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## The IT revolution reassessed part two: Case studies and implications

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### ABSTRACT

The article focuses on two specific case studies – the Internet of Things (IoT) and the rise of Autonomous Vehicles (AVs). The former is already being portrayed as a kind of unquestioned default assumption. The latter are being widely promoted to replace standard vehicles driven directly by humans on conventional roads. The article then outlines salient features of the two most dominant Internet giants, Facebook and Google, with two goals in mind. First, to identify ways to improve our understanding their interior human and cultural aspects and second, to use the insights gained to explore what should be done and by whom – an issue addressed in the third and final paper. Taken together this and the previous paper help define a draft agenda that can be critiqued, modified and put to wider use. The overarching goal is not merely to help moderate the present impacts of IT but to evolve strategies that better serve more constructive, humanly valuable ends.

We rely on technology for almost everything...and yet no society in the world has yet stood up to demand greater control over its digital destiny. No country has committed itself to building a technology that is as fair as it is convenient.

(Fox, 2017)

The new technologies do not entail a radical reshaping of modes of doing things. A driverless car is still a car.

(Das, 2016)

Google's tools are not the objects of value exchange. They do not establish productive consumer-producer reciprocities. Instead they are 'hooks' that lure users into extractive operations and turn ordinary life into a 21 st Century Faustian pact. This social dependency is at the heart of the surveillance project.

(Zuboff, 2015, 82)

### 1. Introduction

The first part of this study considered a sample of publications to explore some of the many contested issues that have arisen between promoters and critics of the IT revolution. It concluded that there are substantive reasons to believe that the Internet, in particular, falls short what it was originally intended to be and, indeed, what it could yet become. It underperforms when assessed for fairness and egalitarian uses. It seriously over-reaches as a medium that's become dedicated to selling and to extracting value from entire populations – usually without their knowledge or permission. Hence the Internet we have is a degraded – and to some extent degrading – version of what it could be had it been designed and implemented differently. That is, according to positive values

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exercised in the public interest, rather than an oppressive, diversionary realm dominated by powerful corporations and providing unlimited opportunities for abuse.

There are obviously many other aspects of the IT revolution, many of which are beyond the scope of an individual paper. So this article focuses on two specific case studies – the Internet of Things (IoT) and the apparently unstoppable rise of Autonomous Vehicles (AVs). The former is already being portrayed as a kind of unquestioned default assumption. The latter are being widely promoted to replace standard vehicles driven directly by humans on conventional roads. The article then outlines salient features of the two most dominant Internet giants, Facebook and Google, with two goals in mind. First, to identify ways to improve our understanding their interior human and cultural aspects and second, to use the insights gained to explore what should be done and by whom – an issue addressed in the third and final paper. Taken together the first two papers help define a draft agenda that can be critiqued, modified and put to wider use. The overarching goal is not merely to help moderate the present impacts of IT but to evolve strategies that better serve more constructive, humanly valuable ends.

How, for example, can people begin to better understand the uses, abuses and limitations of algorithms? How can the vast potential of ‘big data’ be captured and applied in ways that support egalitarian uses within civil societies while avoiding the slide toward becoming an oppressive instrument of power and control? How can the ‘dark’ side of the Internet be rendered less dangerous, less of a continuing threat to the normal operations and general wellbeing of entire societies? How can the increasingly monopolistic and dehumanising aspects of ‘surveillance capitalism’ be moderated and replaced by more open and genuinely participatory forms of economic and social organisation? This alone constitutes a huge and challenging agenda. Yet, behind all such IT-related questions lies another, deeper one, that has arguably been eclipsed by the rampant and all-consuming growth of Internet phenomena. How can humanity employ its vast new technical capacities to moderate its multiple impacts on the global system and, over time, shift toward more far-sighted options that reduce the growing risk of ‘overshoot and collapse’ futures? This is the great question that few people – including Internet entrepreneurs – care to consider. Yet it arguably represents the greatest existential threat in history.

It is helpful to keep in mind the very real possibility that putting all this technical power and capacity to work primarily for the radically limited instrumental purposes of surveillance, advertising and selling may come to be seen as amongst the greatest misuses of human ingenuity ever. So it is time to question the current narratives, structures and dominant values that continue to drive the Internet as we know it. Society as a whole can do far better than to proceed ever further into a cultural desert operated increasingly by remote AI devices for the benefit of a dominant few.

