Postcapitalism: A Guide to Our Future – Paul Mason (2015)

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# **Introducti****on**

The economy is complex – prone to reactions that accelerate uncontrollably and to complex feedback loops.

It moves through a mixture of long- and short-term cycles, leading to mutations and ultimately to breakdown over timescales of 50 to 500 years.

Four things that at first allowed neoliberalism to flourish but which have begun to destroy it:

1. ‘**Fiat money**’, which allowed every slowdown to be met with credit loosening, and the developed world to live on debt.
2. **Financialisation**, which replaced the stagnant incomes of the developed world workforce with credit.

Velocity and momentum built up by finance during the last 25 years

1. The **global imbalances** (in trade, saving and investment), and the risks remaining in the vast debts and currency reserves of major countries.

Neoliberalism can exist only because certain key countries do not practise it. Germany, China and Japan pursue what their critics call “neomercantilism”: manipulating their trade, investment and currency positions to accumulate a large pile of other countries’ currencies.

Current account balance: difference between imports and exports of goods, services and investments

Foreign exchange reserves: the stock of money held by the surplus countries in other currencies

1. **Information technology**, which allowed everything else to happen, but whose future contribution to growth is in doubt.

The **network effect** was first theorised by **Theodore Vail** as early as 1908, when he was at the head of Bell Telephone. Vail realized that networks create something extra, for free. In addition to utility for the user of a telephone and revenue for the owner, he noticed a third thing: the more people join the network, the more useful it becomes to everybody. Ex. With search engines: the more people use a particular search engine, the more data the algorithm can use to come up with better results.

The problem comes when you try to measure and capture that third thing. **Robert Metcalfe**, the inventor of the Ethernet switch, claimed in 1980 that a network’s value is “the number of users squared”. So while the cost of building a network rises in a straight line, its value rises in an exponential curve. (see <http://techopedia.com/definition/29066/metcalfes-law>) By implication the art of doing business in a knowledge economy is to capture everything between the straight line and the rising curve.

But how do we measure value? In terms of money saved, revenue earned or profits accrued? In 2013, the OECD’s economists agreed that it could not be captured by traditional market metrics. “While the Internet’s impact on market transactions and value added has been undoubtedly far-reaching”, they wrote, “its effect on non-market interactions…is even more profound.” (‘Measuring the Internet Economy: A Contribution to the Research Agenda’, OECD, 2013)

Economists have tended to ignore non-market interactions: they are, by definition, non-economic – as insignificant as a smile passed between two customers in the Starbucks queue. As to the network effect, they assumed its benefits would be quantified into lower prices and distributed between producers and consumers. But in the space of less than 30 years, network technologies have opened whole areas of economic life to the possibility of collaboration and production beyond the market.

An information economy may not be compatible with a market economy – or at least not one dominated and regulated by market forces primarily. Capitalism, a system based on markets, property ownership and exchange, may not be able to capture the ‘value’ generated by the new technology. Information goods conflict fundamentally with market mechanisms.

Without the escape route (which entails stabilization of fiat money, retreat from financialization and an end to the imbalances), the prospect looks more and more like long-term stagnation.

Without immigration in the developed countries, the workforce and the tax base of the West would shrink so badly over the next 50 years that states would go bankrupt. But the populations of the developed world may not accept the flow of migrants.

In 2014, the OECD released its projections for the world economy in the years between now and 2060. World growth will slow to 2.7%, as the catch-up effects boosting growth in the developing world – growing population, education, urbanization – will peter out. Meanwhile, because semi-skilled jobs will become automated, leaving only high- and low-paid ones (the middle-income jobs disappearing), global inequality will rise by 40%.

By 2060, countries such as Sweden will have the levels of inequality currently seen in the USA, with Stockholm resembling the destroyed cities of the American rust belt. And Los Angeles and Detroit would look like Manila today; abject slums alongside guarded skyscrapers.

If things do not change, says the OECD, it is realistic to expect stagnation in the West, a slowing pace of growth in emerging markets and the likely bankruptcy of many states.

So what’s more likely is that at some point one or more countries will quit globalization, via protectionism, debt write-offs and currency manipulation. Or that a de-globalization crisis originating in diplomatic and military conflict spills over into the world economy and produces the same results.

Central premises of this book:

**(1) Alongside the long-term stagnation problem arising from the financial crisis and demographics,**

**(2) information technology has removed the ability of market forces to create dynamism.**

Before the advent of IT, technological change was recharging the batteries of capitalist growth**.**

**🡪 It may not be possible to rescue capitalism (as Keynes did with radical policy solutions) because its technological foundations have changed.**

**(3) Instead, IT is creating the conditions for a post-capitalist economy.**

# **Wave-theory**

# **The long cycles**

Industrial capitalism has gone through 4 long cycles, leading to a 5th whose take-off has stalled:

1. 1790-1848: The first long cycle is discernible in the English, French and US data. The factory system, steam-powered machinery and canals are the basis of the new paradigm. The turning point is the depression of the late 1820s. The 1848-51 revolutionary crisis in Europe, mirrored by the Mexican War and Missouri compromise in the USA, forms a clear punctuation point.
2. 1848-mid-1890s: The second long cycle is tangible across the developed world and, by the end of it, the global economy. Railways, the telegraph, ocean-going steamers, stable currencies and machine-produced machinery set the paradigm. The wave peaks in the mid-1870s, with financial crisis in the USA and Europe leading to the Long Depression (1873-96). During the 1880s and 90s, new technologies are developed in response to economic and social crises, coming together at the start of the third cycle.
3. 1890s-1945: In the third cycle, heavy industry, electrical engineering, the telephone, scientific management and mass production are the key technologies. The break occurs at the end of the First World War; in the 1930s, Depression, followed by the destruction of capital during World War II terminate the downswing.
4. 1948-2008: In the fourth long cycle, transistors, synthetic materials, mass consumer goods, factory automation, nuclear power and automatic calculation create the paradigm – producing the longest economic boom in history. The peak could not be clearer: the oil shock of October 1973, after which a long period of instability takes place, but no major depression.
5. In the late 1990s, overlapping with the end of the previous wave, the basic elements of the fifth long cycle appear. It is driven by network technology, mobile communications, a truly global marketplace and information goods. But it has stalled. And the reason it has stalled has something to do with neoliberalism and something to do with the technology itself.

The present crisis represents a disruption of the pattern – which arguably signals something bigger than the end of a 50-year cycle.

# **Nikolai Kondratieff’s wave-theory –** the rhythms of capital investment

In the 1930s, **Nikolai Kondratieff** posited that capitalism, instead of collapsing under crisis, generally adapted and mutated. Doing pioneering data-mining work, he showed that beyond short-term business cycles, there is evidence of a longer, 50-year pattern whose turning points coincide with major structural changes within capitalism and major conflicts. Thus, these moments of extreme crisis and survival (chaos, panic, revolution, huge swathes of capital destroyed, empires liquidated, business models scrapped, etc.) were not evidence of chaos but of order. Kondratieff was the first person to show the existence of long waves in economic history. Though it was later popularized as wave-theory, Kondratieff’s most valuable insight was to understand why the global economy goes through sudden change, why capitalism hits structural crisis, and how it morphs and mutates in response. Each wave, building on the next, creates a new version of the pattern.

Stalin’s police imprisoned and executed him, considering that his theory would bring Marxism face to face with a dangerous proposition: that there is no final crisis of capitalism.

Kondratieff used the term ‘long cycle’ instead of ‘wave’ because cycles in science have a sub-language that is highly useful, with concepts such as phases, states and their sudden alteration.

Kondratieff’s data series begins with the industrial revolution in the 1770s. In his theory, each long cycle has an upswing lasting about 25 years, fuelled by the deployment of new technologies and high capital investment. Then a slowdown begins, caused by the reduction of capital investment, the rise of savings and the growth of non-productive military expenditure, resulting in a downswing of about the same length, in which commodity prices and interest rates on capital both fall (there is more capital accumulated than can be invested in productive industries, so it tends to be stored in the finance sector), wages and prices collapse, usually ending with a depression.

In the up phase, capital flows to productive industries; in the down phase, it gets trapped in the finance system.

Kondratieff made no claim as to the exact timing of events, and no claim that the waves are regular.

**Argument about cause and effect** (important in Kondratieff’s thesis): takeoff is caused by capital accumulating faster than it is invested during the previous depression phase (economic cause); the effects are political (wars, revolutions) and technological (increased availability of new, cheaper technologies).

There is more evidence for the existence of long cycles in the work of **Cesare Marchetti**, an Italian physicist who analysed historical data on energy consumption and infrastructure projects. The result, he concluded in 1986, “very clearly reveals cyclic or pulsed behaviour” in many areas of economic life, with cycles lasting roughly 55 years. Marchetti said that the clearest evidence for long cycles lied in the pattern of investment in physical communication grids. Taking canals, rail, paved roads and airline networks as his examples, he showed how the build-out of each peaked roughly 55 years after the previous technology had done so. On this basis, he predicted that a new type of grid should appear around the year 2000. Though writing a mere 14 years before the millennium, he could not guess what it would be. Today though we have the answer: the information network.

# **Josef Schumpeter’s wave-theory – Technology and the entrepreneurs**

**Josef Schumpeter** argued that long waves are driven by technology, not by the rhythms of capital investment.

In *Business Cycles* (1939), Schumpeter argued that capitalism is shaped by interlocking wave-cycles, ranging from a short-wave 3- to 5-year cycle produced by the build-up of stocks inside businesses, through to the 50-year waves Kondratieff had observed. “Innovation is the outstanding fact in the economic history of capitalist society and (…) is largely responsible for most of what we would at first sight attribute to other factors.”

He supplied a detailed history of each of Kondratieff’s waves as an innovation cycle: the first is triggered by the invention of the factory system in the 1780s, the second driven by railways from 1842, the third by a cluster of innovations we now call the Second Industrial Revolution, in the 1880s and 90s.

In his wave-theory, the entrepreneur and the innovator drive each new cycle. Conversely, periods of breakdown are the result of innovation becoming exhausted, and capital being hoarded in the finance system. For Schumpeter, crisis is a necessary feature of the capitalist system, in that it promotes the “creative destruction” of old and inefficient models.

Schumpeter’s work can be regarded as a techno-deterministic account of boom and bust.

New technologies bring to power what Schumpeter called “new men” – who in turn bring with them their own tastes and norms of consumption.

# **Carlota Perez’ wave-theory**

**Carlota Perez**, a modern follower of Schumpeter, dates the waves from the invention of key technologies, not their rollout, departing from both Kondratieff and Schumpeter.

She proposes a different causal sequence: innovators invent, financiers get excited and speculate, it all ends in tears and the state moves in, regularising the situation so that a golden age of high growth and productivity can occur.

Perez’ version of wave-theory stresses the response of governments at crisis points. In an almost pure inversion of Kondratieff, the economics are driven by technology, and technology is driven by governments.

She has used the tech-driven theory to urge policymakers to give state support to info-tech, biotech and green energy – with the promise of a new golden age to follow sometime in the 2020s, once the next wave takes off.

Perez added some refinements to wave-theory that are useful for understanding the present phase. The most important is her idea of the techno-economic paradigm. It is, she argues, not enough for there to be a cluster of innovations at the start of each wave-cycle, nor for these innovations merely to interact with each other. A “new common sense, guiding the diffusion of each revolution” has to emerge, a recognisable “logic of the new” that enables the replacement of one set of technologies and business practices with another.

# **Paul Mason’s normative restatement of long-cycle theory,** merged with what he considers rational about the Marxist understanding of crisis

1. The start of a wave is usually preceded by the build-up of capital in the finance system, which stimulates the search for new markets and triggers the rollout of clusters of new technologies. The initial surge sparks wars and revolutions, leading at some point to the stabilization of the world market around a new set of rules or arrangements.

2. Once the new technologies, business models and market structures begin to work in synergy – and the new “technological paradigm” is obvious – capital rushes into the productive sector, fuelling a golden age of above-average growth with few recessions. Since profit is everywhere, the concept of allocating it rationally between players becomes popular, as does the possibility of redistributing wealth downwards. The era feels like one of ‘collaborative competition’ and social peace.

3. Throughout the whole cycle, the tendency to replace labour with machines operates. But in the upswing, any fall in the profit rate is counterbalanced by the expanded scale of production, so overall profits rise. In each of the up cycles, the economy has no trouble absorbing new workers into the workforce even as productivity increases. By the 1910s, for example, the glass-blower displaced by machinery becomes the projectionist in a cinema, or the worker on a car production line.

4. When the golden age stalls, it is often because euphoria has produced sectoral over-investment, or inflation, or a hubristic war led by the dominant powers. There is usually a traumatic *break point* – where uncertainty (over the future of business models, currency arrangements and global stability) becomes general.

5. Now the first adaptation begins: there is an attack on wages and an attempt to de-skill the workforce. Redistribution projects, such as the welfare state or the public provision of urban infrastructure, come under pressure. Business models evolve rapidly in order to grab what profit there is; the state is urged to organize more rapid change. Recessions become more frequent.

6. If the initial attempt to adapt fails (as it did in the 1830s, 1870s and 1920s), capital retreats from the productive sector and into the finance system, so that crises assume a more overtly financial form. Prices fall. Panic is followed by depression. A search begins for more radical new technologies, business models and new supplies of money. Global power structures become unstable.

At this point we need to factor in the concept of agents: social groups pursuing their own interests. A problem with the Schumpeter-inspired version of wave-theory is its tendency to obsess about innovators and technologies, and not see classes. When we look closely at social history, each ‘failed adaptation’ phase happens because of working-class resistance; each successful one is organized by the state.

Crucial addition to wave-theory: in each long cycle, the attack on wages and working conditions at the start of the downswing is one of the clearest features of the pattern. It sparks the class warfare of the 1830s, the unionization drives of the 1880s and 90s, the social strife of the 1920s. The outcome is critical: if the working class resists the attack, the system is forced into a more fundamental mutation, allowing a new paradigm to emerge. But in the fourth wave the workers did not successfully resist.

If the working class is able to resist wage cuts and attacks on the welfare system, the innovators are forced to search for new technologies and business models that can restore dynamism on the basis of higher wages – through innovation and higher productivity, not exploitation. In general, for the first three long cycles, working-class resistance did force capitalism to reinvent itself on the basis of existing or higher consumption levels.

Once you factor in class, wages and welfare states, working-class resistance can be technologically progressive; it forces the new paradigm to emerge on a higher plane of productivity and consumption. It forces the ‘new men and women’ of the next era to promise and find ways of delivering a form of capitalism that is more productive and which can raise real wages.

The role of the state in creating the new paradigm is equally clear. The history of long cycles shows that only when capital fails to drive down wages and when new business models are swamped by poor conditions is the state forced to act: to formalize new systems, reward new technologies, provide capital and protection for innovators.

Long cycles are not produced by just technology plus economics, the third critical driver is class struggle. And it is in this context that Marx’s original theory of crisis provides a better understanding than Kondratieff’s ‘exhausted investment’ theory 🡪 the long cycles are the long-term rhythms of the profit system (see [Marxism](#Marxism)).

As to financial crisis, it is always possible during the up phase of the long cycle (for example in the US panic of 1907) – but virtually certain during the down phase. As capital flows out of the troubled productive sector and into finance, it destabilizes the latter, leading to speculative boom-bust cycles.

A final observation concerns the need for capitalism to interact with a world outside to search for new markets for goods and a new labour supply. This is a crucial consideration in systems theory but is underplayed by Marxist crisis theory with its focus on closed and abstract models.

With the fourth wave, a substantial part of the world outside is initially closed off. Once the Cold War starts, about 20 % of the world’s GDP is being produced outside the market. After 1989 the sudden availability of new markets and a new labour force plays an important part in prolonging the wave; so does the West’s new freedom of action to shape markets in neutral countries that were formerly off-limits. In other words, between 1917 and 1989 capitalism’s full potential for complex adaptive behaviour was suppressed. After 1989 it experienced a sugar-rush: labour, markets, entrepreneurial freedom and new economies of scale. On this basis, 1989 accounts for some of the phase distortion, but it cannot account for all of it.

The long-wave pattern has been disrupted. The fourth long cycle was prolonged, distorted and ultimately broken by factors that have not occurred before in the history of capitalism: the defeat and moral surrender of organized labour, the rise of information technology and the discovery that once an unchallenged superpower exists, it can create money out of nothing for a long time.

# **Marxism**

Marxism is both a **theory of history** and a **theory of crisis**.

As a theory of history, it is superb: armed with and understanding of class, power and technology, we can predict the actions of powerful men before they know what they’re going to do themselves.

But as a theory of crisis, describing how market mechanisms lead to breakdown, Marxism is flawed to some extent; it understood that capitalism is an unstable, fragile and complex system, and recognised that class gives different agents in the market unequal power, but it underestimated capitalism’s capacity to adapt.

## Forms of crisis

Across the three volumes of *Das Kapital* (1867, 1885, 1894), **Karl Marx** described several forms of crisis.

The first is an overproduction crisis, when too many commodities are chasing too little demand, leaving the profits generated in the production process unable to be realized by selling the goods.

Marx also expected crises to emerge from the inefficient flow of capital between sectors: he lived through numerous crises where heavy industry had grown out of step with the consumer goods producing sector, leading to a recession until they rebalance.

Then there are crises triggered by the failure of the counteracting tendencies listed previously, leading to a tangible collapse in the profit rate, an investment freeze, layoffs and falling GDP.

Finally, in volume III of *Capital*, Marx describes how a financial crisis happens: credit becomes massively overextended, and then speculation and crime drive it to unsustainable limits where the bust inevitably overcorrects the boom – pushing the economy into a multi-year depression. In one evocative sentence Marx anticipated the world of Enron, Bernie Madoff and the wealthy 1 %. The main function of credit, he wrote, is to develop exploitation “to the purest and most colossal form of gambling and swindling, and to reduce more and more the number of the few who exploit the social wealth”.

Capitalism = complex adaptive system

3 general features of complex adaptive systems were to challenge Marxism:

1. Openness: thrive on contact with the outside world (ex. integration of new colonies).
2. Unpredictable response to danger: respond to challenges by innovating and transforming in unpredictable ways, with each innovation producing an intricate new set of opportunities for growth and expansion within the system.
3. Generation of “emergent” phenomena, which can only be studied at a higher level than the workings of the system itself. For example, the behaviour of an ant colony might be a product of the ant’s genetic code, but it has to be studied as behaviour, not genetics.

Marxism was, in a way, the most systematic study ever attempted of emergent phenomena, but was constantly confused as to their nature. Only in the 1970s, when the idea of “relative autonomy” arrived in Marxist economics, did the discipline begin to understand that not all layers of reality are a simple expression of the layers beneath them.

At the centre of the disputes of the classic economists (Smith, Say, Mill, Malthus and Ricardo) was the idea that human labour is the source of value and determines the average price of things. This is known as the **Labour Theory of Value (LTV)** = a theory of value that argues that the economic value of a good or service is determined by the total amount of socially necessary labour required to produce it, rather than by the use or pleasure its owner gets from it – which would correspond to the Subjective Theory of Value (STV), and, by extension, to the theory of marginal utility.

[Seeing flaws in the classic versions of LTVs, Marx produced a coherent version of it – using the term ‘law of value’ instead at the time – notably making distinctions between categories of labour.]

(see [On Price and value](#OnPrice))

**Karl Marx** argued that in fully fledged capitalism profits tend to converge on the average. Via the finance sector, managers create an aggregate pool of profits into which investors can dip at fairly constant rates of return for any given level of risk. Marx grasped the way finance, in the form of interest, becomes the main mechanism for allocating capital rationally in response to average sectoral risks and rewards.

Marx realised that the ultimate source of profit is work; specifically, the extra value coerced out of employees by the unequal power relationships in the workplace. But there is an inbuilt tendency to replace labour with machinery, driven by the need to increase productivity. Since labour is the ultimate source of profit this will tend, as mechanisation spreads across the whole economy, to erode the rate of profit. In a company, sector or whole economy where increasing proportions of capital are invested in machinery, raw materials and other non-labour inputs, you are reducing the scope for labour to generate profit. Marx called this “the most fundamental law of capitalism”.

🡪 An arrangement that allows for the rapid replacement of labour by machinery works for a while, generating expanded profits, and then breaks down.

Counteracting tendencies: the system reacts to this threat spontaneously, with behaviours that counteract the tendency of the profit rate to fall. Investors switch to new markets where profits are higher; labour costs are driven down by cheapening consumer goods and food; managers search for new sources of cheap labour in foreign countries; or they produce machinery that costs less in labour-terms to make; or they move out of machine-intensive industries into labour-intensive ones; or they pursue market share (profit size) instead of margins (profit rate).

Marx identified the rise of finance as a more strategic counter-tendency: a proportion of investors begin to accept interest – rather than the outright entrepreneurial profit that comes from setting up a company and operating it – as the normal reward for owning large amounts of money. Entrepreneurs will still take one-sided risks, as private capital and hedge funds do today, but large parts of the system are geared to survive on low-risk, low-reward investments via the finance system – which Marx says allows capitalism to go on operating when profits are depressed.

For Marx, these counter-tendencies operate constantly. A crisis happens only when they become exhausted or break down. That is, when you run out of cheap labour, or new markets fail to appear, or the finance system can no longer safely hold all the capital that risk-averse investors are trying to store there. In summary, Marx argued that crisis is the pressure valve for the system as a whole. It is a normal feature of capitalism and a product of its technological dynamism. Even when it looks stable, capitalism is not in equilibrium: there is a spontaneous breakdown process counterbalanced by numerous spontaneous stabilisers. Crisis theory explains when and why these stabilisers stop working.

To recapitulate:

Marx suggested that there is a process whereby labour is expelled by machinery; the result is a tendency for the profit-rate to fall. There is an equal tendency for falling profits to be offset by adaptation (the counteracting tendencies), and a cyclical crisis is what happens when these adaptations break down.

But Kondratieff shows us how at a certain point – when crises become frequent, deep and chaotic – a more structural adaptation is triggered. Because their economic model could not accommodate structural adaptation, Marxists in the early twentieth century had to describe this in terms of historical ‘epochs’, or philosophical categories such as parasitism, decay and transition.

In fact, the moment of mutation is fundamentally economic. It is the exhaustion of an entire structure – of business models, skill-sets, markets, currencies, technologies – and its rapid replacement by a new one.

The book argues that the crisis that broke out in 2008 was not the result of a breakdown of this or that counteracting factor, or due to a short-term fall in the profit rate. It was the breakdown of an entire system of factors supporting the profit rate: neoliberalism.

The impact of technology – as well as the sudden availability of a new outside world (after 1989) – created a break in the long-term pattern.

# **Socialism**

# **Rudolf Hilferding’s doctrine of progressive transition**

**Rudolf Hilferding**’s book, *Finance Capital* (1910), would become the reference point for all left-wing debates on the future of capitalism for a century.  He was the first Marxist to understand the scale of capitalism’s mutation. Finance took a controlling stake in industry, carving out monopoly positions where possible or oligopolies (price-fixing cartels were legal), suppressing market forces – and the state was directly allied to the whole project, throwing up numerous tariffs on external trade, explicitly designed to promote the interests of their companies.

What’s more, in the new structure many of the permanent features looked exactly like those Marx had listed as counter-tendencies to the falling profit rate: the export of capital, the export, via migration, of surplus workers to white-colonial settlements abroad, the pooling of profits via the stock market, the move away from entrepreneurship into rentier-style investing.

The finance system, which in the previous century had functioned as a puny redistribution centre for business profit and an unreliable source of capital, now dominated and controlled the business world. The counter-tendencies to crisis had become synthesized into a new, more stable system.

Hilferding argued that this new structure could suppress cyclical crisis. Big firms and big banks could survive for long periods on low or zero profits. And investors would rather accept prolonged stagnation than see a sudden crisis destroy firms like Siemens, Bell or Mitsui. As a result, crisis periods under finance capitalism would be long and stagnant rather than sharp and traumatic. Banks would suppress speculation because they understood its destructive power. Cartels would suppress the operation of market forces – and therefore crisis – for major firms, dumping the losses on less powerful sectors of the economy. Small firms would bear the brunt of any recession, hastening their acquisition by monopolies.

For Hilferding, the forces of instability had not disappeared, but had been driven into a single sphere: the imbalance between the production and consumption-oriented sectors of the economy. He explicitly ruled out ‘under-consumption’ as a cause of crisis, pointing out that capitalism could always create new markets where old ones were exhausted, and thus go on expanding output. But the possibility remained that sectors would expand at different rates. Hence the need for state intervention to prevent such an imbalance.

The socializing function of finance capital facilitates enormously the task of overcoming capitalism. Once finance capital has brought the most important branches of production under its control, it is enough for society, through its conscious executive organ – the state conquered by the working class – to seize finance capital in order to gain immediate control of these branches of production.

Hilferding was a moderate socialist and would become more moderate as time went on. He believed capitalism would gradually evolve into socialism. His ideas, however, influenced reformists and revolutionaries alike. Both wings of the labour movement became wedded to the belief that socialism could be introduced by taking control of the state and the organized market. Finance capital was, as Lenin later put it, “moribund capitalism, capitalism in transition to socialism (…) already dying capitalism”.

