

Chapter 4

Money and Economy

is digital cash making us careless?

The idea of the future being different from the present is so repugnant to our conventional modes of thought and behaviour that we, most of us, offer a great resistance to acting on it in practice.

John Maynard Keynes

A few years ago, I was walking down a street in West London when a white van glided to a halt opposite. Four men stepped out and slowly slid what looked like a giant glass coffin from the rear. Inside it was a large shark.

The sight of a live shark in London was slightly surreal, so I sauntered over to ask what was going on. It transpired that the creature in question was being installed in an underground aquarium in the basement of a house in Notting Hill. This secret subterranean lair should, I suppose, have belonged to Dr Evil. To local residents opposing deep basement developments, it probably did. A more likely candidate might have been someone benefiting from the digitally networked nature of global finance. A partner at Goldman Sachs, perhaps, the investment bank immortalised by Matt Taibbi in *Rolling Stone* magazine as ‘a great vampire squid wrapped around the face of humanity’. Or possibly the owner was the trader known as the London Whale, who lost close to six billion dollars in 2012 for his employer, JP Morgan, by electronically betting on a series of highly risky and somewhat shady derivatives called credit default swaps.

London real estate had fast become a serious place to stash funny money, so maybe the house belonged to a slippery individual dipping their fingers into the bank accounts of a corrupt foreign government or international institution. In the words of William Gibson, the feted sci-fi prophet and writer, London is now ‘where you go if you successfully rip off your Third World nation’. (Not that the nation necessarily has to be Third World.)

Whichever ruthless predator the house belonged to, something fishy was

underfoot. My suspicion was that it had something to do with unchecked financial liberalisation, but also how the digital revolution is turning the economy into a winner-takes-all online casino.

The shift of power away from locally organised labour to globally organised capital has been occurring for a while, but recent developments have accelerated and accentuated this. Digitalisation hasn't directly enabled globalisation, however it certainly hasn't restrained it either, and one of its negative side effects has been a tendency towards polarisation, both in terms of individual incomes and market monopolies.

Throughout most of modern history, around two-thirds of the money made in developed countries was typically paid as wages. The remaining third was paid as interest, dividends, or other forms of rent to the owners of capital. Yet since 2000, the amount paid to capital has increased substantially while that paid to labour has declined, meaning that real wages have remained flat or fallen for large numbers of people.

The shift towards capital could have an innocent analog explanation. China, home to an abundant supply of low-cost labour, has pushed wages down globally. This situation could soon reverse, as China runs out of people to move to the cities, their pool of labour shrinks due to ageing, and Chinese wages increase. Alternatively, low-cost labour may shift somewhere else — possibly Africa.

Another explanation for the weakened position of labour is that humans are no longer competing against each other, but against a range of largely unseen digital systems. It is humans that are losing out. Given that automated systems will take on an increasing number of roles and responsibilities, a future challenge for governments worldwide will therefore be the allocation of resources (and perhaps taxes) between people and machines.

Same as it ever was?

Ever since the invention of the wheel, we've used our inventions to supplement our natural abilities. This has always displaced certain skills. And for every increase in productivity and living standards, there have been downsides. Just to take one example: fire cooks our food and keeps us warm, but it can burn down our houses and fuel our enemy's weapons.

During the industrial revolution, machines enhanced human muscle and we outsourced as many dirty and dangerous jobs to machines as we could. More recently, we've used machines to supplement our thinking by using them for tedious or repetitive tasks. What's different now is that digital technologies, ranging from advanced robotics and sensor networks to basic forms of artificial intelligence and autonomous systems, are threatening areas where human activity or input was previously thought essential or unassailable.

In particular, software and algorithms with near-zero marginal cost are now being used for higher-order cognitive tasks. This is not digital technology being used alongside humans, but as an alternative to them. This is not digital *and* human. This is digital *instead of* human.

Losing an unskilled job to an expensive machine is one thing, but if highly skilled jobs are lost to cheap software, where does that leave us? What skills do the majority of people have left to sell if machines and automated systems start to think? You might be feeling pretty smug about this because you believe that your job is somehow special or terribly difficult to do, yet the chances are that you are wrong, especially when you take into account what's happening to the cost and processing power of computers. It's not so much what computers are capable of now, but what they could be capable of in ten or 20 years time that you should be worried about.

I remember ten or so years ago reading that if you index the cost of robots to humans with the year 1990 as the base (where all labour is equally worth 100), the cost of robots had fallen to 18.5. In contrast, the cost of people had risen to 151. More recently, *Der Spiegel* magazine reported that the cost of factory automation relative to human labour has fallen by 50 per cent since 1990.

Over the shorter term, it's unlikely that there will be much to worry about. Even over the longer term, it's probable that there will still be jobs that idiot-savant software won't be able to do very well — or do at all. But unless we wake up to the fact that we're training people to compete head-on with machine intelligence, there's going to be trouble eventually. This is because we're filling peoples' heads with knowledge that's applied according to sets of rules, which is exactly what computers do. We should be teaching people to do things that machines cannot. We should be teaching people to constantly ask

questions, find fluid problems, think creatively, and act empathetically. We should be teaching high abstract reasoning, lateral thinking, and interpersonal skills.

If we don't, a robot may one day come along with the same cognitive skills as us, but with a price tag of just \$999. That's not \$999 a month, that's \$999 in total. Forever. No lunch breaks, holidays, childcare, sick pay, or strike actions, either. How would you compete with that?

