regulation of certain things – of which finance is one and some aspects related to the environment are another – so that races to the bottom can be avoided.

Regulations for affordable green housing would not only tackle one of the main sources of carbon emissions (home energy) but also stimulate innovation and job creation. Above all, affordable green housing would assure a better quality of life, and the desirability for this clearly showed during the pandemic.

The current leadership has the opportunity to unleash a global sustainable golden age. Providing a context with clear directions and missions; favouring production and definancialising the economy, while rethinking Keynes plus Schumpeter, and being as bold and imaginative as those who set up the Bretton Woods system.

The deployment of smart, green, fair and global growth can be a positive sum game between business and society, between advanced, emerging and developing countries, and between humanity and the planet. And there is no better time in which to set it up than in the post-pandemic reconstruction.