What’s important is that Hilferding not only tied socialism to a project of state-led transition, but also that he effectively ruled out any further mutation of capitalism beyond the model established in the 1900s. And his basic theory remained influential well into our lifetime. As late as the 1970s you could argue that, though capitalism had survived longer than expected, it was still essentially a state-directed, heavily monopolized and national system. Left-wing workers could rationally believe that a world of state-owned airlines, steel mills and auto companies was stage two of the progression: free markets -> monopoly -> socialism.

This was the idea that died after 1989, with the collapse of the Soviet bloc, the rise of globalization and the creation of the fragmented, marketized and privatized economy we see today. The progression Hilferding imagined, which had implicitly guided socialism for 80 years, has been broken and indeed reversed.

While it lasted, though, the doctrine of an inevitable linear transition to socialism was all-powerful.

# **Rosa Luxemburg’s theory of under-consumption**

If Hilferding is right, said **Rosa Luxemburg**, then socialism is not inevitable. It becomes a “luxury” for the working class. They can just as easily choose to coexist with capitalism, and – given their political consciousness – probably will. So Luxemburg was driven to search for an objective rationale for breakdown.

Luxemburg’s book, *The Accumulation of Capital* (1913), was written with twin purposes: to explain the economic motivation for the colonial rivalry between the big powers, and to show that capitalism was doomed. In the process she produced the first modern theory of under-consumption. She argued that capitalism is in a permanent state of overproduction. It is forever beset by the problem of too little spending power among the workers. So it is forced to open up colonies, not just as sources of raw material but as markets. The military costs incurred while conquering and defending colonies have the added benefit of soaking up excess capital. It is, said Luxemburg, akin to waste or luxury consumption: it drains off excess capital. Since colonial expansion was the only pressure valve in a system prone to crisis, Luxemburg predicted that once the entire globe had been colonized, and capitalism introduced across the colonial world, the system must collapse.

However, her many critics argued that any mismatch between production and consumption was temporary, and would be solved by capital investment moving from heavy industry to consumer goods. In any case, new colonial markets were not the only escape valve from crisis.

But Luxemburg’s book went on to become hugely significant. It introduced the idea of final crisis into left-wing economics. It expressed the intuition felt by many activists that monopoly, finance and colonialism were, even amid the peace and prosperity of the 1900s, storing up an almighty final catastrophe. By the 1920s, under-consumption became the left’s main theory of crisis and – once things calmed down – provided its common ground with Keynesian economics for the next 50 years.

Luxemburg remains relevant because she identified something critical to the debate on postcapitalism today: the importance of an *outside world* for systems that successfully adapt. Capitalism is an open system, but not limited to the possession of colonies, which was the subject of her attention; new markets can also be created at home, and not just by boosting the workers’ spending power, but by transforming non-market activities into market ones (ex. introduction of cars, new leisure activities, etc.).

All forms of under-consumption theory have an Achilles heel though: what if capitalism does find a way of overcoming the low spending power of the masses? By 1928, **Nikolai Bukharin** was struck by the intuition that it had done so. Capitalism, he claimed, had stabilized in the 1920s – not temporarily, nor partially – and unleashed a new surge of technical innovation. The cause of this surge, he said, was the emergence of *state capitalism* – a fusion of monopolies, banks and cartels with the state itself.

With this, crisis theory had come full circle, back to the possibility that organized capitalism could suppress crisis. Bukharin’s misfortune was to say it on the eve of the Wall Street Crash, amid a factional dispute with Stalin. He was expelled from the party leadership and, despite an uneasy decade trying to coexist with Stalin and publicly recanting his former views, was executed like Kondratieff in 1938.

# **Experiments with socialisation**

Between 1917 and 1923 both wings of socialism (reformists and revolutionaries) got to test out the idea that workers could use state power to socialize capitalism.

In January 1919, Hilferding joined the German government’s socialization commission in Berlin, which for four months attempted to nationalize and plan the economy. But the project collapsed at the design stage, after obstruction by moderate socialists and liberals in government.

In Austria – a new country formed from the ruins of the Austro-Hungarian Empire – socialisation was more successful. The Socialist-Christian coalition government pushed through a law allowing the nationalization of failing firms, but a socialist plan to take over the banking system was rejected. In the end, Austria was left with 3 significant state enterprises: a shoe factory, a pharmaceuticals plant and the arsenal of the Austro-Hungarian Empire, which the government tried to convert into a diversified manufacturing company. The fate of this project is best summed up by the man who tried to run it: “The problem before the newly founded corporation was to employ its men and machines in producing goods for which a market had yet to be created.”

In Hungary, during the brief Soviet republic of 1919, **Jeno Varga**, a one-time acolyte of Hilferding in the Vienna seminars, became finance minister. He decreed that all businesses with more than 20 workers should be nationalized. All large shops were closed to prevent the middle classes buying luxury goods and using them as investments. Land was nationalized. Soon the Hungarian workers’ republic faced another problem. Factories needed managing, but the workers could not manage. Varga outlined the problem frankly:

*“The members of the works committees endeavoured to evade productive labour. In the capacity of controllers, they all sat round the office table … they sought to win the favour of the workers, through concessions in discipline, in the amount of work exacted, and in wages, to the detriment of the general interest.”*

In Russia, the Bolsheviks had overcome such problems by introducing military discipline into the factories and abolishing workers’ control. Now they had a bigger problem: the economy was collapsing under the strain of industrial chaos, shortages and the refusal of peasants to supply grain to the cities. In 1920 **Nikolai Bukharin** outlined a solution: a detailed plan to move rapidly from this improvised system, known as *war communism*, to a permanent one of central planning across the entire economy. Vladimir Lenin scrapped this a year later, as starvation and chaos forced the Bolsheviks to switch to a crude form of market socialism.

* For decades, the leaders of pre-war social-democracy showed very little forethought about the problem that would take down both the reformist and revolutionary versions of socialisation: namely, the independent action of workers, pursuing their own short-term interests, and its conflict with the need for technocratic management and centralized planning.

From Varga’s recalcitrant works committees in Budapest to the Russian workers who insisted on self-control, or the Fiat workers in Milan who even tried to produce cars without the help of managers, this problem – workers control *vs* planning – would hit the socialist leaders as a total surprise.

## Stalin’s version of Marxism

**Jeno Varga**, who’d fled Hungary for Moscow, was the chief economist of Stalin. *Varga’s Law* predicted the constant decline of workers’ real incomes. This, he wrote, “is the economic basis for the general crisis of capitalism (…) the absolute impoverishment of the working class comes to the fore”. Varga was explicit: the downward trend of mass consumption was a non-cyclical, general feature of the 20th century and would, given time, destroy all support for reformist and liberal politics among workers. Instead of growth there would be, in Varga’s phrase, ‘decumulation’.

As a result, the ‘authorized version’ of Marxist economics – inevitable and imminent collapse – was plausible. Even the Trotskyists, hounded by Stalin, were convinced of capitalism’s doom by the late 1930s, their leader insisting that ‘the productive forces stagnate’.

In a global labour movement now dominated by the Moscow variant of Marxism, no possibility other than collapse was allowed.

But Bolshevism and the forced-march abolition of the market turned out to be a failed experiment of Marx’ followers – by contrast, Trotsky wanted a transitional approach, but was expelled from the party.

# **The 4th Long, Disrupted Wave**

In 1944, the **Bretton Woods** Conference agreed a system of fixed exchange rates designed to restore pre-1914 stability, only this time with explicit rules. All currencies would be pegged against the dollar, and the USA would peg the dollar to gold at $35 an ounce. Countries whose trade balance became seriously out of kilter would have to buy or sell dollars to keep their own currency at the agreed peg.

This was a system also stacked against high finance. Strict limits on bank leverage were imposed by law and *moral suasion* – quiet pressure from central banks on banks that lent too much. In the USA, big banks were required to hold cash or bonds equivalent to 24 % of the money they’d lent out. In the UK it was 28 %. By 1950, bank loans across 14 advanced capitalist countries equalled just one fifth of GDP – the lowest since 1870, and much smaller than the scale of bank lending during the pre-1914 upswing.

The result created a form of capitalism that was profoundly national. Banks and pension funds were required by law to hold the debt of their own countries; and they were discouraged from making cross-border financial trades. Add to that an explicit ceiling on interest rates and you have what we now call *financial repression*.

Bretton Woods achieved something unprecedented: it shrank the debts run up during a global war, suppressed speculation, mobilized savings into productive investment and enabled spectacular growth. It pushed all the latent instability of the system into the sphere of relationships between currencies, but US dominance ensured these were, at first, contained. Right-wing outrage over the inflationary aspect of Bretton Woods was overcome by the greatest period of stability and full production ever known.

Another major change had taken place during wartime, with the state taking control of innovation. By 1945, national bureaucracies had become adept in the use of state ownership and control – and indeed mass communication – to shape private-sector behaviour. Perfectly ordinary managers, under the ultimate pressure of ‘you lose, you die’, had fine-tuned technocracy. Even in the Axis powers, where the state was dismantled in 1945, this culture of innovation and a large part of the technocratic system survived the war.

At the Federal level, research and development was centralized and industrialized by the Office of Scientific Research and Development (OSRD). Key to the whole deal was the prohibition of profit directly from research. “Profit is a function of the production activities of an industrial establishment, not of a research department”, the OSRD decreed. Contracts were placed where skills were high, where the danger of mass-production overload was least and “spread among as many organizations as possible”. Only when all these criteria were equal could the lowest cost be brought into consideration. Competition and patent ownership issues were put on hold.

These were remarkable things to achieve within capitalism: to treat research as public property, to suppress competition and to plan not just production but the direction of research. And though the USA perfected it, all major combatant states attempted it. The result was to stimulate an unprecedented culture of cross-fertilization in strategic disciplines. The new approach inserted maths and science into the heart of the industrial process; economics and data management into political decision-making.

It was the OSRD that took **Claude Shannon**, the founder of information theory, out of Princeton and put him into Bell Labs to design algorithms for anti-aircraft guns. There, he would meet Alan Turing and discuss the possibility of *thinking machines*. Turing, too, had been scooped out of academia by the British government to run the Enigma codebreaking operation at Bletchley Park.

A transistor is simply a switch with no moving parts. Information theory plus transistors gives you the ability to automate physical processes. So factories throughout the West were re-tooled with semi-automated machinery: pneumatic presses, drills, cutters, lathes, sewing machines and production lines. What they lacked was sophisticated feedback mechanisms: electronic sensors and automated logic systems were so crude that the latter used compressed air to do what we now do with iPhone apps. But human beings were plentiful – and for many manual work became the act of controlling a semi-automated process.

**In this sense, the wartime economy gave birth to one of the most fundamental reflexes within the capitalism of the long boom: to solve problems through audacious technological leaps, pulling in experts from across disciplines, spreading the best practice in a sector, and changing the business process as the product itself changed.**

State direction produced a culture of science-led innovation. Innovation stimulated high productivity. Productivity allowed high wages, so consumption kept pace with production for 25 years. An explicit global rules system amplified the upside. Fractional reserve banking stimulated a ‘benign’ inflation which, combined with financial repression, forced capital into productive sectors and kept speculative finance marginal. The use of fertilizers and mechanization in the developed world boosted land productivity, keeping the cost of inputs cheap. Energy inputs were, at the time, also cheap.

## WHAT CAUSED THE WAVE TO BREAK?

There is no dividing line in economic history clearer than 17 October 1973. With their armies at war with Israel, the majority of the oil-exporting Arab countries imposed an oil embargo on the USA and slashed output. The oil price quadrupled. The resulting shock pushed key economies into recession. America’s economy shrank by 6.5 % between 1974 and 1975.

The crisis was unique because in the worst-hit countries, falling growth coincided with high inflation. By 1975, inflation in Britain reached 20 %, and 11 % in the USA. The word **stagflation** hit the headlines.

Yet the oil shock was merely the trigger. In each developed country, growth in the late 1960s seemed beset by national or local problems: inflation, labour troubles, productivity concerns and flurries of financial scandal.

What made it happen is a question that has defined modern economics. For right-wing economists, the answer lay in the exhaustion of Keynesian policy. For the left, however, the explanations have varied over time: in the late 1960s, high wages were seen as responsible; in the following decade, economists of the New Left tried to apply the Marxist overproduction theory.

## **Devaluations**

Under the Bretton Woods rules, you were not supposed to devalue your currency to make your exports cheap and boost employment. Instead, if your economy was uncompetitive, you could either protect yourself from international competition through trade barriers, or impose *internal devaluation* – cutting wages, controlling prices, reducing the amount spent on welfare payments. In practice, protectionism was discouraged by the Bretton Woods rules and wage cutting was never seriously attempted until the mid-1970s – which left devaluation. In 1949, Britain devalued Sterling by 30 % against the dollar [in order to reflect their lower economy with large debts, less imports than dollars, lower reserves of gold for the BoE to buy back Sterling in order to maintain the fixed exchange rate with the dollar under Bretton Woods] and 23 other countries followed suit. A total of 400 official devaluations took place before 1973.

So, from the outset, Bretton Woods was a system where states were repeatedly trying to offset their economic failings by manipulating their exchange rates against the dollar. This was seen in Washington as a form of unfair competition, and the USA fought back. By the 1960s, it was devaluing its own currency in real terms, as measured by price differences, against those of its competitors. This subcutaneous economic warfare became overt during the inflation crises of the late 1960s.

## **End of Bretton Woods**

In August 1971, **Richard Nixon** broke the commitment to exchange dollars for gold, thereby destroying Bretton Woods. America had become the big loser from Bretton Woods. It needed to pay for the Vietnam War and the welfare reforms of the late 1960s, but could not. It needed to devalue but could not, because to make that happen, other countries had to raise their own currencies against the dollar, and they refused. So Nixon acted.

The world moved from exchange rates fixed against the dollar and gold to totally free-floating currencies. From then on, the global banking system was effectively creating money out of nothing.

## **The State’s response to the economic problems**

With the end of Bretton Woods, each stricken country was temporarily free to solve the underlying problems of productivity and profitability in ways the old system had made impossible: with higher state spending and lower interest rates. The years 1971–3 were lived in a kind of nervous euphoria. The inevitable stock market crash hit Wall Street and London in January 1973, triggering the collapse of several investment banks. The oil shock of October 1973 was the final straw.

By 1973, every aspect of the unique regime that had sustained the long boom was broken. But the crisis looked accidental: low input prices destroyed by OPEC; global rules ripped up by Richard Nixon; profits eroded by that figure of loathing, the ‘greedy worker’.

After 1973, governments tried to fix the system by applying the old, Keynesian rules harder. They used price and wage control policies in an attempt to suppress inflation and appease worker unrest. They used state spending – and borrowing on an increased scale to maintain demand in the face of the slump. But even though growth recovered after 1975, it could never reach its old levels.

During the late 1970s, the Keynesian system destroyed itself. This destruction was not just the work of policymakers but of all the players in the Keynesian game: the workers, the bureaucrats, the technocrats, the politicians.

Working-class militancy had already moved out of the factory and into the arena of bargaining nationally with the government. In the mid-1970s, in almost every country the attention of trade union leaders was focused on national wage agreements, price controls, social reform programmes, together with strategies that would maintain their grip over specific sectors – such as the British dockers’ attempt to resist container technology. The ultimate aim of labour movements in the developed world became to put in power leftist social-democratic governments that would permanently guarantee Keynesian policies.

## **Neoliberalism**

It has become commonplace to think that the triumph of globalization and neoliberalism was inevitable. But it was not. Their emergence was just as much the result of government action as corporatism and fascism had been in the 1930s.

Neoliberalism was designed and implemented by visionary politicians: Pinochet in Chile; Thatcher and her ultra-conservative circle in Britain; Reagan and the Cold Warriors who brought him to power in the USA. They had faced massive resistance from organized labour, and they had had enough. In response, these pioneers of neoliberalism drew a conclusion that has shaped our age: a modern economy cannot coexist with an organized working class. Consequently, they resolved to smash labour’s collective bargaining power, traditions and social cohesion completely.

Unions had come under attack before – but always from paternalist politicians who had proffered the lesser of two evils: in place of militancy, they had encouraged a ‘good’ workforce, defined by moderate socialism, unions run by agents of the state. And they helped build stable, socially conservative communities that could be the breeding ground for soldiers and servants.

The neoliberals sought something different: **atomization**. Because today’s generation sees only the outcome of neoliberalism, it is easy to miss the fact that this goal – the destruction of labour’s bargaining power – was the essence of the entire project: it was a means to all the other ends. Neoliberalism’s guiding principle is not free markets, nor fiscal discipline, nor sound money, nor privatization and offshoring – not even globalization. All these things were byproducts or weapons of its main endeavour: to remove organized labour from the equation.

Not all the industrialized countries followed the same path, nor at the same pace. Japan had blazed the trail for flexible working in the 1970s. Of all the advanced economies, Japan was the only one to successfully rationalize industrial business models after 1973. There was of course resistance, dealt with in a brutal fashion – by taking out the ringleaders and beating them physically every day until resistance stopped. “It is as though the ‘company world’ were immune from the law of the state”, wrote the Japanese leftist Muto Ichiyo, who witnessed some of these beatings.

Germany, by contrast, resisted labour reforms until the early 2000s, preferring instead to create a peripheral migrant workforce in low-grade service and construction jobs alongside the paternalistic world of the production line. For this it was branded ‘the sick man of Europe’ by The Economist magazine, which as late as 1999 lamented its ‘bloated welfare system and excessive labour costs’. These were eradicated in the Harz II labour reforms (2003), which have now left Germany a highly unequal society, with many of its communities gripped by poverty.

Many developed countries took advantage of the recession of the early 1980s to impose mass unemployment. They adopted policies overtly designed to make the recession deeper: they hiked interest rates, sending old industrial businesses to the wall. They privatized or closed large swathes of coal, steel, auto and heavy engineering production owned by the state. They banned the wildcat and solidarity actions that had plagued managers in the boom years. But they did not, yet, try to dismantle welfare systems; these were needed to maintain social order in communities whose hearts had been ripped out.

With the unions sidelined, the transformation of work could begin in earnest, creating the atomized and precarious workforce of today.

Considered through the lens of long-wave theory, the defeat of organized labour in the 1980s is in fact unique.

The 1980s saw the first *adaptation phase* in the history of long waves where worker resistance collapsed. In the normal pattern, resistance forces the capitalists to adapt more radically, creating a new model based on higher productivity and higher real wages. After 1979, the workers’ failure to resist allows key capitalist countries to find a solution to the crisis through lower wages and low-value models of production. This is the fundamental fact, the key to understanding everything that happens next.

The defeat of organized labour did not enable – as the neoliberals thought – a ‘new kind of capitalism’ but rather the extension of the fourth long wave on the basis of stagnant wage growth and atomization. Instead of being forced to innovate their way out of the crisis using technology, as during the late stage of all 3 previous cycles, the 1 % simply imposed penury and atomization on the working class.

Across the Western world the wage share of GDP fell markedly. The economist Engelbert Stockhammer, surveying the damage for the International Labour Organization, showed that this fall in the wage share had been driven entirely by the impact of globalization, financialization and reductions in welfare provision. That, as it turns out, is an understatement. It was to trigger the reshaping of the world.

## HOW IS THE PATTERN BROKEN?

Here is the critical difference: in all 3 previous cycles, workers had resisted the cheap and nasty solution to the crisis – wage cuts, de-skilling and a reduction in the social wage. In the fourth wave, their resistance failed (see [Agents of change](#AgentsOfChange)). It was this failure that enabled the entire global economy to be rebalanced in favour of capital.

For about 20 years, this rebalancing worked – and worked so well that it convinced many rational people that a new age had dawned. What the Kondratieff theory had indicated should lead to downturn and depression led instead to two exhilarating decades in which an upswing in profits coexisted with social breakdown, military conflict, the return of abject poverty and criminality to communities in the West – and spectacular riches for the 1 %.

But this is not a social order, it is a disorder; it is what you get when you combine the move from production to finance (which Kondratieff would have expected) with a defeated and atomized workforce, and a super-rich elite living off financial profits.

**The factors that allowed neoliberalism to happen: fiat money, financialization, the doubling of the workforce, the global imbalances, including the deflationary effect of cheap labour, plus the cheapening of everything else as a result of information technology.**

# **The information economy**

The challenge was to train knowledge workers to make the kind of connections that the brain of an Einstein would make spontaneously. Management guru **Peter Drucker**’s solution was straight out of the playbook of management theory: a methodology, a project plan, better training. Humanity came up with a better solution: the network. This was not the result of any centralized plan or management group, but the spontaneous interaction of people using information pathways and forms of organization that did not exist until 25 years ago. Nevertheless, Drucker’s focus on *connection* and the modular use of information as the key to productivity was inspired.

Who is the social archetype of postcapitalism? If feudal society was epitomized by the medieval knight, and capitalism by the bourgeoisie, then who is in the historical scheme of things the bearer of postcapitalist social relations? It’s the same question that preoccupied Karl Marx, but Drucker’s answer would dismay most traditional leftists, who think it’s the proletariat. It would be, Drucker proposed, the universal educated person.

Drucker imagined this new kind of person emerging as a fusion of the managerial and intellectual classes of Western society, combining the manager’s ability to apply knowledge with the intellectual’s ability to deal with pure concepts. Such an individual would be the opposite of the polymath – those rare people who are simultaneously expert in Mandarin Chinese and nuclear physics. This new type of person would, on the contrary, be someone able to pick up and run with the products of expert research in narrow fields and apply them generally: applying chaos theory to economics, genetics to archaeology, or data-mining to social history.

In 1990 the American economist **Paul Romer** came up with a proposition specific to info-capitalism, with revolutionary implications. He defined technological change in a deliberately facile way: as an “improvement in the instructions for mixing together raw materials”. That is, he separated out things and ideas – for that is what *instructions* are. Information, for Romer, is like a blueprint or recipe for making something either in the physical world or in the digital world. This led to what he called a new fundamental premise: “that instructions for working with raw materials are inherently different from other economic goods”.

An information product is different from every physical commodity so far produced. And an economy primarily based on information products will behave differently from one based on making things and providing services. Romer spelled out why: “Once the cost of creating a new set of instructions has been incurred, the instructions can be used over and over again at no additional cost. Developing new and better instructions is equivalent to incurring a fixed cost.”

Once you can copy and paste something, it can be reproduced for free. It has, in economic terms, a zero marginal cost. Info-capitalists have a solution to this: make it legally impossible to copy certain kinds of information. But intellectual property rights are notoriously messy. If you are trying to ‘own’ a piece of information – whether you’re a rock band or a turbofan manufacturer – your problem lies in the fact that it does not degrade with use, and that one person consuming it does not prevent another person consuming it. Economists call this non-rivalry. A simpler word for it would be ‘shareable’.

Once a commodity is non-rival, the only way you can defend your ownership of it is by what economists call exclusion. So you can either put a bug into the software that makes it impossible to copy – as with a DVD – or you can make copying illegal. But the fact remains, whatever you do to protect the information – bug it, encrypt it, arrest the pirate-DVD seller in the car park – the information itself remains copiable and shareable, and at negligible cost.

This has major implications for the way the market operates.

Mainstream economists assume that markets promote perfect competition and that imperfections – such as monopolies, patents, trade unions, price-fixing cartels – are always temporary. They also assume that people in the marketplace have perfect information. Romer showed that, once the economy is composed of shareable information goods, imperfect competition becomes the norm.

The equilibrium state of an info-tech economy is one where monopolies dominate and people have unequal access to the information they need to make rational buying decisions. Info-tech, in short, destroys the normal price mechanism, whereby competition drives prices down towards the cost of production. A track on iTunes costs next to zero to store on Apple’s server, and next to zero to transmit to my computer. Whatever it cost the record company to produce (in terms of artist fees and marketing costs) it costs me 99p simply because it’s unlawful to copy it for free.

Critics of mainstream economics, **Joseph Stiglitz** at their head, had been saying for years that its general assumptions – of perfect information and efficient markets – were wrong. Now Romer, working inside the mainstream and using its methods, had knocked down the mainstream’s defence against these critics. For Romer’s research had shown that, once you move to an information economy, the market mechanism for setting prices will drive the marginal cost of certain goods, over time, towards zero – eroding profits in the process.

[As a whole, the US economy has steadily improved its productivity for nearly five decades, growing from 45.3 in 1965 to 111.5 in 2010. This trend makes the decline in ROA even more worrisome. Companies seem unable to capture the benefits of labor productivity for themselves. Instead, cost savings are competed away(…)”]

[The topple rate, a measure of how rapidly companies lose their leadership positions, has increased by 39 % since 1965.]

With info-capitalism, a monopoly is not just some clever tactic to maximize profit. It is the only way an industry can run. The small number of companies that dominate each sector is striking.

Romer and his supporters assumed the economy was, as in the textbooks, composed of price makers and price takers: rational individuals trying to pursue their self-interest through the market. But tech visionaries, by the late 1990s, began to understand what Romer did not: that info-tech makes possible a non-market economy and creates a demographic prepared to pursue their self-interest through non-market actions.

## THE RISE OF OPEN SOURCE

*“If anything deserves a reward, it is social contribution. Creativity can be a social contribution, but only in so far as society is free to use the results. Extracting money from users of a program by restricting their use of it is destructive because the restrictions reduce the amount and the ways that the program can be used. This reduces the amount of wealth that humanity derives from the program.”*

Richard Stallman in The GNU Manifesto, which launched the free software movement in 1985

Stallman had been irked not just by Microsoft but by the attempt by makers of much more powerful business computers to ‘own’ a rival operating system called Unix. His plan was to write a free version of Unix, called GNU, distribute it for free, and invite enthusiasts to collaborate on improving it – with the proviso that nobody could own or make money out of it. These principles have become known as *Open Source*.