If you think that's far-fetched, Foxconn, a Chinese electronics company, is designing a factory in Chengdu that's totally automated — no human workers involved whatsoever. I'm fairly sure we'll eventually have factories and machines that can replicate themselves, too, including software that writes its own code and 3D printers that can print other 3D-printers.

Once we've invented machines that are smarter than us, these machines may go on to invent their own machines — which we then may not be able to understand — and so on ad infinitum. Let's hope these machines are nice to us.

It's funny that our addiction to machines today, especially mobile devices, is undermining our interpersonal skills and eroding our abstract-reasoning and creativity, when these skills are exactly what we'll need to compete against the machines tomorrow. Who ever said that the future couldn't be deeply ironic?

There are more optimistic outcomes, of course. Perhaps the productivity gains created by these new technologies will eventually show up, and the resulting wealth will be more fairly shared, offsetting our ageing populations and shrinking workforces. Perhaps there'll be huge cost savings made in healthcare or education. It's highly unlikely that humans will stop having interpersonal and social needs, and even more unlikely that the delivery of all these needs will be within the reach of robots. In the shorter term, it's also worth recalling an insightful comment attributed to NASA in 1965: 'Man is the lowest-cost ... all-purpose computer system which can be mass-produced by unskilled labour.'

But if the rewards of digitalisation are not equitable or designers decide that human agency is dispensable or unprofitable then a bleaker future may emerge, one characterised by polarisation, alienation, and discomfort.

Money for nothing

Tim Cook, the CEO of Apple, who recently announced the largest annual profit in corporate history (\$53.4 billion), once responded to demands that Apple raise its return to shareholders by saying that his aim was not to make more profit. His aim was to make better products, from which greater financial returns would flow. This makes perfect sense to anyone except speculators carelessly seeking short-term financial gains at the expense of broader measures of benefit or value. As Jack Welch, the former CEO of General Electric, once said, 'shareholder value is the dumbest idea in the world'.

It was Plato who pointed out that an appetite for more could be directly linked with bad behaviour. This led Aristotle to draw a black and white distinction between the making of things and the making of money. Both philosophers would no doubt have been disillusioned with high-frequency trading. In 2013, algorithms traded \$28 million worth of shares in 15 milliseconds after Reuters released manufacturing data milliseconds early. Doubtless money was made here, but for doing what?

Charles Handy, the contemporary philosopher, makes a similar point in his book *The Second Curve*: when money becomes the point of an activity then something is wrong. Money is merely a secure way to hold or transmit value (or 'frozen desire', as James Buchan more poetically put it). Money is inherently valueless unless exchanged for something else.

Yet the aim of many digital companies appears to be to make money by selling themselves to someone else. Beyond this, their ambition appears to be market disruption by delivering something faster or more conveniently than before. But to what end ultimately? What is their great purpose? What are they for beyond saving time and delivering customers to advertisers?

In this context, high-frequency trading is certainly clever, but it's socially useless. It doesn't make anything other than money for a small number of individuals. Moreover, while the risks to the owners of the algorithms are almost non-existent, this is not generally the case for society as a whole. Huge profits are privatised, but huge losses tend to be socialised.

Connectivity has multiple benefits, but linking things together means that any risks are linked, with the result that systemic failure is a distinct possibility. So far, we've

been lucky. ‘Flash Crashes’ such as the one that occurred on 6 May 2010 have been isolated events. On that date, high-speed-trading algorithms decided to sell trillions of dollars worth of stocks in seconds, causing momentary panic. Our blind faith in the power and infallibility of algorithms makes such failures more likely to happen and more severe when they do. As Christopher Steiner, author of *Automate This: how algorithms came to rule our world*, writes, ‘We’re already halfway towards a world where algorithms run nearly everything. As their power intensifies, wealth will concentrate towards them.’

Similarly, Nicholas Carr has written that ‘Miscalculations of risk, exacerbated by high-speed computerized trading programs, played a major role in the near meltdown of the world’s financial system in 2008.’ Digitalisation helped to create the subprime mortgage market, and expanded it at a reckless rate. But negative network effects meant that the market imploded with astonishing speed, partly because financial networks were able to spread panic as easily as they had been able to transmit debt.

Network effects can create communities and markets very quickly, but they can destroy them with velocity and ferocity, too. Given that the world’s financial markets, which influence our savings and pensions, are increasingly influenced by algorithms, this is a major cause for concern. After all, who’s analysing the algorithms that are doing all of the analysing?

Out of sight and out of mind

Interestingly, it’s been shown that individuals spend more money when they use digital or electronic money rather than physical cash. Because digital money is somehow invisible or out of sight, our spending is less careful. And when money belongs to someone else — a remote institution rather than a known individual, for instance — any recklessness and impulsiveness is amplified.

Susan Greenfield claims that digitalisation creates a mindset of disposability, and has linked this to modern financial problems. If, as a trader, you have grown up playing rapid-fire computer games in digital environments, you may decide that similar thrills can be achieved via trading screens without any direct real-world consequences. You can become desensitised.

Looking at numbers on a screen, it's easy to forget that these numbers represent money and ultimately people. Having no contact with either can be consequential. Worse, we tend to take less notice of information when it's delivered on a screen amid a deluge of other digital distractions.

Carelessness can have other consequences, too. Large basement developments such as the one I stumbled upon represent more than additional living space. They are symbolic of a gap that's opening up between narcissistic individuals who believe they can do anything they want if they can afford it and others who are attempting to hang on to some semblance of physical community. A wealthy few even take pleasure seeing how many local residents they can upset, as though this were some kind of glorious computer game. Of course, in the midst of endless downward drilling and horizontal hammering, the many have one thing that the few will never have: enough.

Across central London, where a large house can easily cost ten million pounds, it's not unusual for basement developments to include underground car parks, gyms, swimming pools, and staff quarters, although the latter are technically illegal. It's fine to stick one of nature's most evolved killing creatures 15 metres underground, but local councils draw a line in the sand with Filipino nannies.

The argument for downward development is centred on the primacy of the individual in modern society. It's their money (digital or otherwise), and they should be allowed to do whatever they like with it. There isn't even a need to apologise to neighbours about the extended noise, dirt, and inconvenience. The argument against such developments is that it's everyone else's sanity and that neighbourhoods and social cohesion rely on shared interests and some level of civility and cooperation.

If people start to build private cinemas with giant digital screens in basements, this means they aren't frequenting public spaces such as local cinemas, which in turn affects the vitality of the area. In other words, an absence of reasonable restraint and humility by a handful of self-centred vulgarians limits the choices enjoyed by the broader community.

This isn't totally the fault of digitalisation, far from it, but the idea that an individual can and should be left alone to do or say what they like is being amplified by digital technology. This is similar, in some respects, to the way in which being seated

securely inside a car seems to bring out the worst in some drivers' behaviour towards other road users.

Access to technology, especially technology that's personal and mobile, facilitates remoteness, which in turn reduces the need to interact physically or consider the feelings of other human beings. Remote access in particular can destroy human intimacy and connection, although on the plus side such technology can be used to expose or shame individuals who do wrong in the eyes of the broader community.

In ancient Rome, there was a law called Lex Sumptuaria that restrained public displays of wealth and curbed the purchasing of luxury goods. Similar sumptuary laws aimed at superficiality and excess have existed in ancient Greece, China, Japan, and Britain. Perhaps it's time to bring these laws back — or at least to levy different rates of tax or opprobrium on immodest or socially divisive consumption, or on digital products that damage the cohesiveness of the broader physical community.

What's especially worrying is that studies suggest that wealth beyond a certain level erodes empathy for other human beings. Maybe the shift from physical to digital interaction and exchange is doing much the same thing.

It's not just the wealthy who are withdrawing physically. Various apps are leading to what some commentators are calling the 'shut-in economy'. This is a spin-off from the on-demand economy, whereby busy people, including those that work from home, are not burdened by household chores. They can use an app to order not only groceries or fast food, but also just about any item they would have traditionally gone shopping for, laundry services, and even housemaids and cleaners. As one food-delivery service, DoorDash, says: 'NEVER LEAVE HOME AGAIN.'

Where have all the jobs gone?

I'd like to dig a little deeper into the question of whether computers and automated systems are creating or destroying wealth, and what happens to anyone who becomes irrelevant to the needs of the digital economy.

The digitally networked nature of markets is making some people rich, but also spreading wealth around far more than you might think. Globally, the level of inequality between nations is lessening and so is extreme poverty. In 1990, for example, 43 per cent

of people in emerging markets lived in extreme poverty, defined as existing on less than one dollar per day. By 2010, this figure had shrunk to 21 per cent.

Or consider China. In 2000, around 4 per cent of Chinese households were considered to be middle class. By 2012, this had increased to two-thirds, and by 2022 it's predicted that almost half of the Chinese population will be middle class, defined as having annual household incomes of between US \$9,000 and \$16,000. This has more to do with demographics and deregulation than digitalisation, but, by accident or design, global poverty has been reduced by half in 20 years.

Nevertheless, the gap between the highest- and lowest-earning members of society is growing and is set to continue with the onward march of digital networks. The novelist Jonathan Franzen says it well: 'The internet itself is in an incredibly elitist concentrator of wealth in the hands of the few while giving the appearance of voice and the appearance of democracy to people who are in fact being exploited by the technologies.'

These days, if you have something that the world feels it needs *right now*, it's possible to make an awful lot of money very quickly, especially if the needed thing can be transmitted digitally. However, the spoils of regulatory and technological change are largely being accrued by people who are highly educated and internationally minded. If you are neither of these things then you are potentially destined for low-paid, insecure work, although at least you'll have instant access to free music, movie downloads, and computer games to pass the time until you die.

There's been much discussion about new jobs being invented, including jobs we can't currently comprehend, but most current jobs are fairly routine and repetitive and therefore ripe for automation. Furthermore, it's unrealistic to expect that millions of people can be quickly retrained and reassigned to do jobs that are beyond the reach of robots, virtualisation, and automation. Losing a few thousand jobs in car manufacturing to industrial robots is one thing, yet what happens if automation removes vast swathes of employment across the globe? What if half of all jobs were to disappear?

In theory, the internet should be creating jobs. In the US between 1996 and 2005, it looked like it might. Productivity increased by around 3 per cent and unemployment fell. But by 2005 (i.e. *before* the global recession), this development started to reverse.

Why might this be so? According to consulting firm McKinsey, manufacturing, computers and related electronics, and information industries contributed about half of US productivity increases since 2000, ‘but reduced (US) employment by 4,500,000 jobs’.

It could be that our new technology, for all its power, can’t compete with simple demographics and sovereign debt. Perhaps, for all its glitz, computing just isn’t as transformative as we think. Yes, we’ve got Facebook, Snapchat, and *Rich Cats of Instagram*, but we still haven’t got moon hotels or roast dinner in a pill, and traffic in many cities moves no faster today than it did a century ago. Yet it’s certainly difficult to argue that nothing’s changing. Between 1988 and 2003, for example, the effectiveness of computers increased a staggering 43-million-fold. Exponential growth of this nature must be creating tectonic shifts somewhere — but where exactly?