By 1991 GNU had incorporated Linux – a version of Unix for PCs developed by hundreds of programmers working collaboratively, for free, and licensed under the original legal contract that Stallman had designed.

Fast-forward to 2014 and maybe 10 % of all corporate computers are running Linux. The ten fastest supercomputers in the world all run Linux. More importantly, the standard tools for running a website – from the operating system to the web server to the database and the programming language – are Open Source.

The success of Open Source software is startling. It demonstrates that new forms of property ownership and management become not just possible but imperative in an information-rich economy. It shows there are things about information goods that even monopolies can’t monopolize.

According to standard economics a person like Richard Stallman should not exist: he is not following his self-interest but suppressing it in favour of a collective interest that is not just economic but moral.

The birth of free software and the pursuit of collaborative software projects in the 1980s were just the opening shots of a war that is still raging, and whose battlefront is fluid. The Open Source movement also gave impetus to a movement for freedom of information, to Wikipedia, Wikileaks and a branch of the legal profession dedicated to writing contracts that could defend openness and shareability.

It was within this milieu, in the late 1990s, that the first systematic thinking took place about a question obvious to Drucker, but not to Romer: could an economy based on information networks create a new mode of production beyond capitalism?

# **The network economy**

In 1997, US journalist **Kevin Kelly** wrote:

*“The grand irony of our times is that the era of computers is over. All the major consequences of stand-alone computers have already taken place. Computers have speeded up our lives a bit, and that’s it. In contrast, all the most promising technologies making their debut now are chiefly due to communication between computers that is, to connections rather than to computations.”*

Suddenly a network economy was taking shape. Kelly wrote:

*“I prefer the term network economy, because information isn’t enough to explain the discontinuities we see. We have been awash in a steadily increasing tide of information for the past century (…) but only recently has a total reconfiguration of information itself shifted the whole economy.”*

It was the moment we began to understand that the ‘intelligent machine’ was not the computer but the network, and that the network would speed up the rate of change and make it unpredictable. In a statement that defines our era, Kelly said:

*“We are now engaged in a grand scheme to augment, amplify, enhance, and extend the relationships and communications between all beings and all objects.”*

In 2006 **Yochai Benkler**, then a law professor at Yale, concluded that the network economy was “a new mode of production emerging in the middle of the most advanced economies in the world”.

The rise of cheap physical computing power and communications networks had put the means of production of intellectual goods into the hands of many people.

*“The result is that a good deal more that human beings value can now be done by individuals who interact with each other socially, as human beings and as social beings, rather than as market actors through the price system.”*

This, he argued, leads to the rise of non-market mechanisms: decentralized action by individuals, working through cooperative, voluntary forms of organization. It is producing new forms of peer-to-peer economics, in which money is either absent or not the main measure of value.

**Wikipedia** is the best example. Founded in 2001, the collaboratively written encyclopaedia has, at the time of writing, 26 million pages and 24 million people registered to contribute and edit – with about 12,000 people regularly editing and 140,000 people vaguely taking part.

Wikipedia has 208 employees. The thousands who edit it do so for free. A user survey found 71 % of them do it because they like the idea of working for nothing, and 63 % because they believe information should be free. With 8.5 billion page views per month the Wikipedia site is the sixth most popular in the world – just above Amazon, the most successful e-commerce company on earth. By one estimate, if it were run as a commercial site, Wikipedia’s revenue could be $2.8 billion a year.

The principle Wikipedia works on is the same the early Open Source programmers used on GNU and Linux, but applied to a mass consumer product. When we visit Amazon, and buy a camera or a book, our recorded choices help other users choose. In economics this is called a positive externality – an unintended economic benefit.

With Amazon, it is the corporation that reaps most of the benefit, in the form of increased buying and selling power. With Wikipedia, there is only a human benefit: no kid ever again has to sit in a small town library, as I did, lost in a maze of mediocre and random knowledge, itself trapped for ever on sheets of paper that can never be updated or corrected without printing a completely new book.

Wikipedia, like Linux, is radical in two ways. First, in the communal nature of what is produced: it is free to use but impossible to grab, own and exploit. Second, in the collaborative nature of the production process: nobody in a central office decides what the pages should be about; Wikipedia’s employees simply regulate the standards of creation and editing, and defend the whole platform against erosion by property and management hierarchies.

Benkler defines this as commons-based peer production – and the concept challenges the certainties of mainstream economics some more. Our human desire to make friends, build relationships based on mutual trust and obligation, fulfilling emotional and psychological needs, has spilled over into economic life. At the precise moment in history when it became possible to produce stuff without the market or the firm, significant numbers of people started doing so.

In the first place, the cheapening of computer power and network access puts the ability to produce information goods into the hands of many people, not the few. Next, you need what Benkler calls **planned modularity**: that is, a task is broken up into chunks small enough for people to complete on their own and then submit the outcome to a wider network. A Wikipedia page is a perfect example: adding a snippet of info or deleting an erroneous one is a modular task that can be done from the top deck of a bus on a smartphone, or from a PC in the web café of a Manila slum.

For Benkler, then, cheap technology and modular forms of production have driven us towards non-market, collaborative work. It is not a fad, he argues, but “a sustainable pattern of human production”. Though he uses the words “new mode of production” Benkler does not say that this is something different from capitalism. He argues instead that it will lead to a radically different and more sustainable form of capitalism. He predicts a redistribution of wealth and power from dominant firms and elites to a wider mixture of individuals, peer networks and businesses that can adapt to the new situation.

But the problem is that Benkler is describing the new forms of info-capitalism without describing their dynamics, which are necessarily contradictory. Info-tech drives labour out of the production process, reduces the market price of commodities, destroys some profit models and produces a generation of consumers psychologically attuned to free stuff. But in the first full decade of its existence it has helped fuel a global crisis during which the poorest citizens of developed countries were reduced to scrambling through dumpsters, even as they eked out the last few cents of credit on their mobile phones.

Info-capitalism is real, but if we analyse the whole thing – the collision of neoliberal economics with network technology – we must conclude it is in crisis.

## THE ECONOMICS OF FREE STUFF

In an information economy, externalities are a prime subject. In the old world, economists categorized information as a ‘public good’: the costs of science, for example, were borne by society – so everybody benefited. But in the 1960s economists began to understand information as a commodity. In 1962, **Kenneth Arrow**, the guru of mainstream economics, said that in a free-market economy, the purpose of inventing things is to create intellectual property rights. “Precisely to the extent that it is successful there is an under-utilisation of information.”

Patenting the advanced HIV drug Darunavir keeps its price at $1095 a year, which is, as Médecins sans Frontières put it, “prohibitively expensive”. The information exists to place millions of people on this advanced HIV treatment, but thanks to the patent it is underutilized. Conversely, because India famously prevented pharmaceutical companies slapping twenty-year patents on other advanced HIV treatments, their cost has slumped since the year 2000, and the information on how to make them has been utilized.

In an economy where information is everywhere, so are externalities. If we survey the giants of info-capitalism, almost the whole of their business model is about capturing good external side-effects.

If we restate Arrow’s observation in a different way, its revolutionary implications are obvious: if a free-market economy with intellectual property leads to the underutilization of information, then an economy based on the full utilization of information cannot have a free market or absolute intellectual property rights. And this is just another way of saying what Benkler and Drucker understood: that info-tech undermines something fundamental about the way capitalism works.

But what does it create in its place? For the term *postcapitalism* to be meaningful, you would have to describe exactly how network technology triggers a transition to something else, and what the dynamics of a postcapitalist world would look like.

## Karl Marx’ *Fragment on Machines*

In writing the *Fragment on Machines* (a section of the *Grundrisse*, translating as the *Outline*, a series of notebooks never published, and only read in 1960s) in 1858, Karl Marx produced visionary work.

Marx had imagined an economy in which the main role of machines was to produce, and the main role of people was to supervise them. He was clear that in such an economy the main productive force would be information.

Given what Marxism was to become – a theory of exploitation based on the theft of labour time – this is a revolutionary statement. It suggests that – once knowledge becomes a productive force in its own right, vastly outweighing the actual labour spent creating a machine – the big question becomes not wages versus profits but who controls the ‘power of knowledge’.

Marx also dropped a bombshell. In an economy where machines do most of the work, where human labour is about supervising, mending and designing the machines, the nature of the knowledge locked inside the machines must be ‘**social’**.

Using a modern example, if a software developer uses a programming language to write code linking a web page to a database, then he would be working with social knowledge. The programmer himself doesn’t own the code he’s working on, obviously. But equally the company employing him can’t own more than a fraction of it. The code will still contain thousands of bits of previous code written by other people that cannot be patented. Plus, the knowledge it took to produce the code is still in the programmer’s brain. He can, if market conditions allow, move to a different workplace and execute the same solution, should it be required. With information, part of the product remains with the worker in a way it did not during the industrial era.

The tool he’s using, the programming language, has been developed by tens of thousands of people contributing their knowledge and experience. If he downloads the latest update, it is sure to contain changes based on lessons learned by everyone else using it. On top of that, the consumer data – the record left by each interaction with the website – may be wholly owned by a company. Yet it is socially produced: I send you a link, you click on it, or retweet it to 10,000 followers.

Marx could observe the telegraph system. The memoirs of telegraph operators show clearly the social nature of the technology. Rule number one was that you could send information only as fast as the person on the other end could receive it. But in the complex telegraph systems, where rooms full of senders and receivers negotiated use of the crowded line capacity with far distant operators, “handling egos was as much a part of an operator’s work as handling a telegraph key. Considerate, helpful operators made work easier; domineering, cavalier, or self-righteous ones made work more difficult.” Their work was social, the knowledge embodied in the machine was social.

In the *Fragment on Machines*, these two ideas – that the driving force of production is knowledge, and that knowledge stored in machines is social – led Marx to the following conclusions.

1. First, in a heavily mechanized capitalism, boosting productivity through better knowledge is a much more attractive source of profit than extending the working day, or speeding up labour: longer days consume more energy, speed-ups hit the limits of human dexterity and stamina. But a knowledge solution is cheap and limitless.
2. Second, Marx argued, knowledge-driven capitalism cannot support a price mechanism whereby the value of something is dictated by the value of the inputs needed to produce it. It is impossible to properly value inputs when they come in the form of social knowledge. Knowledge-driven production tends towards the unlimited creation of wealth, independent of the labour expended. But the normal capitalist system is based on prices determined by input costs, and assumes all inputs come in limited supply.

For Marx, knowledge-based capitalism creates a contradiction – between the *forces of production* and the *social relations*. These form “the material conditions to blow [capitalism’s] foundation sky-high”. Furthermore, capitalism of this type is forced to develop the intellectual power of the worker. It will tend to reduce working hours (or halt their extension), leaving time for workers to develop artistic and scientific talents outside work, which become essential to the economic model itself. Finally Marx throws in a new concept, which appears nowhere else – before or after – in his entire writings: the general intellect. When we measure the development of technology, he writes, we are measuring the extent to which “general social knowledge has become a force of production (…) under the control of the general intellect”.

Marx anticipated an information-driven fall of capitalism, predicting that the ability to create prices would dissolve if information became collectively distributed and embodied in machines.

The ideas outlined in the *Fragment on Machines* were recognized in the 1960s as a complete departure from classic Marxism. In the 20th century, the left had seen state planning as the route out of capitalism. They had assumed that capitalism’s inner contradictions lay in the chaotic nature of the market, its inability to fulfil human need and its propensity to catastrophic breakdown.

In the 1858 *Fragment on Machines*, however, we are confronted with a different model of transition: a knowledge-based route out of capitalism, in which the main contradiction is between technology and the market mechanism. In this model, scribbled on paper in 1858 but unknown to the left for more than 100 years, capitalism collapses because it cannot exist alongside shared knowledge. The class struggle becomes the struggle to be human and educated during one’s free time.

The Italian leftist **Antonio Negri** described the *Fragment on Machines* as “Marx beyond Marx”. Its ideas are not present in any of his other writings and in fact seem alternative to the habitual formula.

But in the following decade, Marx constructed a theory of capitalism in which the mechanisms of exchange are not exploded by the emergence of a general intellect, and in which no mention is ever made of knowledge being an independent source of profit. Marx might have abandoned this thought experiment because it had scant relevance to the society he lived in. But it has massive relevance for ours.

***Summary:***

Marx imagined socially produced information becoming embodied in machines. He imagined this producing a new dynamic, which destroys the old mechanisms for creating prices and profits. He imagined capitalism being forced to develop the intellectual capacities of the worker. And he imagined information coming to be stored and shared in something called a *general intellect* – which was the mind of everybody on earth connected by social knowledge, in which every upgrade benefits everybody. In short, he had imagined something close to the info-capitalism in which we live.

Furthermore, he had imagined what the main objective of the working class would be if this world ever existed: freedom from work. The utopian socialist Charles Fourier had predicted that labour would become the same as play. Marx disagreed. Instead, he wrote, liberation would come through leisure time:

*“Free time has naturally transformed its possessor into a different subject, and he then enters into the direct production process as this different subject … in whose head exists the accumulated knowledge of society.”*

This is possibly the most revolutionary idea Marx ever had: that the reduction of labour to a minimum could produce a kind of human being able to deploy the entire, accumulated knowledge of society; a person transformed by vast quantities of socially produced knowledge and for the first time in history more free time than work time. The worker imagined in the *Fragment on Machines* is not so far from the *universal educated person* predicted by Peter Drucker.

## A third kind of capitalism: cognitive capitalism

Cognitive capitalism, say its proponents, is a coherent new form of capitalism: a ‘third capitalism’, following the merchant capitalism of the 17th and 18th centuries and the industrial capitalism of the last 200 years. It is based on global markets, financialized consumption, immaterial labour and immaterial capital.

**Yann Moulier-Boutang**, a French economist, believes that the cornerstone of cognitive capitalism is the capture of the positive externalities. “Capturing positive externalities becomes the number one problem of value.” As people use digital devices, they become *co-producers* with the companies they are dealing with: their choices, their apps, their friend lists on Facebook can all be given monetary value by the company that provides the service and harvests the information.

In cognitive capitalism, the nature of work is transformed. Manual labour and industry don’t stop, but their place in the landscape changes. Because profit increasingly comes from capturing the free value generated by consumer behaviour, and because a society focused on mass consumption has to be constantly fed coffee, smiled at, serviced by call centres, the ‘factory’ in cognitive capitalism is the whole of society. For these theorists, ‘society as a factory’ is a crucial concept.

Concept of the **socialized factory** 🡪 we are no longer in a world of clearly delineated production and consumption, but one in which ideas, behaviours and customer interactions with the brand are critical to generating profit; production and consumption are blurred. This partly explains why struggles against the new capitalism are often focused on consumer issues, or brand values (e.g. corporate social responsibility), and why protesters behave more like the *tribes* in marketing demographics than a unified proletariat. For cognitive capital theorists – as for Drucker – the primary activity of the new workforce is ‘the production of knowledge by means of knowledge’.

However, the cognitive capitalism theory contains a major flaw. It would be one thing to say “a new kind of info-capitalism has been born within late industrial capitalism”. But the key cognitive capitalism theorists say the opposite: many of them believe cognitive capitalism to be a fully functioning system already. Factories in Shenzhen, slums in Manila, metal-bashing shops in Wolverhampton may look just as they did ten years ago – but to these theorists their economic functions are already transformed.

It leads cognitive capitalism theorists to underestimate the importance of the rise of old-style industrial production in the BRIC (Brazil, Russia, India and China) countries, and for some to downplay the significance of the post-2008 financial crisis, or to see it as merely the teething troubles of the newborn system.

In fact, the system we live in is not a new, coherent and functioning form of capitalism. It is incoherent. Its tense, febrile and unstable character comes from the fact that we are living in an age of the network alongside the hierarchy, the slum alongside the web café – and to understand the situation we have to see it as an incomplete transition, not a finished model.

## POSTCAPITALISM: A HYPOTHESIS

**Jeremy Rifkin**, an influential management consultant, came closest to describing current reality in his book *The Zero Marginal Cost Society* (2014). Rifkin argues that peer-production and capitalism are two different systems; currently they coexist and even gain energy from each other, but ultimately peer-production will reduce the capitalist sector of the economy to a few niches.

Rifkin’s most radical insight was to understand the potential of the Internet of Things. The most enthusiastic consultancies – for example McKinsey – have valued the impact of this process as up to $6 trillion a year, mainly in healthcare and manufacturing. But the vast majority of that $6 trillion is in reduced cost and increased efficiency: that is, it contributes to reducing the marginal cost of physical goods and services in the same way as copy and paste reduces the cost of information goods.

Rifkin points out that the impact of wiring every person and every object into an intelligent network could in fact be exponential. It could rapidly reduce the marginal cost of energy and physical goods in the same way as the internet does for digital products.

Rifkin’s book though is light on the social dimension. He understands that a world of free stuff cannot be capitalist; that the free stuff is beginning to pervade the physical as well as the digital world, but the struggle between the two systems is reduced to a struggle between business models and good ideas.

Conducted among social theorists, lawyers and tech visionaries, the postcapitalism debate exists in a parallel universe to the debate among economists about the crisis of neoliberalism, and the debate among historians about the problematic take-off of the fifth long wave. To move forward, we need to understand how the new economics of info-tech, the post-2008 crisis and the long-cycle pattern fit together.

What follows below is a first attempt to do that. It’s a hypothesis – but it is based on evidence and can be tested against reality.

### **Paul Mason’s take on postcapitalism**

Since the mid-1990s, a revolution in the way we process, store and communicate information has created the beginnings of a network economy. This has started to corrode the traditional property relations of capitalism in the following ways.

It corrodes the price mechanism for digital goods, as understood by mainstream economics, by pushing the cost of reproducing information goods towards zero.

It adds a high information content to physical goods, sucking them into the same zero-price vortex as pure information goods – and often, as with trainers, making their value dependent more on socially created ideas (the brand) rather than the physical cost of production.

It makes financialization necessary, creating two streams of profit flowing to capital from the general population: as workers producing goods, services and knowledge; and as borrowers generating interest payments. So, while it’s true to say “the whole of society has become a factory”, the mechanisms of exploitation are still first of all wages, then credit and only finally our mental collusion in the creation of brand value, or the giveaway of externalities to tech companies.

It is in the process of revolutionizing the productivity of physical things, processes and energy grids, as machine-to-machine internet connections begin to outnumber person-to-person links.

If information corrodes value, then corporations are responding with three types of survival strategies: the creation of monopolies on information and the vigorous defence of intellectual property; the ‘skating to the edge of chaos’ approach, trying to live within the gap between expanded supply and falling prices; and the attempt to capture and exploit socially produced information such as consumer data, or by imposing contracts on programmers that say the company owns code they write in their free time.

However, alongside the corporate response, we are seeing the rise of non-market production: horizontally distributed peer-production networks that are not centrally managed, producing goods that are either completely free, or which – being Open Source – have very limited commercial value.

Peer-produced free stuff drives out commercially produced commodities. Wikipedia is a space in which commerce cannot operate; with Linux or Android there is clearly commercial exploitation, but at the edges – not based on ownership of the main product. It is becoming possible to be both producer and consumer in the same process.

In response, capitalism is beginning to reshape itself as a defence mechanism against peer-production, through info-monopolies, through allowing the wage relationship to weaken and through the irrational pursuit of high-carbon business models.

Non-market forms of production and exchange exploit the basic human tendency to collaborate – to exchange gifts of intangible value – which has always existed but at the margins of economic life. This is more than simply a rebalancing between public goods and private goods: it is a whole new and revolutionary thing. The proliferation of these non-market economic activities is making it possible for a cooperative, socially just society to emerge.

The rapid change in technology is altering the nature of work, blurring the distinction between work and leisure and requiring us to participate in the creation of value across our whole lives, not just in the workplace. This gives us multiple economic personalities, which is the economic base on which a new kind of person, with multiple selves, has emerged. It is this new kind of person, the networked individual, who is the bearer of the postcapitalist society that could now emerge.

The technological direction of this revolution is at odds with its social direction. Technologically, we are headed for zero-price goods, unmeasurable work, an exponential take-off in productivity and the extensive automation of physical processes. Socially, we are trapped in a world of monopolies, inefficiency, the ruins of a finance-dominated free market and a proliferation of ‘bullshit jobs’.

Today, the main contradiction in modern capitalism is between the possibility of free, abundant socially produced goods, and a system of monopolies, banks and governments struggling to maintain control over power and information. That is, everything is pervaded by a fight between network and hierarchy.

There are two basic possibilities ahead of us. Either a new form of cognitive capitalism does emerge and stabilize – based on a new mix of firms, markets and networked collaboration – and the remnants of the industrial system find an orderly place within this third capitalism. Or the network erodes both the working and the legitimacy of the market system. If so, a conflict will take place that results in the abolition of the market system and its replacement by postcapitalism.

Postcapitalism could take many different forms. We will know it has happened if a large number of goods become cheap or free, but people go on producing them irrespective of market forces. We will know it is underway once the blurred relationship between work and leisure, and between hours and wages, becomes institutionalized.

Because its precondition is abundance, postcapitalism will deliver some form of social justice spontaneously – but the forms and priorities of social justice will be negotiable. Whereas capitalist societies always had to worry about ‘guns vs butter’, postcapitalist societies might fight over growth vs sustainability – or the timeframe for delivery of basic social goals, or challenges like migration, women’s liberation and demographic ageing.

So we have to design the transition to postcapitalism. (see [Project Zero](#_Project_Zero))

To go forward, we need to know how, exactly, information goods corrode the market mechanism; what might happen if this tendency was being promoted instead of restrained; and what social group has the interest to make the transition happen. We need, in short, a better definition of value and a more detailed history of work.

# **On price and value**

Supply and demand explains only why prices fluctuate. When supply and demand are equal, why isn’t the price zero? Obviously it can’t be. In a normal capitalist economy, based on scarce goods and labour, there has to be a more intrinsic price around which the selling price moves up or down. So what determines that?

Over the past 200 years, two completely different answers have been put forward: the labour theory of value (LTV) – also known as labour-theory – and the theory of marginal utility.

In this book, Paul Mason mounts a sustained defence of the LTV. The LTV is not popular because it is not very useful for calculating and predicting movements within a functioning and stable market system. But faced with the rise of info-capitalism, which is corroding price mechanisms, ownership and the connection between work and wages, the LTV is the only explanation that does not collapse. It is the only theory that allows us to properly model where value is created in a knowledge economy, and where it ends up. The LTV tells us how to measure value in an economy where machines can be built for free and last forever.

Classic labour theory of value: the work needed to make something determines how much it’s worth.

“It was not by gold or by silver but by labour that all the wealth of the world was originally purchased”, Adam Smith wrote; “and its value, to those who possess it, and who want to exchange it for some new productions, is precisely equal to the quantity of labour which it can enable them to purchase or command.”

In *The Wealth of Nations* (1776) the argument is clear: labour is the source of value but the market can only reflect this roughly, through what Smith calls ‘higgling and bargaining’. [He theorised that the LTV holds true only in the "early and rude state of society" but not in a modern economy where owners of capital are compensated by profit.] So the law operates beneath the surface in a full capitalist economy. Profits and rents are deductions from the value produced by labour.

**David Ricardo**, arguably the most influential economist of the early 19th century, created a more developed model. Published in 1817, it established the LTV as firmly in the public mind as supply and demand is now. Ricardo, who had witnessed the great upsurge of the factory system, ridiculed the idea that machines were the source of increased wealth. Machines merely transfer their value to the product; only labour adds new value, he said.

The magic of machinery lay in increased productivity. If you can use less labour in making something, it should be cheaper and more profitable. If you cut the amount of labour needed to produce hats, he wrote, “their price will ultimately fall to their new natural price, although demand should be doubled, trebled, or quadrupled”.

[Ricardo's LTV is not a normative theory, as are some later forms of the LTV, such as claims that it is immoral for an individual to be paid less for his labour than the total revenue that comes from the sales of all the goods he produces.]

After Ricardo, the LTV became the signature idea of industrial capitalism. It was used to justify profits, which rewarded the work of the mill owner; it was used to attack the landed aristocracy, who were living off rents instead of working; and it was used to resist workers’ demands for shorter hours and union rights, which would hike the price of labour to ‘artificial’ levels, i.e. above the minimum needed to feed, clothe and house a working family.

Despite its ultra-capitalist rationale, the LTV proved subversive. It created an argument about who gets what, which the factory owners immediately started to lose. Amid the candlelight of the pubs where the early trade unions met, David Ricardo suddenly had a whole new set of followers.

The worker-intellectuals of the 1820s understood the revolutionary implication of the LTV: if the source of all wealth is work, then there’s a legitimate question about how that wealth should be distributed. Just as a rent-seeking aristocracy can be shown to be parasites on the productive economy, so too can capitalists be seen as parasites on the work of others. Their work is needed – but the factory system looks as if it is structured to deliver them excess rewards. Ricardian socialism spread among (illegal) trade unions.