In its heyday, in 1955, General Motors employed 600,000 people. Today, Google, a similarly iconic American company, employs around 50,000. Facebook employs only 6,000. More dramatically, when Facebook bought Instagram for one billion dollars in 2012, Instagram had 30 million users, but employed just 13 people full-time. When Facebook bought Whatsapp in 2014, the start-up had just 55 employees, but a market value exceeding that of the entire Sony Corporation. This forced Robert Reich, a former US secretary of labour, to describe Whatsapp as ‘everything that’s wrong with the US economy’. This isn’t because the company is bad — it’s because it doesn’t create jobs.

Another example is Amazon. For each million dollars of revenue that Amazon makes, it employs roughly one person. This is undoubtedly efficient, but is it desirable? Is it progress?

These are all examples of the dematerialisation of the global economy, where we don’t need as many people to produce things, especially when customers can be co-opted as free workers who don’t appear on any balance sheet.

A handful of people are making lots of money from this, and when regulatory frameworks are weak or almost non-existent these sums tend to multiply. For multinational firms, making money is becoming easier, too, not only because markets are growing, but also because huge amounts of money can be saved by using information technology to coordinate production and people across geographies.

Technology vs psychology

If a society can be judged by how it treats those with the least then things are not looking good. Five minutes walk from the solitary shark and winner-takes-all mentality, you can find families that haven't worked in three generations. Many of them have given up hope of ever doing so. They are irrelevant to a digital economy, or more specifically, to what Manuel Castells, a professor of sociology at Berkeley, calls 'informational capitalism'.

Similarly, Japan is not far off a situation where some people will retire without ever having worked and without having moved out of the parental home. In some ways, Japan is unique — for instance, its resistance to immigration. But in other ways, Japan offers a glimpse of what can happen when a demographic double-whammy of rapid ageing and falling fertility means that workforces shrink, pensions become unaffordable, and younger generations don't enjoy the same dreams or disposable incomes as their parents.

Economic uncertainty and geopolitical volatility, caused partly by a shift from analog to digital platforms, can mean that careers are delayed, which delays marriage, which feeds through to low birth rates, which lowers GDP, which fuels more economic uncertainty. This is all deeply theoretical, but the results can be hugely human.

If people don't enjoy secure employment, housing, or relationships, what does this do to their physical and especially psychological state? I expect that a negative psychological shift could be the next big thing we experience unless a coherent 'we' emerges to challenge some of the more negative aspects of not only income inequality, but also the lack of secure and meaningful work for the less talented, the less skilled, and less fortunate.

A few decades ago, people worked in a wide range of manufacturing and service industries and collected a secure salary and benefits. But now, according to Yochai Benkler, a professor at Harvard Law School, the on-demand economy is efficiently connecting people selling certain skills to others looking to buy. This sounds good. It sounds entrepreneurial. It sounds efficient and flexible and is perhaps an example of labour starting to develop its own capital. Yet it's also, potentially, an example of mass consumption decoupling from large-scale employment and of the fact that unrestrained free-markets can be savagely uncompromising.

Of course, unlike machines, people can vote, and they can revolt, too, although I think that passive disaffection and disenfranchisement are more likely. One of the great benefits of the internet has been the ease with which ideas can be transmitted across the globe, yet ideas don't always turn into actions. The transmission of too much data or what might be termed 'too much truth' is also resulting in what Castells describes as 'informed bewilderment'. This may sound mild, but if bewilderment turns into despair and isolation, there's a chance this could feed into radicalisation, especially when the internet is so efficient at hosting communities of anger and transmitting hatred.

There's also evidence emerging that enduring physical hardship and mental anguish not only creates premature ageing, which compromises the immune and cardiovascular system, but also produces a lasting legacy for those people having children. This is partly because of their own reduced capacity to care for their children, and partly because many of the subsequent diseases can be passed on genetically. A study, co-led by George Slavich at UCLA, says that there is historical evidence for such claims and cites the fact that generations born during recessions tend to have unusually short lifespans. Research with monkeys also suggests that if animals perceive they have a lower social rank, their pro-inflammatory genes become more active. This may be applicable to humans perceiving that they are becoming digital serfs.

Poorer individuals are certainly more attuned to injustice, especially when they've never known anything else. Yet perhaps it's neither the absolute wealth nor relative income levels of the rich that so offend, but the fact that it's now so easy to see what you haven't got. Social media spreads images of excess abundantly and exuberantly.

A narrowing of focus

In the Victorian era, when wealth was polarised, there was at least a shared moral code, a broad sense of civic duty, and collective responsibility. People, you might say, remained human. Nowadays, increasingly, individuals are purely looking out for themselves.

Individualism has created a culture that's becoming increasingly venal, vindictive, and avaricious. This isn't just true in the West. In China, there is anguished discussion about individual callousness and an emergent culture of compensation. The debate was initiated back in 2011 when a toddler, Wang Yue, was hit by several vehicles in Foshan,

a rapidly growing city in Guangdong province, and a video of the event was posted online. Despite the fact she was clearly hurt, no vehicles stopped and nobody bothered to help, until a rubbish collector picked the two-year-old girl up. She later died in hospital.

Another incident, also in China, saw two boys attempting to save two girls from drowning. The boys failed and were made to pay compensation of around 50,000 yuan (nearly double the average annual salary) each to the parents for not saving their children.

Such incidents are rare, but they aren't unknown and do perhaps point toward a world that's becoming more interested in money than mankind — a world that is grasping and litigious, where trust and the principle of moral reciprocity are under threat. You can argue that we are only aware of such events due to digital connectivity, which is probably true, and that both sharing and volunteering are in good health. Yet you can also argue that the transparency conjured up by connectivity and social media is making people more nervous about sticking their necks out. In a world with no secrets, ubiquitous monitoring, and perfect memory, people have a tendency to conform.

Hence we click on petitions online rather than actually doing anything. I was innocently eating my breakfast recently when I noticed that Kellogg's were in partnership with Chime for Change, an organisation committed to raise funds and awareness for girls' education and empowerment through projects promoting education, health, and justice. How were Kellogg's supporting this? By asking people to share a selfie 'to show your support'. To me, this is an example of internet impatience and faux familiarity. It personifies the way that the internet encourages ephemeral acts of empathy and belonging that are actually nothing of the sort.

As for philanthropy, there's a lot of it around, yet much of it has become, as one wag rather succinctly put it, 'money laundering for the soul'. Philanthropy is becoming an offshoot of personal branding. It's buildings as giant selfies, rather than the selfless or anonymous love of humanity. One pleasing development that may offset this trend is crowdfunding, whereby individuals fund specific ideas with micro-donations. At the moment, this is largely confined to inventions and the odd artistic endeavour, but there's no reason why crowds of people with small donations can't fund altruistic ideas, or even interesting individuals with a promising future.

I sometimes wonder why we haven't seen a new round of uprisings in the West.

Thanks to digital media, we all know all about the haves and the have-yachts. It's even easy to find out where the yachts are moored, thanks to free tracking apps. Then again, we barely know our own neighbours these days, living, as we increasingly do, in digital bubbles where friends and news stories are filtered according to preselected criteria. The result is that we know more and more about the people and things we like, but less and less about anything or anyone outside of our existing preferences and prejudices.

Putting aside cognitive biases such as inattentional blindness — which means we're often blissfully unaware of what's happening in front of our own eyes — there's also the thought that we've become so focussed on ourselves that focusing anger on a stranger five minutes up the road is a bit of stretch. This is especially true if you're addicted to status updates of your daily existence or looking at photographs of cute animals online.

Mugged by reality

Are many people out there thinking about how Marx's theory of alienation might be linked to social stratification and an erosion of humanity? I doubt it, but the fall of communism can be connected with the dominance of individualism and the emergence of self-obsession.

This is because before the fall of the Berlin Wall in 1989, there was an alternative ideology and economic system that acted as a counterweight to the excesses of capitalism and individualism. Similarly, in many countries, unions and an agile and attentive left took the sting out of any political right hooks. Then in the 1990s, there was a dream called the internet. But the internet is fast becoming another ad-riddled venue for capitalism, where, according to Jeff Hammerbacher, an early Facebook engineer, 'The best minds of my generation are thinking about how to make people click ads.' The early dream of digital democracy has also soured, because it turns out that a complete democracy of expression attracts voices that are 'stupid, angry, and have a lot of time on their hands'. This is a Jonathan Franzen again, although he reminds me of another writer, Terry Prachett, who pointed out that 'Real stupidity beats artificial intelligence every time.'

To get back to the story in hand, the point here is that if you take away any

balancing forces, you end up not only with tax-shy billionaires, but also with income polarisation and casino banking — not to mention systemic financial crashes, another of which will undoubtedly be along shortly, thanks to our stratospheric levels of debt, the globally connected nature of risk and the corruption, and the villainy endemic in emerging markets. It's possible that connectivity will create calm rather than continued volatility, but I doubt it. More likely, a relatively insignificant event, such as a modest rise in US interest rates, will spread panic and emotional contagion — at which point, anyone still living in a digital bubble will get mugged by reality.

Coming back to some good news, a significant economic trend is the growth of global incomes. This sounds at odds with declining real wages, but I'm talking about emerging, not developed, markets. According to the accountancy firm Ernst & Young, an additional three billion individuals are being added to the global middle class. That's three billion more smartphone-using, Fitbit-wearing, LinkedIn-profiled, hybrid-driving, Instagram obsessives. In China, living standards have risen by an astonishing 10,000 per cent in a single generation. Per capita GDP in China and India has doubled in 16 and 12 years respectively. In the UK, such growth took 153 years.

This development is pleasing, although Ernst & Young's definition of 'middle class' includes people earning as little as ten dollars a day. Many of these people also live behind the Great Firewall of China, so we shouldn't get too carried away with trickle-down economics or the opening up of democracy. Also, what globalisation giveth, automation may soon taketh away — and many may find themselves sinking downward toward working-class or neo-feudal status rather than effervescently rising upward.

According to Pew Research, the percentage of people in the US that think of themselves as middle class fell from 53 per cent in 2008 to 44 per cent in 2014, with 40 per cent now defining themselves as lower class compared to 25 per cent in 2008. Teachers, for example, who have studied hard, worked relentlessly, and benefit society as a whole find themselves priced out of real estate and various socio-economic classifications by the relentless rise of financial speculators.

Even if the newfound global wealth isn't temporary, it simply means the newly better-off can join the developed world in focusing more attention on their own needs at the expense of others.

Of course, it's not numbers that matter. What counts are feelings, especially feelings related to the direction of social mobility. The perception in the West generally is that we are mostly moving in the wrong direction. This can be seen in areas such as health, and it's not too hard to imagine a future world split into two halves: a thin, rich, well-educated, mobile elite and an overweight, uneducated, anchored underclass. This is reminiscent of H.G. Wells' intellectual, surface-dwelling Eloi and downtrodden, subterranean Morlocks in *The Time Machine*. The only difference in our new future might be that it's the global rich that end up living underground, cocooned from the outside world in deep basement developments.