In economics, the earth-shaking theory arrives with Marx. It is often claimed that Marx built on the theories of Smith and Ricardo. In fact he demolished them. He described his project as a critique of political economy: of Smith, Ricardo, the Ricardian socialists, the liberal moralists and the bean counters. He said – long before mainstream economists did so in the 1870s – that Ricardo’s version of the LTV was a mess. It would have to be rewritten from scratch. Despite all of its flaws, Marx recognized in the LTV something that could explain both how capitalism worked and why it might one day cease to work. The version he produced is coherent and has stood the test of time. There are thousands of tenured academics – including some of the world’s most cited scholars – who teach that it is correct. The problem is, very few of them are allowed to teach economics.

## Simple explanation of the labour theory of value

A commodity’s value is determined by the average amount of labour hours needed to produce it. It is not the actual number of hours worked that sets the value but the ‘socially necessary’ hours of work established across each industry or economy. So the basic unit of account here can be summed up as ‘hours of socially necessary labour time’. If we know what an hour of basic labour costs – in Bangladesh the minimum wage pays about 28 US cents an hour – we can express it in money.

Two things contribute to the value of a commodity: (a) the work done in the production process (which includes marketing, research, design, etc.) and (b) everything else (machinery, plant, raw materials, etc.). Both can be measured in terms of the amount of labour time they contain.

The labour-theory treats machines, energy and raw materials as finished labour – transferring their value to the new product. So if the cotton for one garment took altogether 30 minutes average labour to grow, spin, weave and transport, it will transfer that value to the final shirt. But with machines and other big capital goods the process takes time; they transfer their value in small chunks. So if a machine took a million hours’ worth of labour to make, and over its lifetime it makes one million objects, each object will carry a single hour of the machine’s value into its final value.

Meanwhile, we treat the actual labour expended within the firm’s production process as new value, added by what Marx called living labour.

This underlying process – labour time determines the amount of new value – operates at a deep level, behind the backs of workers, managers, wholesale buyers and Primark shoppers. When we negotiate a price, it can be influenced by many other things – supply, demand, short-term usefulness, the lost opportunity if we don’t buy, the cost of spending instead of saving – everything Adam Smith summed up in the evocative word ‘higgling’. But at an aggregate level, the price of all the goods and services sold in a given economy is just a monetary expression of how much labour it took to produce them.

The problem is, we only know if we paid the right price after the event. The market acts like a giant calculating machine, rewarding those who guessed correctly what the socially necessary cost was, and penalizing those who used too much labour.

So prices always diverge from the underlying value of things, but they are ultimately determined by it. And value is determined by the amount of necessary labour it took to make the commodity.

But what determines the value of labour? Consistent with everything else, the answer is: other people’s labour – the average amount of labour it takes to present each worker at the factory gate, ready for work. This includes the work that went into producing the food they consume, the electricity they use, the clothes a worker wears and – as society develops – the average amount of education, training, healthcare and leisure consumption needed for the worker to do their job.

The average cost of an hour’s labour changes from one country to another.

Only the market can tell us what the socially necessary labour time is, as it mediates the individual choices into an aggregate effect.

So where does profit come from? On average, a worker’s monthly salary will reflect the amount of labour by others needed to produce their food, their energy needs, their clothes, etc. But the employer comes away with something more. My boss can pay me the true value of the eight hours work I just did. But that true value might be just four hours.

This mismatch between the inputs and outputs of human labour is the kernel of the theory, so let’s look at an example.

*Nazma at the Bangladeshi shirt factory agrees to work for a wage that seems roughly enough to pay for a month’s food, rent, leisure, transport, energy and so on, plus a bit on top to put by as savings. She would like to earn more, but there’s a relatively narrow range of wages for factory work, so she has a very clear implicit grasp of the average hourly wage possible with her skills.*

*But her employer is not buying her work per se: he is buying her* ability *to work.*

*If we forget money and measure everything in ‘hours of necessary work’, we can see how profit is generated. If the cost of putting Nazma at the factory gate 6 days a week is 30 h work by other people spread across the whole of society (to produce her food, clothing, energy, childcare, housing and so on), and she then works 60 h a week, her work is providing double the amount of output for the inputs. All the upside goes to the employer.*

Out of an entirely fair transaction comes an unfair result. This is what Marx calls surplus value, and is the ultimate source of profit.

Another way of putting this is to say: labour is unique. Of all the things we buy and sell, labour alone has the ability to add value. Work is not just the measure of value but the motherlode from which profit is mined.

One clue as to the truth of this lies in the fact that, wherever they need to pay labour below its average value, as during the rise of the Chinese export industry, managers resort to providing the inputs collectively: dorms, uniforms and canteens. The labour of a dormitory workforce is much cheaper than the social average, which is based on the living costs of a family in a home – and of course dormitory workers can be disciplined more easily.

But why, if the real weekly value of my labour is 30 h of other people’s work, would I ever work 60 h? The answer is: the labour market is never free. It was created through coercion and is re-created every day by laws, regulations, prohibitions, fines, discipline/forced practices and the fear of unemployment. At the high-skill, high-wage end of the labour market it is not time or discipline, but targets and quality control that are the instruments of coercion.

The main source of change in capitalism – the force that makes expensive things cheaper and which has now begun to make some things free: **productivity**.

# PRODUCTIVITY IN THE LABOUR-THEORY

According to the labour-theory, there are two kinds of productivity gain possible. First, the workers become more skilled. So the work of a trained metal press operator has more value than the work of someone who just started working.

The second kind of productivity gain (the most common case) is driven by new machinery, or a reorganization of the production process, or a new invention.

Marx deals with it as follows. 1 hour of labour always adds 1 hour’s worth of value to the products made. So the impact of rising productivity is to reduce the amount of value embodied in each product.

*Suppose a factory produces 10,000 garments a day, with a workforce of 1,000 people with average ability working ten hours each. So 10,000 hours of ‘living’ labour are going into the daily output. Let’s assume that on top of that there are 10,000 hours of ‘finished’ labour going into each day’s output as well – in the form of wear and tear to machinery, energy used, fabrics and other raw materials, transport costs, etc. The total daily output of the factory, as measured in labour time, therefore consumes 20,000 hours of labour, half living and half finished. So each garment contains 2 hours of labour time. On the market, it should exchange for the money equivalent of 2 hours’ labour time.*

*Now, suppose a process is introduced that doubles labour productivity. For each batch of 10,000 garments you’ve still got roughly the same amount of finished labour going in (10,000 hours in this example). But the living labour component is cut to 5,000 hours. Now each garment contains 90 minutes’ labour time.*

*Here’s how the market rewards you. If your factory is the first to make the change, the garments go into a market where socially necessary labour time to make them is still 20,000 hours. That’s the price you should get in the market. But you only needed 15,000 hours. So the factory reaps the productivity gain in the form of increased profit. The factory boss can cut prices and increase market share or take the above-average profit represented by the difference between 2 hours and 90 minutes. Eventually the whole industry will copy the innovation and the new normal price per garment will be 90 minutes’ labour time.*

This brings us to the main point. As productivity increased, so did the proportion of ‘machine value’ to the living human labour employed. Human beings are driven out of the production process and in the short term – at the level of the firm or sector – profits rise. But since labour is the only source of extra value, once an innovation has been rolled out across the whole sector, and a new, lower social average set, there’s less labour and more machine; the part of the operation producing the added value has got smaller; and if unchecked that would place downward pressure on the profit rate of the sector.

Innovation, which is driven by the need to minimize costs, maximize output and utilize resources, does bring rising material wealth. And it can lead to a rise in profits. But once it has been rolled out, it creates an inbuilt and perennial ‘tendency for the rate of profit to fall’ – if not offset by other factors.

Despite the doom-laden aura of this Marxist phrase ‘tendency of the profit rate to fall’, it is no real catastrophe for capitalism. Offsetting factors are usually strong enough to balance out the effects of the falling labour content – above all, through the creation of new sectors which require higher-value inputs – either in the form of higher-value physical commodities or by the creation of service sectors.

So in the classic model of capitalism outlined by Marx, the pursuit of productivity drives material wealth higher but causes repeated short-term crises and then forces big mutations, whereby the system has to voluntarily raise the cost of labour. If it can’t make workers rich enough to buy all the goods, or it can’t find new consumers in new markets, this piling up of machine value versus labour value leads to a fall in the rate of profit.

And that was how all crises looked in the era of scarcity: mass unemployment and idle plant caused by a collapse in profitability, and all explicable using the labour theory of value.

The LTV can also be used to explain something else, namely what happens when products and new processes can be made without any labour going into them at all.

Before we explore that, however, we have to deal with the alternative theory of price proposed by mainstream economics, known as **marginal utility**.

# The theory of marginal utility

Like Marx, the founders of mainstream economics started by tearing holes in Ricardo. His explanation of profit was inconsistent, they said; nothing could be done to make it work. Their response was to move economics on to different terrain – that of observable movements in prices, supply and demand, rent, taxation and interest rates.

What they produced was the theory of marginal utility, which stipulates that there is no intrinsic value to anything, except what a buyer will pay for it at a given moment. Léon Walras, one of the founders of **marginalism**, put it this way:

*“The selling prices of products are determined in the market (…) by reason of their utility and their quantity. There are no other conditions to consider for these are the necessary and sufficient conditions.”*

This ‘usefulness theory’ of value had been deemed archaic since the days of Adam Smith. The crucial factor in its revival was the addition of the concept of marginality. “The amount of value is determined not by average but by final or marginal utility”, wrote William Smart, an English popularizer of the theory. Marginal simply means all the value is in the ‘extra bit’ you want to buy, not in the whole product. So the value of the last ecstasy tablet in the nightclub is higher than all the others.

**William Stanley Jevons**, the English pioneer of marginalism, demonstrated that in principle these fine judgements about utility – which he understood as choices between pleasure and pain – could be modelled using calculus. This sliding scale of momentary prices was the only thing needed to calibrate supply and demand. The only consistent meaning to value was ‘ratio of exchange’; he proposed scrapping the term ‘value’ altogether.

There is a crucial piece of ideology built into marginalism: the assertion that the market is rational. Walras was revolted by the idea that economic laws work independently of human willpower. The new science of economics should assume the market is an expression of our collective rational will, Walras argued.

The achievement of marginalism was to show that markets governed by free and perfect competition must achieve ‘equilibrium’. It was Walras who worked this into a demonstrable law: since all prices are the result of a choice by a rational individual (buy the lipstick or keep the €10 bill?), once the supply runs out the rational choice is to stop trying to buy it. Conversely, if the supply of something increases, it becomes rational for people to start wanting it, and to decide what price they will pay for it. Supply creates its own demand, says the theory; a freely operating market will ‘clear’ until demand matches supply, with prices changing in response.

Marginalists’ attitude to crisis: they were so convinced of capitalism’s inner tendency towards equilibrium that they assumed crises must be produced by non-economic factors.

Textbook economics is today built on marginalism’s discoveries. But in the pursuit of maths over ‘political economy’, the marginalists created a discipline which ignored the production process; reduced the psychology of the deal to a two-dimensional balance between pleasure and pain; saw no special role for labour; discounted the possibility of economic laws acting at a deep, unobservable level, independent of the rational will of human beings; and reduced all economic agents to traders, abstracting away from class and other power relationships.

In its purest form, marginalism denied not only the possibility of exploitation, but of profit as a specific phenomenon. Profit was just the reward for the utility of something the capitalist was selling: their expertise or, in later forms of the theory, their abstinence – that is, the ‘pain’ they suffered during the act of accumulating their capital. Marginalism was, in short, highly ideological. It introduced a blindness to the problems of distribution and class that still blights professional economics, and a profound lack of interest in what goes on in a workplace.

Marginalism emerged because managers and policymakers alike needed a form of economics that was bigger than accountancy but smaller than a theory of history; it had to describe in detail the way the price system worked – and in a way that took no interest in class dynamics or social justice.

**Carl Menger**, the Austrian economist, summed up the inner psychological motivation for marginalism in a famous attack on Smith and Ricardo. They were obsessed with “the welfare of man in the abstract, about remote things, about things which did not yet exist, about future things. In this effort [they] … overlooked the living, justified interests of the present.” The aim of economics, according to Menger, should be to study the reality that capitalism produces spontaneously, and to defend it against the “one-sidedly rationalistic mania for innovation” which “contrary to the intention of its representatives inexorably leads to socialism”.

Marginalism’s obsession with the continuous present, its hostility to future things, made it a brilliant model for understanding forms of capitalism that do not change, mutate or die. Unfortunately, these do not exist.

# WHY THE DEBATE MATTERS…

For one thing, because it explains the pig-headedness of present-day economics in the face of systemic risk. Economics professor Steve Keen points out that present-day marginalism – by reducing everything to the doctrine of ‘efficient markets’ – actually contributed to the collapse. Mainstream economists made ‘an already troubled society worse: more unequal, more unstable and less ‘efficient’.

But there is a second reason, to do with how we describe the dynamics of info-capitalism. The rise of information goods challenges marginalism at its very foundations because its basic assumption was scarcity, and information is abundant. **Léon Walras**, for example, was categoric: “There are no products that can be multiplied without limit. All things which form part of social wealth … exist only in limited quantities.”

Information goods exist in potentially unlimited quantities and, when that is the case, their true marginal production cost is zero. On top of this, the marginal cost of some physical info-tech (memory storage and wireless bandwidth) is also collapsing towards zero. Meanwhile, the information content of other physical goods is rising, exposing more commodities to the possibility that their production costs begin to plummet too. All this is eroding the very price mechanism that marginalism describes so perfectly.

The economy at present, consists both of scarce and abundant goods; our behaviour is a mixture of the old pleasure-*vs-*pain choices, made in our own self-interest, alongside sharing and cooperation, which seem to the marginalists like sabotage.

But in a full information economy – where much of the utility was provided through information and physical goods were relatively abundant – the price mechanism as described by marginalism would fall apart. Because marginalism was a theory of prices and prices only, it cannot comprehend a world of zero-priced goods, shared economic space, non-market organizations and non-ownable products.

But the labour-theory can. The LTV actually predicts and calibrates its own demise. That is, it predicts a clash between the social forms driving productivity and productivity itself.

The labour-theory, as outlined by Marx, predicts that automation can reduce necessary labour to amounts so small that work would become optional. Useful stuff that can be made with tiny amounts of human labour is probably going to end up being free, shared and commonly owned, says the theory. And it is right.

# KARL MARX AND THE INFO-MACHINES

Let’s restate what Marx called the **law of value**: the price of everything in the economy reflects the total amount of labour used to make it. Productivity gains derive from new processes, machines, reorganizations – and each of these comes at a cost, in terms of the amount of labour it took to create it. In practice, capitalism escapes the tendency of innovation to shrink the labour content of the economy, and thus shrink the ultimate source of profit, because it creates new needs, new markets and new industries where labour costs are high, so there are more wages to drive consumption.

As the culmination of 250 years of innovation, info-tech injects a new dynamic, insofar as you can have machines that last forever and do not break down. Software is a machine that, once built, will last forever. Once the design cost is incurred, the cost of producing software is reduced to the cost of the media it is stored on or flows through: the hard drive or the fibre network. And these costs are plummeting exponentially.

Deloitte describes the falling price of basic info-tech as exponential:

*“The current pace of technological advance is unprecedented in history and shows no signs of stabilizing as other historical technological innovations, such as electricity, eventually did. These rapid advances have the power to disrupt industries. The disruptive potential of exponential technologies is amplified when they interact and combine in innovative ways. The impact is further amplified when technologies coalesce into open platforms and ecosystems. These reduce the investment and lead time required to drive the next wave of innovation into markets by enabling people and technologies to rapidly build on previous waves of innovation.”*

The real wonder of information is that it eradicates the need for labour on an incalculable scale. It does all the things a machine does: it substitutes cheap labour for skilled labour; it eradicates labour altogether for some operations, and it makes new operations possible that no previous forms of labour could have achieved. The new information produced by a computer has a use value, or utility, massively in excess of its component parts. The amounts of labour value embodied in information products can be negligible. And once knowledge becomes truly social – as Marx imagined with the concept of the ‘general intellect’ – some of the value is contributed for free, as follows:

· Information goods naturally leverage general scientific knowledge

· Their users feed back, in real time, data that allows them to be improved, for free

· Any improvement in knowledge somewhere can be implemented in every machine deployed everywhere, immediately.

For example, the internet protocol, invented in 1974 and published for free, is a ‘standard’, not a product. But it is not the same as, say, the safety standard the garment factory is supposed to adhere to. It is more like the electricity grid a factory draws power from: it is materially useful. And it is free.

What happens if you insert some of this free machinery into the labour theory of value? Marx, it turns out, had actually thought this through.

Machines where parts of the value are input for free by social knowledge and public science are central to labour-theory. But Marx thought that if they existed in large numbers they would explode the system based on labour values – ‘blow it sky high’, as he says in the *Fragment on Machines*.

The worked example Marx uses in the *Grundrisse* makes it clear: a machine that lasts forever, or can be made with no labour, cannot add any labour hours to the value of the products it makes. If a machine lasts forever, it transfers a near-zero amount of labour value to the product, from here to eternity, and the value of each product is thus reduced.

Of course, in reality, physical machines do not yet last forever; but what we’ve seen in the past 15 years are machines whose utility derives from the information used to run them, design them or make them. And only the labour-theory can properly comprehend what it means economically, if the world of physical objects becomes alive with information.

In traditional economics, nobody knows how to measure the value of information economically. You can see the impact of buying an automated press on the company’s bottom line; you can value the 3D designs and bespoke computer programs as assets, but as the SAS Institute research showed, you are basically guessing.

The labour-theory enables us to do something better than guess. It allows us to think of software as a machine; the information (3D designs, programs, monitoring reports) as finished labour in the same way the tools and metal dies are. And it allows us to trace the process by which the *zero marginal cost* effect of pure information goods spills over into the world of physical products and the machines that make them.

A press shop in the early 1980s staffed by maybe 25 workers would need nowadays fewer than 5, for a similar-sized operation. The crucial difference is made by software, laser sensors and robotics.

The value of this industrial software is entirely reliant on the patent law that prevents it being used and replicated for free. Though it’s harder to pirate than, say, the DVD of a feature film, the principle remains the same: the reproduction cost of industrial software is zero; the value added is contained in the work done to attach it to specific machines and processes.

Let’s say there are 4 lines on a spreadsheet modelling the inputs to an economy in terms of labour value. The units could be millions of hours of labour time. Let’s say the labour transferred to the final product in Period #1 looks like this:

· Capital: 200

· Energy: 200

· Raw materials: 200

· Labour: 200

If the capital line represents a machine that lasts forever, in the labour-theory that immediately slashes the labour transferred from the capital line to zero, forever.

Over time, gains of productivity tend to bring the labour line towards 0.

Economics in a zero-production-cost society quickly comes to centre on energy and raw materials.

Even though we are far away from the pure information economy modelled crudely here, we can already feel these effects in reality: monopolies are arising to prevent software or information goods becoming free; accounting standards are becoming garbled as companies resort to valuation guesswork. There are attempts to stimulate wage growth, while most of the inputs to labour can now be produced with less labour.

**Arguably, only marginalism enables us to build price models in a capitalist society where everything is scarce. In return, only the labour-theory allows us to build models whereby zero-cost effects begin to cascade over from information into the sphere of machines and products, and from there into labour costs.**

The four-line model outlined above should really have an extra row for profit and instead of simply declining, each value should grow by perhaps 3 % a year, representing GDP growth. But suppose you did add profit and growth? Once the zero marginal cost effect kicks in, there would have to be tremendous profits and growth to offset the eventual impact on labour costs. In other words, there would have to be new industrial revolutions every 15 years, very rapid nominal growth and ever bigger monopoly firms.

But that cannot happen.

Capitalism worked as long as capital could move, when technological innovation brought lower costs in one sector, to sectors with higher wages, higher profits and higher-cost inputs. Capitalism does not self-reproduce in this way when the outcome is zero costs.

# WHAT WOULD INFO-CAPITALISM LOOK LIKE?

The rise of free information and free machines is new. But the cheapening of inputs through productivity is as old as capitalism itself. What stops capitalism from becoming a systemic race to the bottom is the creation of new markets, new needs, and raising the amount of socially necessary labour time used to meet these needs (fashion instead of rags, TVs instead of magazines); this in turn raises the amount of labour time embodied in each machine, product or service.

If this inbuilt reflex could work properly, faced with the information revolution, what we’d get is a fully fledged info-capitalism. But here is how it would have to work.

It would have to stop the price of information goods falling, by using monopoly pricing: think Apple, Microsoft and Nikon/Canon on steroids. It would have to maximize the capture of externalities by corporations. Every interaction – between producer and consumer, consumer and consumer, friend and friend – would need to be mined for value. (In labour-theory terms, our non-work activity has to be turned into work contributed to the corporation for free.) A thriving info-capitalism might seek to maintain artificially high prices for energy and physical raw materials, through hoarding and other monopolistic behaviour, so their cost fed through into higher average necessary labour time to reproduce labour. Crucially, it would have to create new markets beyond production, in the field of services. The 250-year history of capitalism has been about pushing market forces into sectors where they did not exist before. Info-capitalism would have to take this to its extremes, creating new forms of person-to-person micro-services, paid for using micro-payments, and mainly in the private sector.

And finally, for info-capitalism to succeed it would have to find work for the millions of people whose jobs are automated. These could not be in the majority low-paid jobs because the traditional escape mechanism needs labour costs to rise: human life has to become more complex, needing more labour inputs, not fewer, as in the four cyclical upswings described by long-cycle theory.

If all these things could happen, info-capitalism could take off. The elements of such a solution are there in modern economies: Apple is the classic price monopolist, Amazon’s business model the classic strategy for capturing externalities; commodity speculation the classic driver of energy and raw material costs above their value; while the rise of personal micro-services – dog minding, nail salons, personal concierges and the like – shows capitalism commercializing activities we used to provide through friendship or informality.

But there are clear structural obstacles to making this work.

First, the normal escape route – innovation creating expensive new technologies that replace info-tech – is blocked. Information is not some random technology that just came along and can be left behind like the steam engine. It invests all future innovation with the zero-price dynamic: biotech, space travel, brain reconfiguration or nanotechnology, and things we cannot even imagine. The only way you could remove the information effect from these coming technologies would be, as in Frank Herbert’s sci-fi novel *Dune*, to ban computers and replace them with expensive human experts in calculation.

The second obstacle is the scale of workforce redesign. In Marx’s time, there were 82,000 clerical workers in the USA, 0.6 % of the workforce. By 1970, on the eve of the info-tech revolution, there were 14 million – almost one in five workers. Today, despite the automation and disappearance of all kinds of brainwork jobs – such as bank teller, shorthand typist, comptometer operator and the like – ‘office and admin support’ remains the biggest job category in America, with 16 % of the workforce. The second category is ‘sales’, with 11 %.

A study by the Oxford Martin School in 2013 suggested 47 % of all jobs in the US were susceptible to automation. Of these, it was admin and sales that stood the highest risk. They predicted two waves of computerization over the next 20 years.

“In the first wave, we find that most workers in transportation and logistics occupations, together with the bulk of office and administrative support workers, and labour in production occupations, are likely to be substituted by computer capital.”

In the second wave, it is everything relying on finger dexterity, observation, feedback, or working in a cramped space that gets robotized. They concluded the jobs safest from automation were service jobs where a high understanding of human interaction was needed – for example, nursing – and jobs requiring creativity.

The study provoked an outcry along familiar under-consumptionist lines: robots will kill capitalism because they will create mass underemployment and consumption will collapse. That is a real danger. To overcome it, capitalism would have to greatly expand the human services sector. We would have to turn much of what we currently do for free, socially, into paid work. Alongside sex work we might have ‘affection work’: you can see the beginnings of it now in the hired girlfriend, the commercial dog-walker, the house cleaner, the gardener, the caterer and the personal concierge. Rich people are already surrounded by such post-modern servants, but to replace 47 % of all jobs this way would require the mass commercialization of ordinary human life.

And here’s where you hit the third obstacle – what philosopher **André Gorz** called the ‘limits of economic rationality’. At a certain level, human life and interaction resist commercialization. An economy in which large numbers of people perform micro-services for each other can exist, but as a form of capitalism it would be highly inefficient and intrinsically low-value.

You could pay wages for housework, turn all sexual relationships into paid work, mums with their toddlers in the park could charge each other a penny each time they took turns to push the swings. But it would be an economy in revolt against technological progress.

Early capitalism, when it forced people into factories, had to turn large parts of the non-market lifestyle into a serious crime: if you lost your job you were arrested as a vagrant; if you poached game, as your ancestors had always done, it became a hanging offence. The equivalent today would be not just to push commercialism into the deep pores of everyday life, but to make resisting it a crime. You would have to treat people kissing each other for free the way they treated poachers in the 19th century. It is impossible.

Therefore the real danger inherent in robotization is something bigger than mass unemployment, it is the exhaustion of capitalism’s 250-year-old tendency to create new markets where old ones are worn out.

And there’s yet another obstacle: property rights. To capture the externalities in an information-heavy economy, capital has to extend its ownership rights into new areas; it has to own our selfies, our playlists, not just our published academic papers but the research we did to write them. Yet the technology itself gives us the means to resist this, and makes it long-term impossible.

So what we have in reality is an info-capitalism struggling to exist. We should be going through a third industrial revolution but it has stalled. Those who blame its failure on weak policy, poor investment strategy and overweening finance are mistaking symptoms for the disease. Those who continually try to impose collaborative legal norms on top of market structures are missing the point.

An economy based on information, with its tendency to zero-cost products and weak property rights, cannot be a capitalist economy.

The usefulness of the labour-theory is that it accounts for this: it allows us to use the same metric for market and non-market production in a way that the OECD’s economists could not. Crucially it enables us to design the transition process so that we know what we are trying to achieve: a world of free machines, zero-priced basic goods and minimum necessary labour time.

# **Agents of change**

As we have seen, information technology expels labour from production, destroys pricing mechanisms and promotes non-market forms of exchange. Ultimately, it will erode the link between labour and value altogether.

If so, then there is something about the current decline of organized labour that is not just cyclical or the product of defeat, but as historic as its rise 200 years ago. If capitalism must have a beginning, middle and end, so must the story of organized labour.

As in nature – and as in dialectical logic – the end is usually a moment of sublation, a concept that combines the simultaneous destruction of something and its survival as something else. Though it is not dead, the working class is living through a moment of sublation. It will survive in a form so different that it will probably feel like something else. As a historical subject, it is being replaced by a diverse, global population whose battlefield is all aspects of society – not just work – and whose lifestyle is not about solidarity but impermanence.

Those who first spotted such networked individuals mistook them for nihilists who could never effect change. On the contrary, I have argued (in *Why It’s Kicking Off Everywhere*, 2012) that the new wave of struggles beginning in 2011 is a signal that this group does fight, and does embody similar and technologically determined values, wherever it takes to the streets.

If so, it becomes necessary to say something that many on the left will find painful: Marxism got it wrong about the working class. The proletariat was the closest thing to an enlightened, collective historical subject that human society has ever produced. But 200 years of experience show it was preoccupied with ‘living despite capitalism’, not overthrowing it.

The workers were forced into revolutionary action by social and political crises, often provoked by war and intolerable repression. On the rare occasions when they achieved power, they couldn’t stop it from being usurped by elites operating under a false flag. The Paris Commune of 1871, Barcelona in 1937, the Russian, Chinese and Cuban revolutions all demonstrate this.

The literature of the left is littered with excuses for this 200-year story of defeat: the state was too strong, the leadership too weak, the ‘labour aristocracy’ too influential, Stalinism murdered the revolutionaries and suppressed the truth. In the end, the excuses boil down to just two: bad conditions or bad leaders.

The labour movement created a breathing space for humane values inside an inhumane system. It produced, out of the depths of squalor, makers of what we today call ‘beautiful trouble’: martyrs, autodidacts and secular saints.

Once we have understood what really happened to work over the four long cycles of industrial capitalism, the significance of its transformation in the fifth cycle becomes clear. Info-tech makes the abolition of work possible. All that prevents it is the social structure we know as capitalism.

### 1771–1848: THE FACTORY AS BATTLEFIELD

In 1818, the cotton spinners of Manchester struck en masse. Then, during 1819, all over northern England, workers set up night schools and clubs, debated politics, elected delegates to town-wide committees and formed women’s groups. Out of these meetings, in the summer of 1819, they launched a mass movement for democracy: unofficial public gatherings to elect unofficial members of parliament. When 100,000 workers congregated at St Peter’s Field in Manchester on 16 August 1819, in defiance of the law, they were mown down by a cavalry charge.

The Peterloo Massacre marked the true beginning of the industrial labour movement. It also prompted the first attempt to deal with social unrest through automation.

Once the skilled men had turned militant, by the early 1820s, however, the only solution was to automate them out of existence. In 1824, a ‘self-acting mule’ was patented, and soon thousands had been deployed. The employers announced that in future the machines would be run entirely by women and children, since ‘attendants have nothing to do but to watch its movements’.

The exact opposite happened.

Male spinners staged repeated strikes after 1819 against the employment of women. They refused to train girls to do the jobs that gave access to higher skill, and insisted that their own sons be chosen. During the 1820s and 30s the minority of women who had kept hold of spinning jobs were driven from them; by the 1840s male domination was complete. The new machines did not abolish the need for high skill; they simply created a new technical skill to replace the old one: “One highly complex task had been substituted for another, while the quality control and mental oversight functions remained unchanged.”

This episode would be repeated many times over the next two centuries. The real history of work cannot be written as ‘economics plus technology’; it involves the interaction of technology with organizations created by workers, and it involves the creation of power relationships based on age, gender and ethnicity.

More specifically, this case study blows apart a cherished passage in Marx’s *Capital* – for Marx, writing in the 1850s, would use the self-acting mule as the main example of capitalism’s tendency to de-skill work to suppress the workforce: “Machinery is the most powerful weapon for suppressing strikes. (…) We would mention above all the self-acting mule.”

We can trace the source of confusion to his collaborator, **Frederick Engels**. When Engels arrived in Manchester in 1842, the entire workforce of the city had been on general strike, and had been defeated. Aided by his working-class lover Mary Burns, the 22-year-old Engels toured factories, slums, and cotton exchanges to gather evidence for the first serious work of materialist sociology: *The Condition of the Working Class in England*. As an anthropologist, Engels gets a lot right: the slum conditions, the near-total absence of religious belief and deference among the workers, their addiction to drink, opium and casual sex. What he gets wrong is the impact of the self-acting mule. He wrote:

*Every improvement of machinery (…) transforms the work of full grown men into mere supervision which a feeble woman or a child can do quite as well and does for half or even one third the wages. (…) Grown men are constantly more and more supplanted, and not re-employed by the increase in manufacture.*

In his defence, Engels was drawing on evidence from radical spinners who, under conditions of downturn and defeat after the 1842 strike, were being thrown out of work. However, the long-term impact of automation was ultimately to reinforce the role of skilled male spinners and to increase their numbers. Skill, male dominance and an intricate power structure among male workers survived the onset of mechanization.

So Marxism’s first contact with the organized working class led to a big misunderstanding, not just about skill but the kind of political consciousness it produces.

Marx argued that the workers would abolish property because they lacked property; abolish class stratification because they could not benefit from it – and they would do it without the need to build up an alternative economy within the old system.

Yet the history of the English labour movement before 1848 simply does not bear this out. It is a story of positivity, the survival and evolution of skill; of hillside mass meetings, study circles, cooperative stores. Above all, it produced a vibrant working-class culture – of song, poetry, folklore, newspapers and bookshops.

What this means has to be confronted squarely by anyone who wants to defend materialist thinking about history: Marx was wrong about the working class. He was wrong to think automation would destroy skill; wrong to say the proletariat could not produce an enduring culture within capitalism.

### 1848–98: MEN VERSUS MACHINES

By the end of the 19th century, trade unions had become woven into the industrial fabric. For the most part, they were led by skilled workers with a bias towards moderation but fiercely defensive of their autonomy in the workplace.

In Britain, after radical republicanism had fizzled out in 1848, the stable form of working-class organization was trade unions organized by skilled workers. Wherever the factory system was rolled out – particularly in metalwork and engineering – the autonomous skilled worker became the norm. Radicalism and utopian socialism were sidelined.

Engels rationalized this first through economics. After 1848, with new markets, new technologies and an expanded money supply, Engels recognized the takeoff of ‘a new industrial era’ – what Kondratieff would dub the second long cycle – which would run until the 1890s. And he identified something crucial to its technological paradigm: cooperation between labour and capital.

But Engels also said workers had become moderate because they ‘shared in the benefits’ of Britain’s imperial power. Not just the skilled workers – whom he described as ‘an aristocracy of labour’ – but also the broad mass of people, who Engels believed also benefited from falling real prices as a result of Britain’s Empire. Britain had bought off its workers by exploiting its imperial power, but when the rest of the world caught up with Britain, moderation would disappear.

But it was a near-total misreading of the situation. Skill, passivity and political moderation were pervasive all across the workforce of the developed world during the second half of the 19th century.

Gregory Kealey’s account of Toronto’s barrel makers shows how, in each workshop, the union set the price of labour. There was no wage bargaining. Coopers would meet, present a price list, and the bosses had to either accept it or start a lockout. Like skilled workers everywhere, though the working week was 6 days, they regularly took a ‘Blue Monday’ – that is an unofficial day off after getting drunk on Sunday night.

They had total autonomy over their own work. They owned their own tools – indeed the term for a strike was ‘taking their tools out of the shop’. They controlled access to apprenticeships tightly. They would restrict output during downturns to keep wages up. They achieved all this through secret meetings, Masonic handshakes, oaths, rituals and total solidarity.

In the workplace, informal control – not just over wages but over the work itself – extended into even the newest industries.

These extraordinary levels of informal workers’ control were not residual, they were actually created by the new technological processes of the mid-century. The signature technologies of the second long wave – telegraphy, steam locomotives, printing, iron and heavy engineering – were heavily manual, which means that the strong hand and the experienced brain were vital. ‘The manager’s brain is under the workman’s cap,’ was a working-class slogan that reflected reality. To prevent skill constantly outpacing automation, the bosses would need ‘a thinking machine’, warned the leader of the Toronto coopers’ union. But that would take another 100 years.

By the 1890s, the existence of a skilled, privileged and organized layer of workers was a general feature of capitalism – not the result of one nation’s competitive advantage.

The combined impact of skilled autonomy, ‘the rich associational life’ and rising social-democratic parties would force capitalism into a new adaptation.

### 1898–1948: SCIENTIFIC MANAGEMENT & BUREAUCRACY

In 1898, in the freight yard of Bethlehem Steel in Pennsylvania, a manager called **Frederick Winslow Taylor** came up with a new solution to the century-old problem of skilled worker autonomy.

‘Pick up a pig and walk,’ Taylor told his labourers – a ‘pig’ being a lump of iron weighing 92lbs. By studying not just the time it took them to move the iron, but the detailed motion of their bodies, Taylor showed how industrial tasks could be made modular. Jobs could be broken down into learnable steps, and then allocated to workers less skilled than those currently doing them.

Taylor’s results were startling: productivity almost quadrupled. The incentive was a pay rise, from $1.15 to $1.85 a day. The ‘science’, from Taylor’s own scant description, seems to have involved putting a manager in strict control over the worker’s rest periods, and even over his speed of walking. Taylor wrote that the type of man suited to such work was “so stupid and so phlegmatic that he more nearly resembles in his mental make-up the ox than any other type”.

On the basis of such insights, scientific management was born. Now Taylor applied his methods to other workplaces. At a ball-bearing factory, he introduced process changes that allowed the workforce to be cut from 120 to 35, with the same output and increased quality. He observed: “This involved laying off many of the most intelligent, hardest working, and most trustworthy girls merely because they did not possess the quality of quick perception followed by quick action.”

Outwardly, Taylorism was about time and motion. But its real purpose was the selection and stratification of the workforce, creating a layer of better-educated workers to check, organize and train the lower layers, and then imposing rigid management control. This, Taylor boasted, “rendered labor troubles of any kind or a strike impossible”. The whole project was designed as an assault on skilled autonomy. The aim was to move the brain work as far away as possible from the manual work.

Though he had never heard of Taylor, in 1913 **Henry Ford** launched the second big innovation needed to enable semi-skilled work: the production line. At Ford, as at Bethlehem Steel, wages were hiked in return for absolute compliance. A ruthless anti-union hiring policy ensured management control. Three-quarters of Ford’s early workforce were first-generation immigrants, and overwhelmingly young.

Taylor, Ford and those who followed them effectively redesigned the working class. The skilled manual layer would survive – with machine-tool makers at its core. But there would now be a white-collar elite within the working class too. The white-collar workers owed their higher wages to the new system, where management were in control.

Semi-skilled workers brought a critical difference to the innovation process: they would generally adapt their skills to new machines free of the restrictions imposed by craft unions. There would still be unskilled general labourers, but the centre of gravity of the working class had moved upwards, towards manual semi-skilled workers.

If all this was designed to induce passivity, it failed. What nobody foresaw was that this reshaped working class would become educated, radicalized and political. Taylor’s ‘dumb oxen’ would teach themselves to read – not just dime novels but philosophy. The white-collar secretaries and telephonists would become agitators and educators in mass socialist parties.

The raw facts of the labour upsurge of the 1900s are startling. An electoral breakthrough by the German SPD gave it 31 % of the vote in 1903. A clandestine labour movement in the tsarist empire formed itself into workers’ councils (soviets) and armed militias in 1905. French industry was paralysed by strikes in 1905-6, while union membership doubled in a decade. The USA saw the tripling of trade union density in 10 years, even as the workforce itself grew by 50 %.

Working-class towns became centres of a sophisticated culture – of clubs, libraries, choirs and nurseries, the separate working-class lifestyle and, above all, of resistance inside the factory.

From 1910 to 1913, unskilled workers staged a strike wave that rolled across the globe and became known as the Great Unrest. At the centre of it was the struggle for control. The Welsh miners’ union outlined a strategy that was being pursued everywhere: “Every industry thoroughly organized, in the first place, to fight, to gain control of, and then to administer, that industry (…) leaving to the men themselves to determine under what conditions and how, the work shall be done.”

It was as if, through their offensive against the old craft control of workplaces, Taylor and Ford had created a new and more sophisticated demand for democratic control among the workforce.

What halted the Great Unrest was a combination of economic downturn, beginning in 1913, and high levels of repression. When war broke out in August 1914, it seemed as if the whole thing had been a blip. Before we consider what happened next, we should ask how the Marxists of that era understood this new configuration of the working class. In summary, they did not.

### **LENIN AND THE ARISTOCRATS**

In 1902, the exiled Russian revolutionary **Vladimir Lenin** wrote a pamphlet that, although only mildly influential at the time, was to have huge significance for the far-left thinking of the 20th century. In *What Is to Be Done?*, Lenin stated baldly that workers were incapable of understanding the role allocated to them in the Marxist project. Socialist consciousness “would have to be brought to them from without”. “The history of all countries shows that the working class, exclusively by its own effort, is able to develop only trade union consciousness”, he wrote. The labour movement, he said, would have to be ‘diverted’ from its spontaneous moderate pathways and towards the seizure of power. This stands in total contradiction to Marx’s understanding of the working class; for Marx, the working class was the self-contained agent of history. For Lenin it was more like a reagent – needing the catalyst of the intellectual-led vanguard party to set off the historical process. For Marx, the working class is capable of becoming communist spontaneously; for Lenin it is not.

But by 1914 Lenin had a new problem to address: why were the workers – so ferocious in their defence of wages and democracy during the Great Unrest – either enthused or paralysed by the patriotism that followed the outbreak of war?

To explain this, Lenin reached back to Engels’s ‘labour aristocracy’ theory, which he turned inside out. Instead of abolishing the skilled elite in Britain, said Lenin, the dash for colonies by all industrial countries had made the labour aristocracy the permanent feature of modern capitalism. They were the source of patriotism and moderation polluting the labour movement. Fortunately, a larger pool of unskilled workers still remained to provide the raw material for revolution. The political split between reform and revolution, Lenin claimed, was the material result of this stratification of the working class.

In 1920, Lenin restated the labour aristocracy theory, calling them “the real agents of the bourgeoisie in the labour movement”, “the real carriers of reformism and chauvinism’”. But this was an utterly bizarre thing to write in 1920. By then, the working class was 4 years into a wave of revolutionary struggles led by skilled workers. Between 1916 and 1921, the working class launched a frontal assault on management control. It would reach revolutionary proportions in Germany, Italy and Russia, and pre-revolutionary levels in Britain, France and parts of the USA. In each case, the struggles were led by the so-called ‘labour aristocracy’.

However, the labour aristocracy theory of reformism does not seem accurate. The source of patriotism is, unfortunately, patriotism, owing to the fact that just as classes are material, so are nations. In his prison notebooks, the Italian communist **Antonio Gramsci** recognized that developed capitalist societies have layer upon layer of defence mechanisms. The state, he wrote, was “just a forward trench; behind it stood a succession of sturdy fortresses and emplacements”. And one of the strongest emplacements is capitalism’s ability to grant reforms.

The skilled layer had, in other words, consistently moved beyond ‘pure trade unionism’. But at the same time they remained wary of those advocating all-or-nothing political revolution. Their objective was workplace control and the creation of a parallel society within capitalism.

For the next 20 years, these shop stewards would become the perennial floating voters of the far left – constantly searching for a third course between insurrection and reform. They understood (because they lived among them) that the majority of workers were not about to immediately embrace communism, that many Western societies had a political resilience unguessed at by Lenin, and that they, the militants, would need strategies to survive: to strengthen the autonomy of the working class, improve its culture and defend the gains already won.

The factional history of most communist parties in the inter-war years is of a recurrent clash between the Leninists, trying to force Moscow-inspired schemes, tactics and language on to these traditions, and the militant shop stewards trying to create an alternative society from within.

And here’s the kernel of truth contained in *What Is to Be Done?*: Lenin was wrong to say workers can’t spontaneously move beyond pure, reform-oriented trade unionism. He was right to say revolutionary communism was not their spontaneous ideology. Their spontaneous ideology was about control, social solidarity, self-education and the creation of a parallel world.

The first half of the 20th century was the ultimate test bed for the Marxist theory of the working class – and it was disproven. Workers wanted something bigger than power; they wanted control.

But capitalism could not grant that: the third long cycle was about to swing downwards, and spectacularly. After the Wall Street Crash of 1929, governments all over the world inflicted mass unemployment, welfare reductions and wage cuts on the working class. Where the stakes were highest, and the working class too strong, the ruling elites concluded it had to be smashed.

The stage was set for the decisive event of the 200-year history of organized labour: the destruction of the German workers’ movement by fascism. Nazism was German capitalism’s final solution to the power of organized labour: in 1933, unions were outlawed and socialist parties destroyed. Catastrophe followed in other countries. In 1934, the labour movement in Austria was crushed in a four-day civil war. Then in Spain, between 1936 and 1939, General Franco waged total war on organized labour and the radical peasantry, leaving 350,000 dead. In Greece, the Metaxas dictatorship of 1936 outlawed not just socialist parties and trade unions but even the folk music associated with working-class culture. The labour movement in Poland, Hungary and the Baltic states – including the massive Jewish labour movement – was first suppressed by right-wing governments and then wiped out during the Holocaust. Meanwhile, in Russia the working-class political underground was exterminated by the gulag and mass executions.

Only in 3 advanced economies did the labour organizations survive and grow in the 1930s: Britain and its Empire, France and the USA.

What Orwell called “the flower of the European working class” was crushed. Even if it had only been a question of numbers, this deliberate slaughter of politicized workers – added to the tens of millions of people killed by military action – would have been a turning point in the story of organized labour. But there was a massacre of illusions going on as well. As the Second World War approached, the extreme left – the Trotskyists and anarchists – tried to maintain the old, internationalist line: no support for wars between imperialist powers, keep the class struggle going at home. But by May 1940, the war was a bigger fact than the class struggle.

As the Allied powers collapsed, with significant pro-Nazi wings emerging among the ruling class in the Netherlands, France and Britain, it was clear to any working-class family with a radio that the very survival of their culture would rely on the military defeat of Germany. Working-class politics would become dependent on an Allied military victory. After the war, those who survived the slaughter, conscious of how close organized labour had come to total obliteration, now sought a strategic accommodation.

### 1948–89: WORK BECOMES ‘ABSURD’

The Second World War was punctuated by workers’ uprisings – but of a different type from those of 1917–21. Fears of a repeat of 1917–21 would force a hike in workers’ living standards and a tilt in the balance of wealth distribution towards the working class.

In the first phase, the rapid post-war expulsion of women from the industrial workforce allowed male wages to rise, causing a narrowing of wage differentials between workers and the middle class. By 1948, while the income of American white-collar workers had doubled in 10 years, that of manual workers had increased threefold.

Additionally, the Allies actually imposed welfare states, trade union rights and democratic constitutions on Italy, Germany and Japan, as a punishment for their elites and as an obstacle to their re-emergence as fascist powers.

Demobilization saw the creation of a university-educated layer of working-class kids utilizing subsidized education. Policies pursued to promote full employment, together with the state-run labour exchanges, training boards and job demarcation rules further increased labour’s bargaining power. As a result, once growth took off in the 1950s, the wage share of GDP in most countries rose significantly above pre-war levels, while the tax take from the upper and middle classes also rose, to fund health and welfare programmes.

The trade-off? Workers abandoned the ideologies of resistance that had sustained them in the third long wave. Communism, social-democracy and trade unionism became – whatever the rhetoric said – ideologies of coexistence with capitalism. In many industries trade union leaders effectively became an arm of management.

This is where the living memory of today’s developed-world workers begins: with welfare, health, free education, public housing projects and with collective rights at work enshrined in law. During its upswing, the fourth long cycle would deliver material improvements previous generations could only dream of.

But for survivors of the pre-war period it was like waking up in a nightmare. In 1955, the US sociologist Daniel Bell argued that “***the proletariat is being replaced by a salariat, with a consequent change in the psychology of the workers***”. Noting the massive rise in white-collar workers compared to blue-collar workers, Bell – at this point a leftist – warned: “these salaried groups do not speak the language of labour. Nor can they be appealed to in the old class conscious terms.” The social theorist Herbert Marcuse concluded in 1961 that new technology, consumer goods and sexual liberation had decisively weakened the proletariat’s alienation from capitalism: “The new technological work-world thus enforces a weakening of the negative position of the working class: the latter no longer appears to be the living contradiction to the established society.”

In Italy, pioneering research by the shop-floor activist Romano Alquati discovered that new levels of workplace automation had left workers alienated from the factory as any kind of arena for political self-expression. For the generation that had overthrown Mussolini, the factories had been an iconic battlefield. But among the young, the word ‘absurd’ was the most common term used to describe the production process. They complained about a “sense of ridiculousness surrounding their lives”.

The most tangible effect of this new sociology of work was the global decline in class-based voting patterns, famously illustrated in the Alford Index. Historian Eric Hobsbawm, surveying the process later, declared that ‘the forward march of labour’ was halted in the early 1950s. He cited the decline of a ‘common style of proletarian life’, the unprecedented rise in the number of women working and the replacement of large workplaces by an extended supply chain of smaller ones. Crucially, Hobsbawm noted that the new technologies of the 1950s and 60s had not only expanded the white-collar layer but had also decoupled high wages from manual skill.

The combined impact of these changes was that, from the war until the late 1960s, workers’ struggles were, as Alquati complained, “always functional to the system. Always atomised, always blind.” André Gorz wrote doomily that the post-war workplace “will never produce that working class culture, which together with a humanism of labour constituted the great utopia of the socialist and trade union movements up until the 1920s”.

A few changes may explain this.

First, the working class expanded. Large numbers of the salariat were in fairly menial office jobs, getting lower pay than manual workers and subject to pointless discipline and routine.

Next, stratification altered the consciousness of this expanded working class. White-collar workers, even unionized or alienated ones, do not think or act like manual workers. And the young manual workers, themselves increasingly alienated from work and the culture surrounding it, also formulated a different kind of rebellious consciousness.

Access to consumer goods did not subdue militancy. It was a material change, but wholly containable within working-class culture.

Automation triggered a long-term psychological change. If work seemed “absurd, ridiculous and boring” to the Fiat workers Alquati interviewed in the early 1960s, there was a deeper reason. The automation levels of the time were crude, but advanced enough to illustrate what the future of work would be like. Though the actuality of a factory run by computer was decades away, and robotization even further, workers understood that these things were no longer science fiction but distinct possibilities. There would come a time when manual work was no longer necessary.

Subtly, the sense of what it meant to be ‘a worker’ changed. What united the young workers in the 1950s, André Gorz believed, was their alienation from work: ‘In short, for the mass of workers it is no longer the power of the workers that constitutes the guiding utopia, but the possibility of ceasing to function as workers; the emphasis is less on liberation within work and more on liberation from work.”

Strikes would happen among the expanded service proletariat once the crisis began in the late 1960s, but they almost never reached the levels of total shutdown possible in factories, ports and mines. When they did, these strikes escalated into confrontations with the state, which the majority of service workers were not prepared to see through to resolution.

### 1967–76: THE HOT DECADE

The new working class defied the decline theorists, staging an uprising that brought parts of the developed world close to chaos. The militants of the mid-1970s and 80s derided those who had declared the old forms of working-class struggle dead, but it was they who had glimpsed the future.

Each of the advanced economies went through extreme class warfare from the late 1960s to the mid-70s. The years 1967–76 saw Western capitalism in crisis and wildcat strike action on an unprecedented scale. In spite of their cars, televisions, mortgages and expensive clothes, the workers took to the streets to free themselves, to destroy constituted authority in the factory. Social-democratic parties veered to the left and revolutionary groups gained footholds in the factories, where they recruited thousands of members.

Among those in power, there were serious fears of a workers’ revolution; certainly in France and Italy – and, in their deepest nightmares, also Britain and the black cities of the USA.

We know how it ended – with defeat and atomization. But why?

For the older generations, before the 1950s, class consciousness was formed out of experience alone: through talking, listening and seeing. Discussions at the pub, slogans chalked on the walls, actions taken. So separate were working-class towns from the world in which newspapers were written, or radio bulletins made, that bourgeois ideology barely touched them. Class consciousness was sub-logical and implicit. It was conveyed through sayings, songs, sighs, body language and constant acts of micro-solidarity. It was a solidarity preserved over generations through industrial and geographic stability.

The ‘common proletarian way of life’ and its physical geography were decisive to class consciousness before 1945.

Though it felt to the young workers of the 1960s that they lived within a stable, 200-year-old culture, its foundations were shifting so rapidly that when they tried to pull the traditional levers of solidarity and struggle, in the 1970s and 80s they didn’t work.