An upside to the downside

It's obviously possible that this outcome could be re-written. It's entirely possible that we will experience a reversal — where honour, courage, or service before self are valued far above commerce, perhaps. This is a situation that existed in Britain and elsewhere not that long ago. It's possible that grace, humility, public spirit, and contempt for vulgar displays of wealth could become dominant social values. Or perhaps a modest desire to leave as small a footprint as possible could become a key driving force.

On the other hand, perhaps a dark dose of gloom and doom is exactly what the world needs. Perhaps the era of cheap money is coming to an end, and an extended period of slow growth will do us all a world of good. A study led by Heejung Park at UCLA found that the trend towards greater materialism and reduced empathy had been partly reversed due to the 2008–2010 economic downturn. In comparison with a similar study looking at the period 2004–2006, US adolescents were less concerned with owning expensive items, while the importance of having a job that's 'worthwhile to society' rose. Whether this is just cyclical or part of a permanent shift is currently impossible to say.

These studies partly link with previous research suggesting that a decline in economic wealth promotes collectivism, and perhaps with the idea that we only truly appreciate things when we are faced with their loss. There aren't too many upsides to global pandemics, rogue asteroids, and financial meltdowns, but the threat of impending death or disaster does focus the long lens of perspective. Perhaps it is only when we're faced with our own extinction that we truly start to live as human beings.

Digital vs physical trust

How else might the digitalisation of money affect our everyday behaviour in the future? I think it's still too early to make any definitive statements about particular technologies or applications, but I do believe that the extinction of cash is inevitable because digital transactions are faster and more convenient, especially for companies. Cash can be cumbersome, too. And, of course, governments and bureaucracies would like to reduce illegal economic activity and collect the largest amount of tax as quickly as possible, thereby increasing their power.

In the US, for instance, it's been estimated that cash costs the American economy \$200 billion a year, not just due to tax evasion and theft, but also due to time-wasting. A study by Tufts University says that the average American spends 28 minutes per month traveling to ATMs — to which my reaction is 'So what?' What are people not doing by 'wasting' 28 minutes going to an ATM? Writing sonnets? Inventing a cure for cancer?

But a wholly cashless society or global e-currency won't happen for a long time, partly because physical money, especially banknotes, is so tied up with notions of national identity (just look at the euro to see how that can go wrong!). Physical money tells a rich story. It symbolises a nation's heritage in a way that digital payments cannot. People in recent years have also tended to trust cash more. The physical presence of cash is deeply reassuring, especially in times of economic turmoil.

In the UK in 2012, more than half of all transactions were cash, and the use of banknotes and coins rose slightly from the previous year. Why? The answer is probably that in 2012 the UK was still belt-tightening, and people felt they could control their spending more easily using cash. Or perhaps people didn't trust the banks or each other. Similarly, in most rich countries, more than 90 per cent of all retail is still in physical rather than digital stores.

We should also be careful not to assume that everyone is like ourselves. The people most likely to use cash are elderly, poor, or vulnerable, so it would be a huge error, in my view, if everyone stopped accepting physical money. It's also a useful Plan B to have a stash of cash in case the economy melts down or your phone battery dies leaving you with no way to pay for dinner. Espousing such a view is probably swimming against the tide though, and I suspect there's huge pent-up demand for mobile and

automated payments.

Globally, cash is still king (85 per cent of all transactions still involve cash, according to one recent study), but in developed economies this tends not to be the case. In the US, about 60 per cent of transactions are now digital, while in the UK there are now more non-cash payments than those using physical cash.

Money will clearly be made trying to get rid of physical money. According to the UK Payments Council, the use of cash is expected to fall by a third by 2022. Nevertheless, circumstances do change, and I suspect that any uptake of new payment technologies is scenario dependent.

I was on the Greek island of Hydra in 2014 and, much to my surprise, the entire economy had reverted to physical money. This was slightly annoying, because I had just written a blog post about the death of cash based on my experience of visiting the island two years earlier. On that previous visit, almost everywhere accepted electronic payments, yet things had changed dramatically. Again, why?

I initially thought the reason was Greek attempts to avoid tax: cash is anonymous. But it transpired that the real reason was trust. If you run a small business supplying meat to a taverna and you're worried about getting paid, you ask for cash. This is one reason why cash might endure longer than some e-vangelists tell us. Cash is a hugely convenient method to store and exchange value and has the distinct advantage of keeping our purchasing private. If we exchange physical cash for digital currency, this makes it easier for companies and governments to spy on what we're doing.

Countless types of cashless transactions

There are many varieties of digital money. We've had credit cards for a very long time. Transactions using cards have been digital for ages and contactless for a while. We've grown used to private currencies, virtual currencies, micropayments, loyalty points, and prepaid cards. We've also learnt to trust PayPal and various peer-to-peer lending sites, such as Zopa and Prosper, although one suspects that, as with ATMs, we are happier taking money out than putting money in.

We're also slowly getting used to the idea of payments using mobile phones. There are even a few e-exhibitionists with currency chips embedded in their own bodies,

and while this might take some time to catch on I can see the value in carrying around money in our bodies. A chip inserted in your jaw or arm is a bit extreme, yet how about a tiny e-pill loaded with digital cash that, once swallowed, is good for \$500 or about a week? There's even digital gold, but, to be honest, I can't get my head around that at all.

The key point here is that all of these methods of transaction are more or less unseen. They are also fast and convenient, which, I would suggest, means that spending will be more impulsive. We will have regular statements detailing our digital transactions, of course, but these will also be digital, delivered to our screens amid a deluge of other digital distractions and therefore widely ignored or not properly read.

Really thinking or mindlessly consuming?

What interests me most here is whether or not attitudes and behaviours change in the presence of invisible money. There is surprisingly little research on this subject, but what does exist, along with my own experience, suggests that once we shift from physical to digital money, things do change.

With physical money (paper money, metal coins, and cheques), we are more likely to buy into the illusion that money has inherent value. We are therefore more vigilant. In many cases, certainly my own, we are more careful. In short: we think. Physical money feels real, so our purchasing (and debt) is more considered. Moreover, our spending is restricted by how much we can carry. And any money in our pockets is usually ours. Digital money and our behaviour with it have no such limitations.

Perhaps the unseen nature of quantitative easing (QE) is similar. What if — instead of pressing a key on a computer and sending digital money to a secondary market to buy financial assets including bonds — we saw fleets of trucks outside central banks being loaded with piles of real money to do the same? I suspect that our reaction would be wholly different. We might even question whether a government buying its own debt is a sensible idea given that the 2008 financial meltdown was caused by the transmission and obfuscation of debt.

Of course, pumping money into assets via QE circles back to create inequality. If you own hard assets, such as real estate, then any price increases created by QE can be a good thing because it increases the value of your assets (often bought with debt, which is

reduced via inflation). In contrast, savers holding cash or people without assets are penalised.

It's a bit of a stretch to suggest QE triggered the Arab Spring, but some people have, pointing out that food-price inflation was a contributory factor, which can be indirectly linked to QE's effects on commodities. If one was a conspiracy theorist, one might even suggest that QE's real aim was to drive down the value of the US dollar, the pound sterling, and the euro at the expense of spiralling hard-currency debt and emerging-economy currencies.

I'm getting back into macro-economics, which I don't want to do, yet it's worth pointing out that in *The Downfall of Money*, the author Frederick Taylor notes that Germany's hyperinflation destroyed not only the middle class, but also democracy itself. As he writes, by the time inflation reached its zenith, 'Everyone wanted a dictatorship.' The cause of Germany's hyperinflation, initially, was Germany failing to keep up with payments due to France after World War I. But it was also caused by too much money chasing too few goods, which has shades of asset bubbles created by QE.

It was economic depression, not inflation per se, that pushed voters toward Hitler, but this, too, has a familiar ring. Across Europe, we are seeing a significant rightwards shift — and one of the main reasons why Germany is reluctant to boost the EU economy is because of the lasting trauma caused by inflation 90 years ago.

If a lasting legacy of QE, debt, networked risk, and a lack of financial restraint by individuals and institutions — all accentuated by digitalisation — is either high inflation or continued depression, things could get nasty, in which case we might all long for the return of cash as a relatively safe and private way to endure the storm.

Crypto-currency accounts

The idea of a global digital economy that's free from dishonest banks, avaricious speculators, and regulation-fixated governments is becoming increasingly popular, especially, as you'd expect, online.

Currencies around the world are still largely anchored to the idea of geographical boundaries and economies in which physical goods and services are exchanged. But what if someone invented a decentralised digital currency that operated independently of

central banks? And what if that currency were to use encryption techniques, not only to ensure security and avoid confiscation or taxation, but also to control the production of the currency? A crypto-currency such as Bitcoin perhaps?

In one scenario, Bitcoin could become an alternative payments infrastructure, competing against the likes of Apple Pay and PayPal as well as against alternative currencies such as frequent-flyer points. But there's a more radical possibility.

What if a country got into trouble (Greece? Italy? Argentina?), and trust in the national currency collapsed? People might seek alternative ways to make payments or keep their money safe. If enough people flocked to something like Bitcoin, a government might be forced to follow suit, and we'd end up with a crypto-currency being used for exports, with its value tied to a particular economy or set of economies.

More radically, how about a currency that rewarded certain kinds of behaviour? We have this already, in a sense, with loyalty cards, but I'm thinking of something more consequential. What if the underlying infrastructure of Bitcoin was used to create a currency that was distributed to people behaving in a virtuous manner? What if, for instance, money could be earned by putting more energy or water into a local network than was taken out? Or how about earning money by abstaining from the development of triple sub-basements or by visiting an elderly person that lives alone and asking them how they are? We could even pay people who smiled at strangers, using eye-tracking and facial-recognition technology on Apple smart glasses or Google contact lenses.

Given what governments would potentially be able to see and do if cash does disappear, such alternative currencies — along with old-fashioned bartering — could prove popular. At the moment, central banks use interest rates as the main weapon to control or stimulate the economy. But this doesn't work if people hoard cash because interest rates are low — or because they don't trust banks. With a cashless society, however, the government has another weapon in its arsenal. What if, in addition to banks charging people for holding money (negative interest rates), governments imposed an additional levy for not spending it?

This is making my head spin, so we should move on to explore the brave new world of healthcare and medicine, of which money is an enabler. But before we do, I'd like to take a brief look at pensions and taxation and then end the chapter by considering

whether the likes of Mark Zuckerberg might actually be OK really.