The central change was the injection of formal knowledge into working class life: information, logic, mental complexity and the ability to question everything. Knowledge arrived into the post-war working-class community not just through the expanded education system and the public library but through the television, the tabloid newspaper, the movie, the paperback book and the lyrics of popular songs.

And it was knowledge about a world that was suddenly complex. Social mobility increased. Geographical mobility increased. Sex – a taboo in the public discourse of the pre-war working class – was everywhere. And now, on the eve of the crisis, the biggest technological innovation of all was rolled out: the contraceptive pill, first prescribed in 1960 but mainly legalized for use by single women during the late 1960s and early 70s, producing what economists Akerlof, Yellen and Katz called a ‘reproductive technology shock’.

In sum, what emerged was a new kind of worker. The generation that would wage class war in the 1970s began with higher incomes, higher levels of personal freedom, fragmenting social ties and much better access to information. Contrary to the decline theorists’ beliefs, none of this would stand in the way of them fighting. But here is why, ultimately, they lost.

The post-industrial, free-market model which destroyed their economic power and the traditional narrative based around work had collapsed. A new capitalist strategy had emerged. There was also the emergence of a new kind of rebel consciousness, which was no longer negative, spontaneous or uninformed, but based on formal knowledge and more reliant on elite-controlled channels of mass communication. On top of this, we have to factor in the dead weight of both Stalinism and social-democracy, which worked virtually full-time during the 1970s upsurge to channel the class struggle into compromise and parliamentary politics. Finally, workers were held back by the knowledge that the revolutions of the 1920s and 30s had failed, and that fascism was beaten only with the help of democratic capitalism.

The Italian upsurge was symptomatic of a change taking place all across the developed world; 1969 was to be just the start of a period of contagious economic struggle, which continually spilled over into political conflict and which would trigger a total rethink of the West’s economic model.

It’s important to understand the sequence of events, because in popular literature the breakdown of Keynesianism often gets rolled into a single moment. In 1971, the long post-war upsurge ran out of steam. But the breakdown of fixed exchange rates, paradoxically, gave each country the ability to ‘solve’ wage and productivity pressures by allowing inflation to take off. Then, with the oil price hike of 1973, which triggered double-digit inflation, the old relationship between wages, prices and productivity simply fell apart.

Across the OECD, redistribution payments – family income supplements, welfare benefits and the like – which had averaged 7.5 % of GDP during the boom years, reached 13.5 % by the mid-1970s. Public spending – which had averaged 28 % of GDP in the 1950s – now hit 41 %. The share of total wealth going to industrial profits collapsed by 24 %.

To contain worker militancy, governments hiked the social wage to record levels and brought workers’ representatives into government. In Italy this was in the context of the 1976 ‘historic compromise’ that ended the period of unrest, tying the Communist Party and its trade unions to a conservative-led government. The same basic process can be seen in the Spanish Moncloa Pact of 1978, the ‘social contract’ of the Wilson–Callaghan governments (1974–9), and numerous attempts by the American unions to secure a strategic deal with the Carter administration.

By the late 1970s, all the actors in the old Keynesian system – the organized worker, the paternalist manager, the welfare politician and the state-owned corporation boss – were locked together in a bid to save the failing economic system.

The standardized production process of the post-war era – and the strict scientific management controls it had relied on – ended up creating a workforce it could not control. The mere fact that work-to-rule actions became the most effective form of sabotage tells the real story. It was the workers who really ran the production process. Any proposal to solve macro-economic problems without their consent was pointless.

**In response, a new breed of conservative politicians decided the entire system would have to be dismantled.** The second oil shock, after the Iranian revolution in 1979, gave them the opportunity. It triggered a new, deep recession and this time the workers faced corporations and politicians determined to try something new: mass unemployment, industrial closures, wage cuts and cuts in public spending.

They also faced the emergence of something they had insufficiently prepared for in the years of radicalism: a part of the workforce prepared to side with conservative politicians. White southern workers put Reagan into power; many skilled British workers, tired of the chaos, swung to the Conservatives in 1979 to give Thatcher 10 years in office. Outright working-class conservatism had never gone away: what it always wants is order and prosperity, and by 1979 it could no longer see these things being delivered by the Keynesian model.

By the mid-1980s, the working class of the developed world had moved in the space of 15 years from passivity to strikes and semi-revolutionary struggles to strategic defeat.

Western capitalism, which had coexisted with organized labour and been shaped by it for nearly two centuries, could no longer live with a working-class culture of solidarity and resistance. Through offshoring, de-industrialization, anti-union laws and a relentless ideological warfare, it would be destroyed.

### DIGITAL REBELS, ANALOGUE SLAVES

After more than 30 years of retreat and atomization, the working class survives, but massively transformed.

In the developed world, the core-periphery model first envisaged in Japan has become the norm, replacing ‘unskilled vs skilled’ as the most important division within the working class.

The core workforce has been able to cling on to stable, permanent employment, with non-wage benefits attached to the job.

The periphery must relate either as temporary agency workers, or via a network of contracting firms.

But the core is shrunken: 7 years into the post-2008 crisis, a permanent contract on a decent wage is an unattainable privilege for many people. Being part of the ‘precariat’ is all too real for up to a quarter of the population.

For both groups, flexibility has become the key attribute. Among skilled workers, much value is placed on the ability to reinvent yourself, to align yourself with short-term corporate objectives, to be good at forgetting old skills and learning new ones, to be a networker and above all to live the dream of the firm you work for.

The workforce of all developed countries is now heavily service-oriented. Only in the export giants – Germany, South Korea and Japan – does the industrial workforce come close to 20 % of the whole; for the rest of the economically advanced countries it is between 10 % and 20 %. In the developing world too, only around 20 % of the workforce is industrial.

The global wage share of GDP is on a downward trend. In the USA it peaked at 53 % in 1970 and has now fallen to 44 %. Though the effect is lessened in countries with an export-oriented model, the social impact has been to push the workforce into financialized behaviour. The proportion of profits generated by the consumption and borrowing of the working class has risen in proportion to that generated through work.

Costas Lapavitsas, a professor of economics at London University’s School of Oriental and African Studies (SOAS), calls this ‘financial expropriation’, and its impact on the self-image of the working class has been profound. For many workers, their primary physical and ideological relationship to capital is through consumption and borrowing rather than work.

This shines a new light on the long-observed tendency of post-1989 capitalism to blur the boundaries between work and leisure. In some sectors, and not all of them high-value, there is increasingly a trade-off between meeting a project target and leeway for personal activity at work (e-commerce, social media, dating); the deal is that the employee has to be answering emails at home, working while travelling, prepared to work long, unofficial hours to meet targets.

In highly information-centred work, especially with smart mobile devices, work and leisure time are substantially blurred. This has over a relatively short period loosened the bond between wages and working time. For the high-value worker you are paid, effectively, to exist, to contribute your ideas to your firm and to meet targets.

In parallel, the geography of working-class life has been transformed. Long commutes from suburbs whose culture bears no specific relationship to work are the new normal. Commuting originally required people to actively re-create a physical community through non-labour organizations: the gym, the nursery, the bowling alley, etc. With the rise of info-tech, a portion of this community-building activity has moved online, fostering even more physical isolation. As a result, the old solidarity – where workplace ties were reinforced by a socially cohesive community – exists far more sporadically than at any other time in capitalism’s history.

Barry Wellman chronicled the move from group-based communities to physical networks and then digital networks, terming the outcome networked individualism and linking it explicitly to greater job flexibility. LSE professor Richard Sennett meanwhile began to study the new characteristics of a hi-tech workforce. If work rewards detachment and superficial compliance, values adaptability over skill and networking over loyalty, Sennett found, this creates a new kind of worker: s/he is focused on the short term, in life as in work, and lacks commitment to hierarchies and structures, both at work and in activism.

Sennett and Wellman both noticed the tendency of people adapted to this networked lifestyle to adopt multiple personalities, both in reality and online. Sennett writes: “The conditions of time in the new capitalism have created a conflict between character and experience, the experience of disjointed time threatening the ability of people to form their characters into sustained narratives.”

The worker of the Keynesian era had a single character: at work, in the local bar, in the social club, on the football terraces, they were the same essential person. The networked individual creates a more complex reality: s/he lives parallel lives at work, in numerous fragmentary subcultures and online.

The challenge is to understand the impact of these changes on humanity’s capacity to fight exploitation and oppression. Michael Hardt and Antonio Negri summed it up well in their 2012 book *Declaration*:

*The center of gravity of capitalist production no longer resides in the factory but has drifted outside its walls. Society has become a factory. (…) With this shift the primary engagement between capitalist and worker also changes. (…) Exploitation today is based primarily not on (equal or unequal) exchange but on debt.*

If, in the 1970s, **Antonio Negri** and the Italian left were premature in declaring the workplace over as a forum for class struggle and ‘the whole of society’ the new venue, they are today correct.

What is the future for the working class, if info-capitalism continues along these lines?

In the first place, the current global division of labour can only be seen as transitional. The workforce of the global south will achieve higher living standards and at some point capital will react by introducing greater automation and pursuing higher productivity in the emerging markets. This will place the workers of China and Brazil on the same overall trajectory as the rich-world workforce, which is to become service-dominated, split into a skilled core and a precariat, with both layers seeing work partially de-linked from wages. In addition, as the Oxford Martin School suggests, it is the low-skilled service jobs that stand the highest risk of total automation over the next two decades.

However, the struggle in the workplace is no longer the only, or most important, drama.

In many industrial and commercial cities around the world, the networked individual is no longer a sociological curiosity, s/he is the archetype. All the qualities the sociologists of the 1990s observed in the tech workforce – mercuriality, spontaneous networking, multiple selves, weak ties, detachment, apparent subservience concealing violent resentment – have become the defining qualities of being a young, economically active human being.

The impact of the (mobile) internet has been transformative. Networks, which in analogue form were used to recruit and divide jobs informally across a single factory, were now being used to check wage rates and conditions and spread information across whole industries.

If you accept that the main fault line in the modern world is between networks and hierarchies, then China is sitting right on top of it. And China’s workers – who for now look like digital rebels but analogue slaves – are at the heart of the phenomenon of networked rebellion. These networked movements are evidence that a new historical subject exists. It is not just the working class in a different guise; it is networked humanity.

And this is the antidote to the pessimism of Gorz’s generation. With the death of the ‘real’ working class, André Gorz concluded, the prime mover in anti-capitalism had disappeared. If you wanted postcapitalism, you must pursue it as a utopia: a good idea, which might or might not come off, and with no major force in society to embody its values.

In the past 20 years, capitalism has mustered a new social force that will be its gravedigger, just as it assembled the factory proletariat in the 19th century. It is the networked individuals who have camped in the city squares, blockaded the fracking sites, performed punk rock on the roofs of Russian cathedrals, raised defiant cans of beer in the face of Islamism on the grass of Gezi Park, pulled a million people on to the streets of Rio and Sao Paulo and now organized mass strikes across southern China.

They are the working class *sublated* – improved upon and replaced. They may be as clueless as to strategy as the workers of the early 19th century were, but they are no longer in thrall to the system. They are enormously dissatisfied with it. They are a group whose diverse interests converge on the need to make postcapitalism happen, to force the info-tech revolution to create a new kind of economy, where as much as possible is produced free, for collaborative common use, reversing the tide of inequality. Neoliberalism can offer them only a world of stagnant growth and state-level bankruptcy: austerity until death, but with an upgraded version of the iPhone every few years. And the freedom they cherish is perennially hemmed in by the neoliberal state – from the NSA’s mass surveillance techniques to those of the Chinese internet police. Above their heads, politics in many countries has become infested by a kleptocratic mafia, whose strategy is to deliver growth at the price of suppressing freedom and expanding inequality.

This new generation of networked people understand they are living through a third industrial revolution, but they are coming to realize why it has stalled: with the credit system broken, capitalism cannot sustain the scale of automation that is possible, and the destruction of jobs implied by the new technologies.

The economy is already producing and reproducing a networked lifestyle and consciousness, at odds with the hierarchies of capitalism. The appetite for radical economic change is clear.

The rise of information technology disrupted the basic institutions of capitalism: price, ownership and wages.

Neoliberalism is a false dawn; the post-2008 crisis is the product of flaws within the economic model which prevent the exploitation of new technologies, and the takeoff of a fifth long wave.

# **Transitions**

## A BOLSHEVIK ON MARS

In **Alexander Bogdanov**’s vintage sci-fi novel *Red Star* (1909), the hero – an organizer in the Russian Bolshevik party – gets taken to Mars on a spaceship. He finds the Martian factories modern and impressive but the most stunning thing is what he sees in the control room: a realtime display provides an hourly snapshot of labour shortages in every factory on the planet, together with a summary of sectors where there is a labour surplus. The aim is for workers to move voluntarily to where they are needed. Since there is no shortage of goods, demand is not measured. There is no money either: “Everyone takes whatever he needs, in whatever quantities he wants”, explains the Martian guide. The workers, controlling but never touching giant pieces of machinery, also fascinate our earthling: “They seem to be inquisitive, learned observers who had no real part in what was going on around them. (…) To an outsider the threads connecting the delicate brains of the men with the indestructible organs of the machines were subtle and invisible.”

In *Red Star*, Bogdanov not only imagined how a postcapitalist economy could work, he imagined what kind of person would be needed to make it possible – information workers, their brains connected by something “subtle and invisible”. But by portraying the communist future, he was defying the conventions of his time: all wings of socialism were opposed to discussing castles in the air. But this was no mere whimsy.

Bogdanov, a medical doctor, was one of the 22 founder members of Bolshevism. He had been imprisoned, exiled, led the party in the Petrograd soviet, edited its newspaper, managed its funds and organized the raising of them – through bank robberies. Bogdanov would be expelled from Lenin’s party; he had formed an opposition to **Vladimir Lenin**, based on disagreements that prefigured the tragedy that was about to unfold.

The 1905 revolution, said Bogdanov, showed that workers were not ready to run society. Because he thought postcapitalist society would have to be a knowledge society, any attempt to create it through blind revolutionary action could only bring to power a technocratic elite, he warned. To prevent this, Bogdanov said, “a new proletarian culture must be disseminated among the masses, a proletarian science developed, a proletarian philosophy worked out”.

All this was anathema to Lenin. Marxism had become a doctrine of imminent breakdown and revolution, where the workers would make the revolution happen despite the ideas and prejudices in their heads. Bogdanov also had the temerity to suggest that Marxism should adapt to new ways of thinking in science. He predicted that mental labour would replace manual labour; that all labour would become technological. Once this happened, our understanding of the world would have to go beyond the dialectical methods of thinking Marx had inherited from philosophy. Science would replace philosophy, Bogdanov predicted; and we would come to see reality as connected “networks of experience”. Separate sciences would become part of a “universal organisational science” – the study of systems.

For becoming, effectively, the first systems theorist, and for his prescient warning about what might happen in Russia, Bogdanov was expelled – at a fractious meeting in Lenin’s Paris apartment in 1909. Within months, his novel *Red Star* was published, and widely circulated among Russian workers. In the light of what actually happened under Stalinism, its treatment of the postcapitalist economy is far-sighted.

In the novel, Martian communism is based on abundance: there is more than enough of everything. Production takes place on the basis of realtime and transparent computation of demand. Consumption is free. It works because there is a mass psychology of cooperation among workers, based on their high education and the fact that their work is primarily mental. They shape-shift between male and female genders, remain calm and selfless in the face of stress and danger, and live an enriched emotional and cultural life.

Bogdanov’s outline of the back-story is also provocative: Mars was industrialized under capitalism; a struggle for control of industry began, followed by a revolution – largely peaceful because it was conducted by workers rather than peasants. There had then been a 100-year-long transition period during which the need for work was progressively eroded, by shortening the compulsory working day from 6 hours to 0.

To anybody with a knowledge of orthodox Marxism, it is easy to read between the lines of Red Star. Bogdanov was using the novel to outline a complete alternative to the ideas that would dominate the far left in the 20th century. He advocates technological maturity as the precondition for revolution, the peaceful overthrow of the capitalists by means of compromise and compensation, a focus on technology as a means to reduce labour to a minimum and a relentless insistence that it is humanity itself that has to be transformed, not just the economy. Furthermore, a major theme of *Red Star* is that postcapitalist society has to be sustainable for the planet. The Martians voluntarily commit suicide if they perceive there are too many of them for their planet to support. And as their natural resources fail, they begin an agonized debate about whether to colonize Earth.

If you are thinking: “What might Russia have become if Lenin had fallen under a tram on his way to the meeting where they expelled Bogdanov?”, you are not the first to do so. There is a whole literature of *what if?* focused on Bogdanov – and rightly so. Though he could not imagine a computer, he had imagined the kind of communism that society based on mental labour, sustainability and networked thought might produce.

After 1909, Bogdanov retired from activism and spent 10 years writing a pioneering book on systems theory. In the early years of the Soviet Union he formed a mass workers’ cultural organization – the Proletkult – which was shut down after it became allied with an opposition group advocating workers’ control.

When they began to construct socialism by diktat in the 1930s, Soviet planners were fond of citing *Red Star* as their inspiration. But by then the facts and the utopia had diverged.

## THE RUSSIAN NIGHTMARE

The Russian Revolution went wrong in stages. Under conditions of civil war, from 1918 to 1921, banks and major industries were nationalized, production was directed by commissars (with trade unions subject to military discipline), factory committees were banned and crops simply requisitioned from the peasants. As a result, output declined to 20 % of its pre-war level, famine spread through the countryside and the rouble collapsed; some companies resorted to barter and wages had to be paid in kind.

In March 1921, the USSR was forced to switch to a form of market socialism known as the *New Economic Policy*. Letting the peasants keep and sell their crops revived the economy, but created two dangers that the beleaguered revolutionaries in Russia had trouble understanding. First, it channelled money towards the better-off peasants, known in slang as *kulaks*, and gave the agricultural sector a de facto economic veto over the speed of industrial development – summarized in the slogan ‘Socialism at a snail’s pace’. Second, it solidified a privileged bureaucracy running factories, distribution organizations, the army, the secret police and government offices.

Against the rich peasants and the bureaucrats, the Russian working class pressed for more democracy, for rapid industrialization through central planning and for a crackdown on speculators. Soon this three-way struggle in society was reflected within the Communist Party itself.

A factional dispute broke out, between a left opposition led by **Leon Trotsky**, arguing for more democracy and more planning; a pro-market wing led by **Nikolai Bukharin**, who wanted to delay industrialization, telling the peasants “enrich yourselves”; and in the centre **Joseph Stalin** himself, defending the interests of the bureaucracy.

In November 1927, at a parade celebrating the anniversary of the revolution, around 20,000 supporters of the left-wing faction carried banners calling for the party to suppress the kulaks, speculators and bureaucrats. When several Moscow factories marched out to join them, the police attacked and street fighting followed.

Stalin expelled Trotsky and the leaders of the left and sent them into forced exile. Then, in one of those U-turns that Orwell would later parody in *Nineteen Eighty-Four*, Stalin implemented the left’s programme – but in a much more extreme form, with maximum violence and brutality. In 1928 it was Bukharin’s turn to be purged, together with the market-oriented right of the party. The kulaks, were ‘liquidated’ in a programme of forced collectivization of their farms. Estimates vary, but a combination of famine and mass shootings in the countryside killed about 8 million people over 3 years.

The USSR had a planned economy, whose objective was to catch up with the West. The industrial targets were met, but at the cost of mass starvation, mass executions, slave labour conditions in many workplaces and, in the end, a further economic crisis.

Soviet growth was never driven by productivity. The RAND study found only a quarter of the USSR’s growth was driven by better technology, with the rest by rising inputs – of machinery, raw materials and energy. After 1970, there was no growth at all in productivity: if you needed double the number of nails produced, you built a new nail factory alongside the old one – productivity was off the agenda.

Economists call this *extensive growth* – as opposed to the intensive growth that raises real wealth. In the medium term, a system based on extensive growth cannot survive. It is likely that, with flatlining productivity, the Soviet system would have collapsed at some point from its internal problems, even if it had not been confronted with pressure from the West in the 1980s.

Soviet planners were flying blind: guessing at a target, erring on the upside to maintain pressure on their subordinates to deliver, and – when they failed – wasting huge amounts of effort trying to remedy the situation or cover it up. They refused to recognize that even transitional economies have objective laws: dynamics that work behind the backs of the economic players and confound their willpower.

Because Soviet growth outstripped that of the West for a time, Keynesian economics remained in awe of the planned economy. It was the prophets of neoliberalism – **Mises** and **Hayek** – who had from the very beginning predicted its chaotic demise.

#### THE CALCULATION DEBATE

Because the marginalists thought the market was the perfect expression of human rationality, they had no problem – as long as it was only a thought experiment – with the idea that an all-knowing state could achieve the same results as a perfect market. “Both systems are not different in form and they lead to the same point”, wrote the Italian economist **Vilfredo Pareto**.

In 1908, his colleague **Enrico Barone** wrote a detailed account of how a socialist state could calculate the exact same outcomes that the market achieves blindly. Barone showed how it would be possible to discover, using linear equations, the most efficient forms of production, consumption and exchange. “It would be a tremendous – a gigantic – work (…) but it is not an impossibility”, he wrote.

This was an article of faith for marginalists: in theory, a perfect plan – made by a state with perfect knowledge and the ability to calculate in realtime – was as good as a perfect market.

But since just like the market, the state cannot calculate what is needed in advance, each year’s plan is in effect an experiment, on a very large scale. And if the market could correct itself relatively quickly, the plan would take longer. A collectivist regime would be just as anarchic as the market, but on a bigger scale, according to Barone. And in practice the state can never have perfect knowledge, nor can it do the calculations fast enough.

In **Ludwig von Mises**’ book *Economic Calculation in the Socialist Commonwealth* (1920), the market acts as a calculating machine: people make choices, they buy and sell things at a given price, and the market works out whether their choices were correct. Over time, this ensures the most rational allocation of scarce resources. Once you remove private property and begin planning, the calculating machine breaks down: “Without economic calculation there can be no economy.”

Mises targeted three critical weaknesses of planning:

1. a state cannot calculate as fast as a market can;
2. a state cannot reward innovation;
3. when it comes to distributing capital between major sectors then, without a finance system, this becomes unwieldy and haphazard.

Mises predicted that as a result planning would lead to chaos, specifically to the overproduction of shoddy goods that nobody wanted. It would work for a while because the ‘memory’ of the appropriate prices would be imprinted on to the system, but once that memory faded, it would collapse in chaos. Because his predictions were proved right, by both the life and death of the Soviet economy, his book has become a hallowed text of the free-market right.

In the 1930s, Mises’ pupil **Friedrich Hayek** retreated on Mises’ main point, the inability of the state to calculate as well as the market. A socialist state could mirror the market effectively, as Barone had said, provided that it had the right information. One of the remaining problems was the Hayek/Robbins objection: the state could never do the calculations fast enough.

This sparked a brisk exchange. The left-wing Polish economist **Oskar Lange** pointed out Hayek and Robbins had effectively made a big concession to the left.

Lange was part of a school of moderate socialists who rejected Marxism and believed socialism could be implemented using the principles of marginal utility theory. He showed that if you retain a consumer market, and leave people free to choose where they work, but plan the production of all goods, then the process of trial and error in a socialist economy is conceptually no different from the one that operates through prices. Instead of being signalled through price movements, the unmet needs of the economy are signalled through shortages and surplus goods. The central supply board simply reorders production quotas in response.

However, we need to revisit the calculation debate for a reason that should be obvious: technology is today eroding the price mechanism without the parallel rise of a planned economy. And supercomputers plus big data are putting realtime calculations within reach.

In fact, however, there is no calculation problem in a postcapitalist economy – for a reason that was suggested by Mises in 1920.

In the calculation debate of the 1930s, both sides rejected the labour theory of value. Lange the socialist and Hayek the ultra-capitalist both believed that marginal utility was the only explanation of what creates value. So for both sides, the idea of a transition – in which a system based on scarcity gives way to one based on abundance – is unexplored territory. If capitalism and state socialism are just two different ways of allocating goods rationally until you reach equilibrium, the transition between them is merely a technical challenge, not a revolution.

But as Mises had already pointed out, if the labour theory of value is correct, there is no calculation problem at all. The problems of allocating goods, deciding priorities and rewarding people who innovate can all be captured within a system based on labour values, because everything can be measured against the same yardstick. Socialism was possible, Mises admitted, but only if there was a “recognizable unit of value, which would permit of economic calculation in an economy where neither money nor exchange were present. And only labour can conceivably be considered as such.”

Yet Mises dismissed the labour-theory for the standard reasons accepted in Vienna in the 1920s: it cannot be used to measure different skill levels, and it cannot be used to apply a market value to natural resources. Both these objections are easily overcome; they are in fact misunderstandings of Marx’s theory. Marx clearly explained how high-skilled work can be measured as a multiple of low-skilled work – and that the labour value embodied in raw materials was simply the work it took to extract and transport them.

And Mises’s work on calculation contains a second valuable insight: it is not trading between enterprises that is the true mediator of supply and demand in a market economy, it is the finance system – which puts a price on capital. This was a perceptive insight, which has relevance today: if we want a postcapitalist economy, not only do we need something better than the market for distributing goods, we also need something better than the finance system for allocating capital.

## TRANSITIONS HAVE THEIR OWN DYNAMICS

It was only the Russian left opposition – above all its leading economist **Evgeny Preobrazhensky** – which understood the centrality of the labour-theory to the transition. For them the goal of the transition was quite simply a rising supply of free, abundant things and the erosion of ‘necessary labour’ as the yardstick of exchange. As in *Red Star*, the early Soviet planners aimed to produce as much as possible so that work would be de-linked from wages and the ability to consume. In Marxist terms, this was understood as ‘abolishing the law of value’.

But the Russian left could only achieve this by promoting heavy industry and state control. By the early 1920s, there was a shortage of everything: to make consumer goods you needed heavy industry and electrification; to feed people you needed to industrialize agriculture. So they urged the concentration of resources in the sectors that would become iconic in Soviet propaganda – power stations, steel works, big machinery. However, they showed great awareness that equilibrium was unlikely to be achieved, and that planning was likely to be anarchic.

In economic terms, the most important thing the Russian Trotskyists left us was probably the idea that a transition phase generates its own dynamics; it is never just the fading of one system and the rise of another.

Trotsky argued that in the first phase of the Soviet-style transition, both a private business and a consumer sector had to be maintained. It was hubris to suggest the plan could, at this stage, allocate better than the market in consumer goods. Plus, the rouble had to remain exchangeable on the world market. Furthermore, all plans were effectively hypotheses. “The plan”, said Trotsky, “is checked and, to a considerable degree, realized through the market.”

To make even the crudest adjustment requires realtime information feedback. But in a heavily bureaucratic society, where to dissent was to invite a one-way ticket to the gulag, such feedback was strangled. Hence Trotsky’s emphasis on reviving workplace democracy. You needed a rolling plan: a combination of plan and market, with money used as both a medium of exchange and store of value. And you needed workers’ democracy.

Money, said Preobrazhensky, would function normally in those sectors you could not plan, while in the planned sector of the economy, money would start to function as a technical accounting device. And while the aim is for the plan to swamp the market, the market could be expected to constantly ‘pollute’ the plan.

Trotsky wrote that in the absence of a “universal mind (…) that could register simultaneously all the processes of nature and society” and which “could a priori draw up a faultless and exhaustive economic plan”, the promotion of workers’ democracy – which had been abolished – is required. Only if human beings, with freedom of speech, became the sensors and feedback mechanisms for the planning system could this crude calculating machine work.

Preobrazhensky, Trotsky and their collaborators were the last Marxists with any political power who conceived the transition in terms of labour value. Preobrazhensky was executed in 1936 and Trotsky assassinated in 1940. But their ideas contain powerful implications for the world we face today.

Under neoliberalism, the market sector is immensely more complex than in the 1920s and 30s. The USA in 1933 was vastly different from Russia in 1933 – but they were much closer to each other than the America of today is to the America of 30 years ago. Today’s consumer sector is not only much bigger, it is much more atomized. Production and consumption overlap – and the economy already includes information goods whose marginal production cost is zero. We also have Negri’s social factory to contend with: a highly financialized and granular consumer society, in which what we buy has become a question of identity.

So lesson one is: the market sector is much more complex and therefore more difficult to replicate or improve on through planning.

## CYBER-STALINISM

Over the past 20 years, Paul Cockshott and Allin Cottrell – a computer scientist and an economics professor – have worked tirelessly on trying to plan an economy using computations.

Cockshott and Cottrell argue that improvements in computer power, together with the application of advanced maths and information theory removes, in principle, the Hayek/Robbins objection: that the planner can never have better realtime information than a market. What’s more, unlike the left in the calculation debate (**Lange**), they say the computer model we would need for planned production should use the labour theory of value, and not try to simulate the results of supply and demand. Cockshott and Cottrell understand that the labour-theory gives you a measuring stick against which both market interactions and non-market ones can be compared, and a way of calibrating the transition.

They see the planning process as similar to a modular computer program. It would collate the demands of consumers and producers; work out the cost and resources needed to meet them; formulate targets; calculate in advance the resource implications; check the feasibility of the plan; and then instruct producers and suppliers of services to hit the targets.

But unlike the Russian left of the 1920s, Cockshott and Cottrell don’t see the plan as provisional, or something for the state sector alone to execute; it has to be drawn up and tested in detail, down to enterprise level and individual products.

Once you remove the market, they argue, there are no other signals for the boss of a factory, or care home, or coffee bar to rely on. They have to know exactly what they’re supposed to be producing. Theirs, in other words, is the methodology for a completely prescriptive plan, as imagined (and ridiculed) by Trotsky in the 1930s.

Historically, of course, sophisticated planning at this level is something the Soviet Union never achieved: by the 1980s there were 24 million different products in the USSR but the entire planning apparatus could track the price and quantity of only 200,000 of them, and the actual central plan just 2,000. As a result, factories met the targets for the small number of goods they were supposed to make, and fulfilled all other requests chaotically or not at all.

In Cockshott and Cottrell’s model, money exists in the form of ‘labour tokens’ which are paid to everybody according to the amount of labour they do, minus a flat tax to pay for state services. This allows for consumer choice. Where supply and demand for a product get out of kilter, the central planners adjust the price to achieve a short-term rebalancing. Then, over a longer period, they compare the prices commanded by a sector, or production unit, to the actual amount of labour it is doing. In the next round of the plan, they boost production in the areas where prices are higher than the labour used and cut them where lower. Planning is ‘iterative’; it is adjusted constantly. But it is not mere trial and error: Cockshott and Cottrell believe the inputs and outputs can be calculated in advance, and they propose a detailed algorithm to do so.

The computing challenge is, first and foremost, to calculate what the value of an hour’s labour should be (=how much work is going into each product). The researchers argue this is doable with a supercomputer, but only if it uses data-processing techniques that prioritize the most relevant information.

The plan itself – the allocation of resources – is an easier calculation to do, because you do not run the program blind. You ask it feasible questions such as: how much of a product is going to be sold this year; how much of the various inputs do we normally use; what’s the seasonal variation, what’s the expected demand, how much should we order within the boundaries of past experience? They conclude: “With modern computers, one could envisage computing an updated list of labour values daily and preparing a new perspective plan weekly – somewhat faster than a market economy is able to react.”

In fact, the researchers make a strong case that, because of its decreased complexity, a planned economy would need fewer calculations than a market one.

In an ambitious application of these principles, Cockshott and Cottrell proposed an outline for a planned economy in the European Union. They explained not just how you would calculate the plan, but also how you would have to restructure the economy to implement it. And it is here that the assumptions behind their methodology become clear: for all their dislike of what went wrong in the 1930s, this is still a form of *cyber-Stalinism*.

In their model, the de-marketization of Europe would be driven not primarily by nationalization, but by reforming the monetary system so that money began to reflect labour value. Banknotes would be overprinted with a ‘labour time figure’, allowing people to see the mismatch between what they were being paid for their labour and what they were being charged for products. Over time, the authors expect people to choose products closer to their true value; consumer choice becomes a mechanism for squeezing profit out of the system. A law banning exploitation would allow workers to claim against excess profit-making; the final aim being to eradicate profit altogether. Banking would effectively cease to be a means of building up capital, which would be done by the state, using direct taxation. The finance industry would be wiped out.

The huge service Cockshott and Cottrell perform here is not the one they intend. They show that to fully plan an early-21st-century developed economy, it would have to be stripped of its complexity, see finance removed completely, and have radical behavioural change enforced at the level of consumption, workplace democracy and investment.

Where the dynamism and innovation would come from is not addressed. Nor how the vastly enlarged cultural sector would come in.

In order for the plan to work, society in this project has to go back to being ‘plannable’. Workers interface with every aspect of Cockshott and Cottrell’s plan via their workplace. Likewise, the financial complexity that has come to characterize modern life has to disappear (no credit cards, no payday loans, etc.). And of course there are no network structures in this model and no peer-produced free stuff.

Though the researchers decry the dogmatic idiocy of Soviet planning, their world view remains that of a hierarchical society, of physical products, of a simple system where the pace of change is slow. The model they’ve produced is the best demonstration yet of why any attempt to use state planning and market suppression as a route to postcapitalism is closed.

In a complex, globalized society, where the worker is also the consumer of financial services and micro-services from other workers, the plan cannot outdo the market unless there is a retreat from complexity and a return to hierarchy. A computerized plan, even if it measured everything against labour values, might tell the shoe industry to produce shoes, but it could not tell Beyoncé to produce a surprise album marketed only via social media, as she did in 2013. Nor would the plan be concerned with the most interesting thing in our modern economy: free stuff. Such a plan would see time spent curating a Wikipedia page, or updating Linux, exactly the same way as the market sees it: wasteful and incalculable.

**André Gorz** once wrote that the source of capitalism’s superiority to Soviet socialism was its “instability, its diversity (…) its complex multiform character, comparable to that of an ecosystem, which continually triggers new conflicts between partially autonomous forces that can neither be controlled nor placed once and for all in the service of a stable order”.

If the rise of the networked economy is beginning to dissolve the law of value, planning has to be the adjunct of something more comprehensive.

#### MODES OF PRODUCTION

The mode of production is one of the most powerful ideas to come out of Marxist economics. It influenced a wide range of historical thinkers, and has come to shape our view of the past. Its starting point is the question: what is the prevailing economic system based on?

**Feudalism** was a system based on obligation: peasants were obliged to hand part of their produce to the landowner and do military service for him; he in turn was obliged to provide the king with taxes, and supply an army on demand.

Shakespeare is a great witness to the moment when one mode of production begins to falter and another begins to rise. In the England of Shakespeare’s history plays, the mainspring of that system had broken down. By the time Richard III was slaughtering his rivals, the power network based on obligation had been polluted by money: rents paid in money, military service paid for with money, wars fought with the aid of a cross-border banking network stretching to Florence and Amsterdam. Shakespeare’s kings and dukes killed each other because money had made all power based on obligation susceptible to being overthrown.

Feudalism was replaced with **merchant capitalism**, which was based on trade, conquest and slavery. Shakespeare saw what this new kind of economy was doing to the human character: empowering us with knowledge, yet leaving us susceptible to greed, passion, self-doubt and power-craziness on a new scale.

Merchant capitalism paved the way for **industrial capitalism**.

In Marx’ materialist view of history, the difference between feudalism and early capitalism materialised in critical changes in the social and economic system. At root, the change is driven by new technologies.

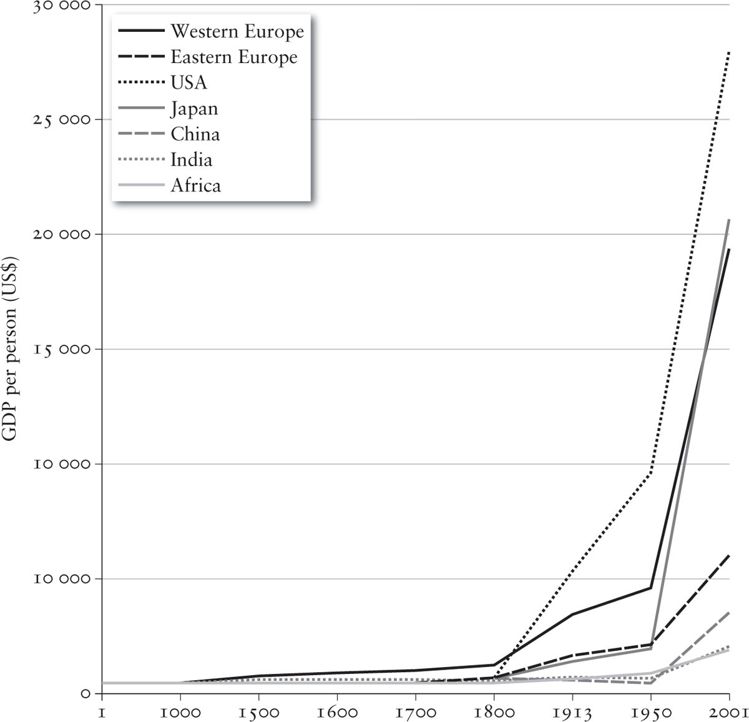
For Marx, a mode of production describes a set of economic relationships, laws and social traditions that form the underlying ‘normal’ of a society.

In feudalism, the concept of lordly power and obligation pervaded everything. In capitalism, the equivalent force is the market, private property and wages.

This is where the mode of production concept gets challenging: the changes are so huge that we are never comparing like with like. So when it comes to the economic system that replaces capitalism, we should not expect it to be based on something as purely economic as the market, nor on something as clearly coercive as feudal power.

For Marx, the modes of production concept led to a strict historical sequence: there are various pre-capitalist forms of society, where the rich get rich through legally authorized violence; then there is capitalism, where the rich get rich through technical innovation and the market; finally there is communism, where the whole of humanity gets richer because there is abundance instead of scarcity. That sequence is open to criticism from two angles. First, it can read like a quasi-mythology: human destiny looks pre-programmed to happen in three logical stages. Second, when used by historians looking backwards, it can lead to the application of simple labels to complex societies, or to imputing economic motives that simply did not exist.

But if we avoid the myth of inevitability and assert simply, “there must come a time when there is relative abundance, compared to the scarcity that has driven all previous economic models”, then Marx was only saying the same thing as Keynes said in the early 1930s: one day there will be enough goods to go around and the economic problem will be solved. “For the first time since his creation,” Keynes wrote, “man will be faced with his real, his permanent problem – how to use his freedom from pressing economic cares (…) to live wisely and agreeably and well.”



In fact, this three-phase view of world history is supported by data we now possess (and which Marx and Keynes did not) on population and GDP. Until around the year 1800, only Western Europe experienced a tangible rise in GDP per person, mainly after the conquest of the Americas; then, with the Industrial Revolution, per person growth took off spectacularly in Europe and America until around 1950, when its rate of acceleration increased again. Today, as the graph above shows, GDP per person rates are rising all across the world. The stage where all the lines go close to vertical is the one Keynes and Marx allowed themselves to imagine – and so should we.

## DRIVERS OF TRANSITION

What caused feudalism to collapse and capitalism to rise? Naturally that’s the subject of a gigantic historical debate. But if we think the transition to postcapitalism is going to be of a similar magnitude, then there are lessons to learn about the interplay between internal and external factors; the role of technology versus the importance of ideas.

Up to about 1300, feudal agriculture had been dynamic, raising GDP per head in Western Europe faster than anywhere else. But famines, beginning in the 1300s, signalled a decline in the efficiency of the feudal systems of land use: productivity could not keep up with population growth. Then, in 1345, the English king Edward III defaulted on his country’s debts, wiping out the Florentine bankers who had lent him the money. Though containable, this was just one symptom of a general malaise, and a warning that crisis in one part of feudal Europe might spread to all parts.

In 1347 the Yersinia pestis bacillus hit Europe. By 1353, the Black Death had killed at least a quarter of Europe’s population. Its economic impact was stark: the supply of labour collapsed. Suddenly farm workers, who had been the lowest of the low, could command higher wages.

Once the plague was over, a surge of economic struggles broke out – peasant revolts in France and England, worker rebellions in the key manufacturing towns of Ghent and Florence. Historians call this the general crisis of feudalism. Though the revolts failed, the economic balance was now tipped in favour of the urban worker and the peasant. “Agricultural rents collapsed after the Black Death and wages in the towns soared to 2 and even 3 times the levels they had held”, according to historian David Herlihy.

With wool prices high, many landowners switched from crops to sheep pasture – and unlike wheat, wool was for trading, not consuming. The old tradition of peasants being forced to do military service was replaced increasingly by cash-based mercenary warfare. And with workers scarce, labour-saving devices began to be invented.

Basically, the rat that brought the Black Death into Cadiz in 1347 triggered an external shock that helped to collapse an internally weakened system.

The second driver of change was the growth of banking. Banking had already become the sure-fire way to amass a fortune in the undocumented space between the official classes of feudalism: nobles, knights, gentry, clerks, etc. The Medicis created a transnational super-company in the 15th century, and the Fugger family of Augsburg overtook them once their influence declined.

Banking does not just systematically inject credit into feudal society, it injects an alternative network of power and secrecy. The Fugger and Medici families wielded unofficial leverage over kings through business – even as their activities were seen as borderline un-Christian. Everyone involved connived in the creation of a subtextual form of capitalism within the officially feudal economy.

The third big driver of capitalism’s take-off was the conquest and pillage of the Americas, beginning in 1503. This created a flow of money to non-aristocrats way in excess of anything generated internally by the market growing, organically, within late feudalism. In a single load, the conquistadores stole 1.3 million ounces of gold from Peru. The huge amount of wealth imported into early modern Europe boosted market forces, craft manufacturing and banking. And it strengthened the power of monarchic states over the old independent towns and the now impoverished dukes in their castles.

Finally, there was the printing press. Gutenberg put the first one to use in 1450. In the following 50 years, 8 million books were printed – more than all the scribes of Christendom had managed to produce since Roman times. The print-shop itself had a revolutionary nature: it brought together scholars, priests, authors and metalworkers into a business environment that no other social situation within feudalism could have created. Printed books established checkable knowledge and authorship. They fuelled the rise of Protestantism, the scientific revolution and humanism. If the medieval cathedral was full of meaning – an encyclopaedia in stone – printing destroyed the need for it. Printing transformed the way human beings think.

To sum up:

The feudal model of agriculture collided first with environmental limits and then with a massive external shock – the Black Death. After that, there was a demographic shock: too few workers for the land, which raised their wages and made the old feudal obligation system impossible to enforce. The labour shortage also made technological innovation necessary. The new technologies that underpinned the rise of merchant capitalism were the ones that stimulated commerce (printing and accountancy), the creation of tradable wealth (mining, the compass and fast ships) and productivity (mathematics and the scientific method).

Present throughout the whole process is something that looks incidental to the old system – money and credit – but which is destined to become the basis of the new system. Many laws and customs are shaped around ignoring money; in high feudalism credit is seen as sinful. So when money and credit burst through the boundaries and create a market system, it feels like a revolution. Then, the new system gains further energy from the discovery of a virtually unlimited source of free wealth in the Americas.

A combination of all these factors took a set of people who had been persecuted or marginalized under feudalism – humanists, scientists, craftsmen, lawyers, radical preachers and bohemian playwrights like Shakespeare – and put them at the head of a social transformation. At key moments, though tentatively at first, the state switched from hindering the change to promoting it.

If we accept the four-factor account given above, the dissolution of feudalism is not primarily a technology story. It is a complex interplay between failing economics and outside shocks. These new technologies would have been useless without a new way of thinking and the external disruptions that allowed new behaviours to flourish.

The classic Marxist explanation of what destroyed feudalism was “its contradictions”: the class struggle between peasant and nobility. For later materialist historians, however, the emphasis was on the failure and stagnation of the old system, giving rise to a “general crisis”. Perry Anderson, the New Left historian, drew an important general conclusion from this: that the key symptom of a mode of production transition is not the vigorous eruption of the new economic model. “On the contrary, the forces of production typically tend to stall and recede within the existent relations of production.”

When we look at the possibility of transition beyond capitalism, we have to expect a similar complex interplay between technology, social struggle, ideas and external shocks. But our minds reel from the scale of it. We have a fatal tendency to push the dynamics of transition into simple categories and simple chains of cause and effect.

But if such a society is structured around human liberation, not economics, unpredictable things will begin to shape it. Maybe, for instance, the most obvious thing to the Shakespeare of 2075 will be the total upheaval in gender relationships, or sexuality, or health.

The thing that is corroding capitalism, barely rationalized by mainstream economics, is information. The equivalent of the printing press and the scientific method is information technology and its spillover into all other forms of technology, from genetics to healthcare to agriculture to the movies.

The modern equivalent of the long stagnation of late feudalism is the stalled fifth Kondratieff cycle, where instead of rapidly automating work out of existence, we are reduced to creating bullshit jobs on low pay, and many economies are stagnating.

The equivalent of the new source of free wealth? It’s not exactly wealth: it’s the externalities – the free stuff and wellbeing generated by networked interaction. It is the rise of non-market production, of un-ownable information, of peer networks and unmanaged enterprises. The internet, says French economist Yann Moulier-Boutang, is “both the ship and the ocean” for the modern-day conquest of a new world. In fact, it is the ship, the compass, the ocean and the gold.

The modern-day external shocks are clear: energy depletion, climate change, ageing populations and migration. They are altering the dynamics of capitalism and making it unworkable in the long term. They have not yet had the same impact as the Black Death – but any financial collapse could easily wreak havoc on the highly fragile urban societies we’ve created. As Katrina demonstrated in New Orleans in 2005, it does not take the bubonic plague to destroy social order and functional infrastructure in a modern city.

Once you understand the transition in this way, the need is not for a supercomputed Five Year Plan, but for a gradual, iterative and modular project. Its aim should be to expand those technologies, business models and behaviours that dissolve market forces, eradicate the need for work and progress the world economy towards abundance.

The socialists of the early 20th century were absolutely convinced that nothing preliminary was possible within the old system. “The socialist system”, **Preobrazhensky** once insisted categorically, “cannot be built up molecularly within the world of capitalism.”

The most courageous thing an adaptive left could do is to abandon that conviction. It is entirely possible to build the elements of the new system molecularly within the old. In the cooperatives, the credit unions, the peer-networks, the unmanaged enterprises and the parallel, subcultural economies, those elements already exist. We have to stop seeing them as quaint experiments; we have to promote them with regulation just as vigorous as that which capitalism used to drive the peasants off the land or destroy handicraft work in the 18th century.

# **The rational case for panic**

# Climate change

In climate summits, a complacent calm rules. The focus is on scenarios for ‘what will happen’, on the climate catastrophe that awaits if we allow global temperatures to rise by more than two degrees Celsius above pre-industrial levels. But in the edge-places of the world the catastrophe is happening already. If we listened to those whose lives are being destroyed by floods, deforestation and encroaching deserts, we would better understand what is coming: the total disruption of the world.

In its 2014 update to their fifth report, the Intergovernmental Panel on Climate Change (IPCC) warned unequivocally: failure to stop the rise in carbon emissions would increase the likelihood of ‘severe, pervasive and irreversible impacts for people and ecosystems’. This is a report by scientists. They do not sign off on words like ‘severe, pervasive and irreversible’ before weighing them carefully.

If you’re a mainstream economist, what’s coming will feel like an ‘exogenous shock’, an extra source of chaos within an already chaotic situation.

The clash between info-tech and market structures is, on its own, driving us towards an important turning point. Even if the ecosphere was in a steady state, our technology would still be pushing us beyond capitalism.

But any project to move beyond capitalism has to shape its priorities around the urgent challenge of climate change. Either we react in time and confront it in a relatively orderly way, or we don’t – and disaster follows.

In January 2014, John Ashton, a career diplomat and formerly the British government’s special representative on climate change, stated: “The market left to itself will not reconfigure the energy system and transform the economy within a generation.”

According to the International Energy Agency, even if all the announced emissions-reduction plans, all the carbon taxes and all the renewables targets are achieved – that is, if consumers don’t revolt against higher taxes, and the world does not de-globalize – then CO2 emissions will still rise by 20 % by 2035. Instead of limiting the warming of the earth to only a two-degree increase, the temperature will rise 3.6 degrees.

Faced with a clear warning that a 4.5-billion-year-old planet is being destabilized, those in power decided that a 25-year-old economic doctrine held the solution. They resolved to incentivize lower carbon use by rationing it, taxing it and subsidizing the alternatives. Since the market is the ultimate expression of human rationality, they believed it would spur the correct allocation of resources to meet the target of the two-degree cap. It was pure ideology and it has been proved plain wrong.

To remain under the two-degree threshold, we – as a global population – must burn no more than 886 billion tonnes of carbon between the years 2000 and 2049 (according to the International Energy Agency). But the global oil and gas companies have declared the existence of 2.8 trillion tonnes of carbon reserves, and their shares are valued as if those reserves are burnable. As the Carbon Tracker Initiative warned investors: “they need to understand that 60–80% of coal, oil and gas reserves of listed firms are unburnable” – that is, if we burn them, the atmosphere will warm to a catastrophic degree.

Yet rising energy prices are a market signal. They tell energy firms that it’s a good idea to invest in new and more expensive ways of finding carbon. In 2011, they invested $674 billion on exploration and development of fossil fuels: tar sands, fracking and deep-sea oil deposits. Then, as global tensions increased, Saudi Arabia decided to collapse the price of oil, with the aim of destroying America’s new hydrocarbon industries, and in the process bankrupting Putin’s Russia.

This, too, acted as a market signal to American drivers: buy more cars and do more miles. Clearly, somewhere, the market as a signalling mechanism has gone wrong.

Look at it as an investment problem: either the global oil and gas companies are really worth much less than their share prices indicate, or nobody believes we’re going to cut our carbon use. The stock market valuations of the top 200 carbon burners totals $4 trillion; much of that could be lost if we persuade ourselves to stop burning carbon. This is not just scaremongering by excitable climate NGOs. In 2014 the governor of the Bank of England, Mark Carney, warned the world’s insurance giants that if the two-degree target is significantly breached it would “threaten the viability of your business model”.

The lesson is: a market-led strategy on climate change is utopian thinking.

What are the obstacles to a non-market-led strategy? First, the lobbying power of the carbon burners. Between 2003 and 2010, climate-denial lobby groups received $558 million from donors in the USA. ExxonMobil and the ultra-conservative Koch Industries were major donors until 2007, when there was a tangible shift to funds channelled through anonymous third parties, under pressure of journalistic scrutiny. The outcome? The world spends an estimated $544 billion on subsidizing the fossil fuel industry.