If economic conditions are good, I'd imagine that money and payments will continue to migrate toward digital formats. Alternatives to banks will spring up, and governments will loosen their tax-take. However, if austerity persists or returns then governments will do everything they can to get hold of more of your money — yet they will be less inclined to spend it, especially on what used to be termed essential services. Taxation based on income and expenditure will continue, but I expect that it could also shift towards assets and wealth and, to a very real extent, individual behaviour.

One of the effects of moving toward digital payments and connectivity is transparency. Governments will, in theory, be able to see what you're spending your money on, as well as how you're living in a broader sense, and relieve you of tax in real time (goodbye annual tax returns). Hence stealth taxation. Have you put the wrong type of plastic in the recycling bin again? That's a fine (tax). Kids late for school again? Fine (tax). Burger and large fries again? You get the idea ...

Governments will seek not only to maximise revenue, but also to nudge people towards certain allegedly virtuous behaviours, so people might be forced to pay for the tiniest transgressions. This, no doubt, will spark rage and resistance, but there could be a tax for that, too.

As for pensions, there are several plausible scenarios, but business as usual doesn't appear to be one of them. The system is a pyramid-selling scheme that's largely bust and needs to be reinvented in many countries. One in seven people in the UK has no retirement savings whatsoever, for instance, and the culture of instant digital gratification would suggest that trying to get people to save a little for later won't meet with much success.

What comes next largely depends on whether the culture of now persists and whether or not responsibility for the future is shared individually or collectively. If the culture of individualism and instant rewards holds firm, we'll end up with a very low safety net or a situation where people never fully retire. If we are able to delay gratification, we'll end up either with a return to a savings culture or one where the state provides significant support in return for significant contributions.

The bottom line here is that pensions are set firmly in the future, and while we

like thinking about the future we don't like paying for it. So what might happen that could change the world for the better and make things slightly more sustainable?

An economy if people still matter

In 1973, the economist E.F. Schumacher's book *Small is Beautiful: a study of economics as if people mattered* warned against the dangers of 'gigantism'. On the one hand, the book was a pessimistic polemic about modernity in general and globalisation in particular. On the other hand, it was prescient and predictive. Schumacher foresaw the problem of resource constraints and foreshadowed the issue of human happiness, which he believed could not be sated by material possessions. He also argued for human satisfaction and pleasure to be central to all work, mirroring the thoughts of William Morris and the Arts and Crafts Movement. They argued that since consumer demand was such a central driver of the economy, one way to change the world for the better would be to change what the majority of people want.

Looked at unkindly, Schumacher's book is an idealistic hippy homily. Looked at more generously, it manages to describe our enduring desire for human scale, human relationships, and technology that is appropriate, controllable, and — above all — understandable. Physical money encourages physical interaction, whereas digital money is hands-off and remote. There's also an environmental consideration: digital transactions require energy, and while any desire for green computing won't exactly stop the idea of a cashless society in its tracks, it may yet restrain it.

There are already some weak signs of a recognition that people matter, which Schumacher may have approved of. Our desire for steampunk fashion and stories, the rise of craft sites such as Etsy, the popularity of live music, vinyl records, and literary festivals, and our attempts at digital detoxing all point to a wish for balance and a world where humans are allowed to focus on what they do best. A world where machines bring us together, not drive us apart. Of course, digital has its part to play here, too: the partly generational shift toward temporary digital access rather than full physical ownership is an encouraging development against what James Wallman terms 'stuffocation'.

Schumacher also warned against the concentration of economic and political power, which he believed would lead to dehumanisation. Decisions should therefore be

made on the basis of human needs rather than the revenue requirements of distantly accountable corporations and governments. In this respect, the internet could go either way. It could bring people together and enable a more locally focussed and sustainable way of living or it could facilitate the growth of autocratic governments and monopolistic transnational corporations. But remember that the dematerialisation of the global economy — the analog to digital switch if you will — is largely unseen and therefore mostly out of mind, so very few people are discussing this at the moment.

To some extent, digital payments are a technology in search of a problem. Cash is easy to carry, easy to use, and doesn't require a power source — except to retrieve it from an ATM. Meanwhile, credit and debit cards are widely accepted worldwide and online, so why do we need additional channels or formats? Maybe we don't. Maybe we don't even need money as much as we think.

One of the problems with the digital economy from an economics standpoint is that, as we've seen, digital companies don't produce many jobs. Yet maybe this isn't a problem. Once we've achieved shelter and security and managed to feed ourselves, the things that make us happy tend to be invisible to economists. The things that fulfil our deepest human needs aren't physical things, but nebulous notions such as love, belonging, and compassion. This is reminiscent of Abraham Maslow's hierarchy of needs, but — unfortunately — self-esteem, altruism, purpose, and spirituality don't directly contribute to GDP or mass employment. Perhaps they should.

It pains me to say it, but maybe Mark Zuckerberg and the other digital dreamers are onto something after all. Maybe the digital economy will change our frame of reference and focus our attention on non-monetary value and human exchange, even if this goes a little crazy at times.

What would Schumacher make of our current economic situation? Maybe he'd see the present day as the start of something terrible. Maybe he'd see it as the start of something beautiful. The future, as always, will be what we make it. As for what Schumacher might make of the shark, I have no idea, although I recently heard that it's now on medication.

[Future Flash 4 — 'Human' — handwritten?]

Santa Fe, New Mexico

December 24, 2018.

Dear A,

I can no longer go to bed with you knowing that someone else might join us at any moment, even in the middle of the night. Even when we are making love, someone inevitably interrupts.

You give priority to being online over and above anything or anyone else at all times. Why? What's so urgent or important? Even the children are getting fed up with it.

I'm leaving you to your own devices.

Goodluck.

D.