But that’s just the most obvious part of climate lunacy. After the failure to agree a global path to the two-degree target at the 2009 Copenhagen Summit, energy companies realigned their efforts in order to pressure national governments for specific outcomes, always with the aim to slow the introduction of carbon targets, or to exempt specific firms.

Yet strong, positive action can work. In Germany, the sudden shutdown in 2011 of the nuclear programme after Fukushima, combined with heavy investment in renewable energy, has done to the power utilities what any hard application of carbon targets would do to market forces. It has shattered them.

In the German system, wind, solar and other renewable generators get the first opportunity to supply energy. If there’s sun, and a healthy breeze, as there was on 16 June 2013, they can generate half of all demand. On that day, the gas and coal producers – who cannot easily adjust the output of their power stations, only switch them on and off – were forced to pay the German electricity grid €100 per megawatt to take unwanted electricity off their hands. The price of carbon energy had gone negative.

According to climate science, in order to keep the temperature rise to around two degrees, we need to halve the amount of CO2 we burn by 2050. In response, various campaigns and research units have designed scenarios to show technically how this 50 % reduction might be achieved. Though they all differ as to the mix of alternative energy types and the way they model energy efficiency, they have one thing in common: nearly all of these scenarios conclude that it will be cheaper in the long term to go low carbon, than not.

The IEA’s Blue Map Scenario, which halves CO2 emissions by 2050, sees the world spending $46 trillion more on energy investments than it would if nothing changed. But because the scenario involves burning less fuel, even by the most conservative estimate it still saves $8 trillion. Greenpeace, whose Energy Revolution Scenario is taken as a reference point in the wider industry debate, wants to achieve the target with no new nuclear power plants and less emphasis on carbon capture and storage, so that by 2050 85 % of all energy is produced from wind, wave, solar and biomass technologies. Even here, however, with much higher upfront investment costs and a bigger social change, the world saves money in the end. In all the scenarios where carbon burning is halved, there is a spin-off benefit because the transition creates new jobs. Building and maintaining machines to generate electricity from wave, wind and solar power is a more technologically advanced solution than burning gas or coal.

Saving the planet, then, is technologically feasible and economically rational, even when measured in cash terms. What stands in the way is the market.

The problem is, first, that the market-led transition is too slow and too vulnerable to pressure from consumers (who naturally want cheap energy) and from fossil-fuel producers. Secondly, as political pressure on governments rises, energy turns into geopolitics. Germany’s move against nuclear energy came at the cost of giving Russia the power to hold the German economy to ransom during the Ukraine crisis. America’s turn to fracking – in addition to its environmental impacts – altered the global balance of power so significantly that Saudi retaliation has in the space of a year collapsed the price of oil by more than half.

Seen against the rising geopolitical tensions, the prospects for global deals do not look positive. More and more, the climate talks conducted in these conferences come to resemble the peace treaties that paved the way to the Second World War.

State intervention into the market – through financial incentives for renewables and targets for reduced carbon emissions – can work. To meet the critical emissions targets we are going to have to use some centralized control. Governments – at state and regional level – will need to take control, and probably ownership, of all big carbon producers. As the energy distribution grid becomes ‘smart’, using technology to predict and balance supply with demand, it makes sense for the grid to be a public resource.

If a state-influenced price mechanism can’t achieve the right mix of investment in renewables, nuclear energy and residual carbon burners, then it will have to be done using state ownership, direct control and targets. This is the ultimate conclusion we have to draw from John Ashton’s comments quoted above: if the market is not working then, given the urgency, state allocation must be tried.

Technically, if you use planning rather than market incentives, it will be easier to create a mix of ‘base load’ power generated by nuclear and cleaner carbon, with the rest coming from renewables: according to scenarios from Greenpeace to the IEA and other variants, that is what is needed to achieve the two-degree target.

The attempt to create a non-market economy and a low-carbon system are clearly interdependent. But while there are many routes to a postcapitalist economy, the potential variants of what we can do to address the climate emergency are limited.

There is, in short, a rational case for panic about climate change.

Even if, as some supporters of ‘deep ecology’ argue, the earth would be better off without us, it is to us that the task of saving it falls.

# Demography

The rational case for panic is compounded when you consider the interrelatedness of climate and the other great uncontrolled variant: population.

Demographic ageing is potentially as big an external shock as climate change – and its impact will be much more immediately economic.

The UN’s projections are not disputed. The world’s population, currently above 7 billion, will rise to 9.6 billion by 2050, with almost all growth occurring in the global south. By 2050, there will be more people in developing countries than there are people on earth right now.

Globally, the proportion of older people to those of working age will increase. In 1950, 5 % of the world’s population was over 65; by the mid-21st century it will be 17 %. But it’s in the rich world where the problems of ageing will turn into a shock.

Here, the crucial problem is the age-dependency ratio: the number of retired people compared to the number of those of working age. In Europe and Japan, there are currently 3 workers for every 1 retired person. By 2050 the ratio will be 1 for 1. And though most developing countries will continue to have mainly young populations, China bucks the trend due to its one-child policy. By 2050 China will be the ‘oldest’ of the big economies in the world, with a projected median age of 53.

The growing age imbalance is irreversible. It’s not just caused by people living longer due to better healthcare and higher incomes; the main driver of the imbalance is falling birth rates, as women gain control of their bodies through contraception, and as education, advances in human rights and urbanization give them greater independence.

The UBS economist George Magnus says rapidly ageing societies “present us with an existential threat to the social and economic models we built after World War Two”. In the developed world, demographic change will create stress in three critical areas of economic life: financial markets, public spending and migration.

#### Pensions

Overall, about $50 trillion is held in pension funds, insurance funds and public pension reserves across the OECD countries, well above their combined annual GDP. Given our busted economic model on life support, the risk to that money is ‘high’. The problem is that an ageing population means a smaller potential workforce, lower growth and lower output per head. Though the picture varies from one country to the next – with some smaller developed countries such as Norway extremely well provided for – the global situation is bleak: either the retired elderly must live on much less, or the financial system must deliver spectacular returns. But to deliver spectacular returns it must become more global and take more risks.

#### Government debt

The second area in which we are certain to face the stress of ageing populations is government debt. An ageing population boosts demand for spending on health, public pensions and long-term care. In 2010, Standard & Poor’s calculated that unless governments across the world reined in public pension provision, their debts, by 2050, would sink the world.

Since then, governments have indeed slashed their pension liabilities: eligibility has been tightened, retirement ages raised and the link to inflation eroded in many countries. When, after this carnage of obligations, S&P recalculated the potential damage, it found the median net debt of developed countries was projected to be 220 % of GDP by 2050, with the big developing countries running average debts of 130 %. Japan still tops the league in 2050, at 500 % (compared to 250 % now) and America will be looking at a debt pile 3 times the current $17 trillion.

In this projection, demographic ageing is set to make state finances unsustainable all across the developed world. S&P’s analysts predict that by 2050, even with pension cuts, 60 % of all countries in the world will have credit ratings below investment grade: it will be suicidal for anybody who does not want to risk losing their money to lend to them.

More than 50 % of all private pension money is currently invested in government debt. Furthermore, typically 2/5 of it is in foreign debt. No matter how safe a company pension fund looks now, if 60 % of all countries’ bonds become junk – so that to lend to them becomes a crazy proposition – the private pension system will not survive.

#### Migration

By 2050, there will be 1.2 billion more people of working age in the world than today – most of them living in squalor.

A stunning half of all the projected population growth between now and 2050 will take place in just 8 countries, 6 of which are in sub-Saharan Africa. To find jobs, people from the population-boom countries will migrate to the cities; the land, as we’ve seen, is already under stress from climate change. In the cities, many will join the world’s slum-dwelling population, which already stands at a billion – and increasing numbers will attempt illegal migration to the rich world.

We can trace these three systemic disruptions happening at once (financial, climatic and demographic) to their cause: an economic system in disequilibrium with its environment and insufficient to satisfy the needs of a rapidly changing humanity.

These external shocks should be the alarm call. Climate change does not present us with a choice of market or non-market routes to meeting carbon targets. It mandates either the orderly replacement of market economics or its disorderly collapse in abrupt phases. Ageing populations run the risk of tanking the world’s financial markets, and some countries will have to wage a social war on their own citizens just to stay solvent. If that happens it will make what happened in Greece after 2010 look like just a few bad summers. In the poorest countries, the combined impact of population growth, institutional corruption, skewed development and climate effects will create, for certain, tens of millions of landless poor people whose most logical choice will be to migrate.

On its own, the rise of info-capitalism would have offered a range of outcomes. You could – just – imagine a stagnant Western economy kept alive with high debt, bailed-out banks and printed money, were it not for the demographic crisis. You could – without climate change – imagine a postcapitalist transition path led by the gradual, spontaneous rise of non-market exchange and peer-production alongside a system faltering under its internal contradictions. More Wikipedias, more Linux, more generic drugs and public science, the gradual adoption of Open Source forms of work – and maybe a legislative curb on the info-monopolies. This is the airport book scenario for postcapitalism: a good idea, implemented in a crisis-free environment, at a pace determined by ourselves.

But the external shocks call for action that is centralized, strategic and fast. Only the state, and states acting together, can organize such action. The starkness of the climate target and the clarity of the technical ways of responding to it mean it will require more planning and more state ownership than anybody expects or even wants. The possibility of a world in which 60 % of states are bankrupted by the cost of their ageing populations means we need structural solutions, not financial ones.

# **Project Zero**

Paul Mason calls his large-scale postcapitalist project **Project Zero** – because its aims are a zero-carbon energy system; the production of machines, products and services with zero marginal costs; and the reduction of necessary labour time as close as possible to zero.

He envisions a distributed project: a set of linked, modular, non-linear tasks that lead to a probable outcome. Decision-making is decentralized; the structures needed to deliver it emerge during the delivery; targets evolve in response to realtime information. And on the precautionary principle, we should use the new breed of simulation tools to model every proposal virtually before we enact it for real.

If I could write the rest of this chapter as post-it notes on a whiteboard, it would better express the modularity and interdependence. The best method for doing a distributed project is for small groups to pick a task, work on it for a bit, document what they’ve done and move on.

Some of its principles:

* The first principle is to understand the limitations of human willpower in the face of a complex and fragile system. The Bolsheviks failed to understand it; to be fair, most mainstream politicians of the 20th century also failed to understand it. Now we understand it well. The solution is to test all proposals at small scale and model their macro-economic impact virtually many times over before we attempt them at a large scale.

Evgeny Preobrazhensky, the murdered Soviet economist, predicted that as market forces began to disappear, economics would become a discipline for designing the future, not just analysing the past. “This is quite a different science”, he said, “this is social technology.” He called for an “extremely complex and ramified nervous system of social foresight and planned guidance”. Note the terms: foresight and guidance, not command and control; a nervous system, not a hierarchy. All the Soviets had was command, control and the bureaucratic hierarchy, but we have the **network**. When it comes to organizing change, the network can function better than a hierarchy, but only if we respect the complexity and fragility that comes with it.

* The second principle for designing the transition is ecological sustainability. External shocks will probably hit us in sequence: short-term localized energy shortages in the next decade; ageing and migration challenges over the next 30 years; and the catastrophic outcomes of climate change after that. The task is to develop technologies that respond to these problems through sustainable growth.
* The third principle is: the transition is not just about economics. It will have to be a human transition. The new kinds of people being created by networked economies come with new insecurities and new priorities. We already have a different perception of the self from the one in our grandfathers’ and grandmothers’ heads. Our roles as consumers, lovers, communicators are as important to us as our role at work.

We will still face a challenge similar to the one the early soviet republics faced with workers: specific social groups may have short-term priorities that clash with the wider priorities of the economy and the ecosystem. That’s what networks are for: to argue things out and model the alternative possibilities. We will need new forms of democracy to arbitrate between valid competing claims.

* A fourth principle should be: attack the problem from all angles. With the rise of networks, the capacity for meaningful action is no longer confined to states, corporations and political parties; individuals and temporary swarms of individuals can be just as powerful agents of change.

We should broaden our thinking so that solutions can be found through a mixture of small-scale experiment (which involves for instance the community of thinkers and activists around the peer-to-peer movement – credit unions or co-ops, for example), proven models that can be scaled up and top-down action by states.

Ex: If the solution in finance is to create a diverse, socialized banking system, then setting up a credit union attacks the problem from one direction, outlawing certain forms of speculation attacks it from another, while changing our own financial behaviour attacks it from still another angle.

* The fifth principle for a successful transition is that we should maximize the power of information. The difference between a smartphone app today and the programs on PCs 20 years ago is that the modern apps self-analyse and pool performance data. Almost everything on your phone and computer is feeding back information on your choices to a corporate owner. Soon the information will be flowing from ‘smart’ electricity meters, public transport passes and computer-controlled cars. The aggregated data of our lives – which will soon include our driving speed, our weekly diet, our body mass and heart rate – could be a hugely powerful ‘social technology’.

Once the Internet of Things is rolled out, we are at the real take-off point of the information economy. From then on, the key principle is to create democratic social control over aggregated information, and to prevent its monopolization or misuse by states and corporations.

The Internet of Things will complete a vast social ‘machine’. Its analytical power alone could optimize resources on a scale that significantly reduces the use of carbon, raw materials and labour. Making the energy grid, the road network and the tax system ‘intelligent’ are just the most obvious things on the task list. But the power of this emerging vast machine does not lie solely in its ability to monitor and feed back. By socializing knowledge, it also has the power to amplify the results of collective action.

The socialists of the belle époque eyed the monopolies and cartels with glee: seize them, and control of society from the centre becomes easy, they believed. Our project is to decentralize control – but there could be no better tool for doing so than the vast physical information machine that is being created.

Top-level goals:

1. Rapidly reduce carbon emissions so that the world has warmed by only two degrees Celsius by 2050, prevent an energy crisis and mitigate the chaos caused by climate events.

2. Stabilize the finance system between now and 2050 by socializing it, so that ageing populations, climate change and the debt overhang do not combine to detonate a new boom-bust cycle and destroy the world economy.

3. Deliver high levels of material prosperity and wellbeing to the majority of people, primarily by prioritizing information-rich technologies towards solving major social challenges, such as ill health, welfare dependency, sexual exploitation and poor education.

4. Gear technology towards the reduction of necessary work to promote the rapid transition towards an automated economy. Eventually, work becomes voluntary, basic commodities and public services are free, and economic management becomes primarily an issue of energy and resources, not capital and labour.

In pursuit of these goals, it will be important in all the economic changes we make to send transparent signals.

The sociologist Max Weber believed the rise of capitalism was driven not by technology but by a ‘new spirit’ – a new attitude to finance, machinery and work, not the things themselves. But for a new spirit of postcapitalism to take off, we need to focus on where the externalities are being generated and distributed – and to actively propagate an understanding of the phenomena. We need to answer: what is happening to the social benefit that network interactions produce, and which capitalist accounting can’t usually see? Where does it fit in?

Let’s consider a concrete example. Coffee shops today often advertise ‘our beans are organic’ – i.e. this is how we are serving a greater social good. What they mean subtextually is “and you are paying a bit more for the feelgood factor”. But the signal is only partially transparent.

Now reimagine the coffee shop as a co-op, paying its workers well, ploughing profits back into activities that promote social cohesion, or literacy, or post-prison rehabilitation, or better public health. The important thing is to indicate – as clearly as the ‘organic’ label on the coffee does – what social good is being produced and who will benefit from it.

It’s more than a gesture: it’s a transparent signal, just as the loaded cannon placed at the gate of the Cromford cotton factory in England in 1771 was a transparent signal. You could erect a sign saying “we sell coffee for a profit and that helps us give away psycho-social counselling for free”.

## Elements of the project plan

* Construct an accurate simulation of economies as they exist today. Its work would be Open Source: anybody could use it, anybody could suggest improvements and the outputs would be available to all. It would most likely have to use a method called ‘agent-based modelling’ – that is, using computers to create millions of virtual workers, households and firms, and letting them interact spontaneously, within realistic boundaries, with the ability to draw on realtime data.
* Switch off the neoliberal privatization machine. It’s a myth that the state is passive in neoliberalism; in reality the neoliberal system cannot exist without constant, active intervention by the state to promote marketization, privatization and the interests of finance. It typically deregulates finance, forces government to outsource services and allows public healthcare, education and transport to become shoddy, driving people to private services. A government that was serious about postcapitalism would give a clear signal: there will be no proactive extension of market forces.
* Reshape markets to favour sustainable, collaborative and socially just outcomes, which create positive externalities.
* The state has to ‘own’ the agenda for responses to the challenges of climate change, demographic ageing, energy security and migration.
* Governments have to do something clear and progressive about debts. It would be sensible to combine controlled debt write-offs with a 10- to 15-year global policy of ‘financial repression’: that is, to stimulate inflation, hold interest rates lower than the inflation rate, remove people’s ability to move money into non-financial investments or offshore, and thus inflate away the debts, writing off the part that remained.

To be brutally clear, this would reduce the value of assets in pension funds, and thus the material wealth of the middle classes and the old; and by imposing capital controls you would be partially deglobalizing finance. But this is only a controlled way of doing what the market will do via chaos if, as S&P predicts, 60 % of all countries see their debt reduced to junk by 2050. In conditions of near-stagnation and long-term zero interest rates, the income generated by pension fund investments is in any case already minimal.

* In a network-based transition, collaborative business models are the most important thing we can foster. But it is not enough for them to be just non-profit businesses; the postcapitalist form of the co-op would try to expand non-market, non-managed, non-money-based activity against the baseline of market activity it starts from. What we need are co-ops where the legal form is backed up by a real, collaborative form of production or consumption, with clear social outcomes.
* Likewise we should not fetishize the non-profit aspect of things. There can be profitable peer-to-peer lenders, cab companies and holiday rental firms, for example, but they would have to operate under regulations that limited their ability to contribute to social injustice.
* Suppress or socialize monopolies. The creation of monopolies to resist prices falling towards zero is capitalism’s most important defence reflex against postcapitalism. To promote the transition, this defence mechanism has to be suppressed. Where possible, monopolies would be outlawed and rules against price fixing strictly enforced. For 25 years, the public sector has been forced to outsource and break itself into pieces; now would come the turn of monopolies such as Apple and Google. Where it’s dysfunctional to break up a monopoly – as for example with an aircraft manufacturer or a water company – the solution advocated by Rudolf Hilferding 100 years ago would suffice: public ownership.

The strategic aim of public ownership would be to cheapen the cost of basic necessities, so that the total socially necessary labour time can fall and more stuff gets produced for free.

If true public provision of water, energy, housing, transport, healthcare, telecoms infrastructure and education was introduced into a neoliberal economy, it would feel like a revolution. Privatizing these sectors over the past 30 years was the means by which the neoliberals pumped profitability back into the private sector: in countries stripped of productive industries, such service monopolies constitute the core of the private sector and, with the banks, the backbone of the stock market.

And providing these services at cost price, socially, would be a strategic act of redistribution, vastly more effective than raising real wages.

* Let market forces disappear. In a highly networked, consumer-oriented society, where people have an individual-centred model of economic need, markets are not the enemy. This is the major difference between a postcapitalism based on info-tech and one based on command planning. There is no reason to abolish markets by diktat, as long as you abolish the basic power imbalances that the term ‘free market’ disguises.

Once firms are forbidden to set monopoly prices, and a universal basic income is available, the market is actually the transmitter of the ‘zero marginal cost’ effect, which manifests as falling labour time across society.

But in order to control the transition, we would need to send clear signals to the private sector, one of the most important of which is this: profit derives from entrepreneurship, not rent.

Patents and intellectual property would be designed to taper away quickly. Simultaneously, the increased use of Creative Commons licences – where inventors and creators voluntarily waive some rights in advance – would be promoted.

The results of state-funded research should be essentially free at the point of use – moving everything produced with public funding into the public sphere.

People who are driven only by material reward would go on creating and innovating – because the market would still reward entrepreneurship and genius. But, as befits a society where the rate of innovation is becoming exponential, the reward period is going to be shorter.

The only sector where it is imperative to suppress market forces completely is wholesale energy. To meet climate change with urgent action, the state should take ownership and control of the energy distribution grid, plus all big carbon-based suppliers of energy. These corporations are already toast, as the majority of their reserves cannot be burned without destroying the planet. To incentivize capital investment in renewables, this technology would be subsidized.

* Socialize the finance system.

🡪 Restructure the banking system into a mixture of utilities earning capped profit rates; non-profit local and regional banks; credit unions and peer-to-peer lenders; and a comprehensive state-owned provider of financial services. The state would stand explicitly as lender of last resort to these banks.

States are forced with each financial crisis to ratchet up the implicit bailout guarantee that stands behind banks, pension funds and insurers. Morally, if the risks are socialized, then so should the rewards.

🡪 Leave a well-regulated space for complex financial activities. The aim would be to ensure the global finance system could, in the short to medium term, return to its historic role: efficiently allocating capital between firms, sectors, savers and lenders, etc.

However, over the long transition to postcapitalism, an elaborate finance system is going to run into a brick wall. Credit creation works only if it makes the market sector grow – so the borrower can repay the loan with interest. If the non-market sector begins to grow faster than the market sector, the inner logic of banking would break down. At this point, if we want to maintain a complex economy, where the finance system acts as a realtime clearing house for a multitude of needs, then the state (via the central bank) would have to take on the task of creating money and providing credit, as advocated by supporters of so-called ‘positive money’.

The aim is to promote the transition to an economy where many things are free, and where returns on investment come in a mixture of money and non-monetary forms. By the end of the process, decades in the future, money and credit would have a much smaller role in the economy, but the accounting, clearing and resource mobilization functions currently provided by banks and financial markets would have to exist in a different institutional form. This is one of the biggest challenges for postcapitalism. The objective is to maintain complex, liquid markets in tradable instruments, while removing the possibility that there will ever be payback in monetary form (because the profit and ownership system disappears). One model could be what’s happened with carbon.

The intention is to promote the most complex form of capitalist finance compatible with progressing the economy towards high automation, low work and abundant cheap or free goods and services.

* With energy and banking socialized, the aim in the medium term would be to retain as extensive as possible a private sector in the non-financial world, and to keep it open to a diverse and innovative range of firms.

Neoliberalism, with its high tolerance for monopolies, has actually stifled innovation and complexity. If we break up the tech monopolies and the banks, we could create an active space for smaller companies to replace them and deliver – at last – on the unfulfilled promise of info-tech.

* A universal basic income guaranteed by the state.

In the postcapitalist project, the purpose of the basic income is radical: it is (a) to formalize the separation of work and wages and (b) to subsidize the transition to a shorter working week, or day, or life. The effect would be to socialize the costs of automation.

It’s only a transitional measure for the first stage of the postcapitalist project.

The ultimate aim is to reduce to a minimum the hours it takes to produce what humanity needs. Once this happens, the tax base in the market sector of the economy would be too small to pay for the basic income. Wages themselves would increasingly be either social – in the form of collectively provided services – or disappear.

So as a postcapitalist measure, the basic income is the first benefit in history whose success measure is that it shrinks to zero.

* Information, work and the network

Info-capitalism is based on asymmetry: the global corporations get their market power from knowing more – more than their customers, suppliers and small competitors. The simple principle behind postcapitalism should be that the pursuit of information asymmetry is wrong – except when it comes to privacy, anonymity and security issues.

In addition, the aim should be to push information and automation into types of work where they are held back at present because cheap labour removes the need to innovate.

Managing means organizing predictable resources – people, ideas and things – to produce a planned outcome. But many benign outcomes of network economies are unplanned. And the best human process for dealing with volatile outcomes is teamwork – which used to be called ‘cooperation’.

Cooperative, self-managed, non-hierarchical teams are the most technologically advanced form of work. Yet large parts of the workforce are trapped in a world of fines, discipline, violence and power hierarchies – simply because the existence of a cheap labour culture allows it to survive.

A crucial goal for the transition process would be to trigger a third managerial revolution: to enthuse managers, trade unions and industrial system designers about the possibilities inherent in a move to networked, modular, non-linear team work.

The atmosphere in the modern video game design workshop shows that play and work can alternate quite freely and produce results. Among guitars, sofas, pool tables covered in piles of discarded pizza boxes, there is of course still exploitation. But modular, target-driven work, with employees enjoying a high degree of autonomy, can be less alienating, more social, more enjoyable – and deliver better results.

As we pursue these goals, a general pattern is likely to emerge; the transition to postcapitalism is going to be driven by surprise discoveries made by groups of people working in teams, about what they can do to old processes by applying collaborative thinking and networks.

Faced with group-think and convergence, either in the design stage of an economic project or in its execution, networks are a brilliant tool for allowing us not just to dissent, but to secede and start our own alternative.

One specific problem is how to record the experience of failure into persistent data that allows us to retrace our steps, amend them and roll out the lessons across the whole economy. Networks are bad at memory; they are designed so that memory and activity sit in two different parts of the machine. Hierarchies were good at remembering – so working out how to retain and process lessons will be critical. The solution may be as simple as adding a recording and storing function to all activities, from the coffee shop to the state. Neoliberalism, with its love of creative destruction, was happy to dispense with the memory function.

What we are looking for are rapid technological leaps that make things cheaper to produce and benefit the whole of society.

We need to be unashamed utopians. The most effective entrepreneurs of early capitalism were exactly that, and so were all the pioneers of human liberation.