## 2. The internet of things

By now most people will have heard of various forthcoming ‘next big things’ such as ‘augmented reality,’ ‘self-driving cars’ and the ‘Internet of Things’ (IoT). Yet the chances are that they won’t have heard about them from personal or local sources since claims about their alleged benefits don’t originate there. Rather, they are one of many campaigns that originate elsewhere – that is, from a handful of the world’s most powerful organisations and their associates. As things stand entire populations are regularly subjected to powerful marketing operations intended solely to prepare them for miraculous new services that no one has ever wanted or needed. As Morozov and others have suggested ‘the Internet’ is a domain where numerous ‘solutions’ are offered for problems that currently do not exist – a phenomenon he calls ‘solutionism’ (Morozov, 2013). Hence it is difficult to find credible evidence of any real ‘demand’ for an IoT. Rather, it is all about power and accumulation on a vast scale. Powerful organisations insist that the latest innovations are coming anyway. They like to claim that ‘the genie is already out of the bottle’ without any real attention to what this ‘genie’ actually is or what kind of ‘bottle’ it may have escaped from. Subtlety and depth of meaning are vanishingly uncommon in this context. Superficial, overly positive views about high-tech innovation, however, not only reflect a lack of imaginative competence, they also speak volumes about the instrumental priorities of the organisations involved. Yet there should be no lingering doubt that the innovation ‘push’ model is certainly disruptive and frequently dangerous. The reasons are straightforward – it constantly inserts poorly considered random elements into complex social systems that are then forced to adapt, often at considerable cost to people, professions and organisations of many kinds. Reflecting on the 2016 US election one observer commented that:

We have fetishised “disruption”. Governments have stood by and watched it take down all industries in its path – the market must do what the market must do. Only now, the wave is breaking on its shore. Because what the last week of this presidential campaign has shown us is that technology has disrupted, is disrupting, is threatening to upturn the democratic process itself – the best, most stable, most equitable form of governance the world has yet come up with.

(Cadwalladr, 2016)

Despite this an IoT *per se* should not necessarily be considered a categorical mistake. Well-designed devices installed in robust networks with appropriate technical and exacting safety standards would have a variety of uses. A host of specialised applications can be readily envisaged in education, surgery, disaster management and so on. The elderly, disabled and sick could gain greater autonomy and enhanced capability to run their own lives. Potentially positive uses like these may well be unlimited. But the dangers and costs of the IoT as currently envisaged appear to outweigh these benefits.

Standing behind the seductive merchandising are questions such as: who is promoting the IoT? Who stands to gain and who will lose? Can we be sure that it will protect privacy and enhance human wellbeing or will it further erode both? Answering the ‘who’ question is straightforward. The main drivers and beneficiaries of this particular ‘radically transformative innovation’ are the corporate tech giants from Silicon Valley, their like-minded associates and high-tech manufacturers ever on the lookout for new markets. As suggested in the previous paper, they share a particular worldview that continues virtually unchallenged. In fact since the US

presidential election the Neo-Conservative ascendancy has been reinvigorated.<sup>1</sup> Central to its ideology is an assumption that equates 'progress' with single-minded technical innovation and development. Such a view, however, works against shared interests as it arguably rests on category errors and inadequate views of culture, human identity and human autonomy. Such limitations and costs were perhaps best expressed by Lewis Mumford who declared that: 'I have taken life itself to be the primary phenomenon, and creativity, rather than the "conquest of nature," as the ultimate criterion of man's biological and cultural success' (Mumford, 1971). He would, of course, be unemployable in Silicon Valley.

### 2.1. Disruptions and consequences

In some ways the high-tech sector resembles a wayward child that challenges authority and ignores boundaries. So it is unsurprising that, as existing product categories become saturated, it seeks to invent new ones. But what's good for Internet oligarchs and giant corporations may not be good for everyone else. Long before the IT revolution informed observers such as C.S. Lewis, Ivan Illich, E.F. Schumacher and many others understood that the 'conquest of nature' has a nasty habit of rebounding on people by compromising their humanity and riding rough shod over their rights. The entire high-tech sector has expanded rapidly over recent decades and, as a result, many of the organisations involved have become financially wealthy. But if they are not rich in humanity, perceptiveness, the ability to sustain people or cultures, then this becomes an empty and regressive form of wealth.

Thus far the high-tech sector has exhibited a dangerous and apparently unquenchable obsession with 'inventing the future backwards.' That's to say, it pours millions into speculative technical operations with little thought as to whether the outputs are necessary or helpful. There's an abiding preoccupation with beating the immediate competition (including other high-tech behemoths) regardless of other considerations. Many will remember how the 'information superhighway' evoked images of openness, safety, productivity, social benefits spread far and wide. A range of new tools certainly came into wide use. Information on virtually any topic became almost instantly available. Useful knowledge is another matter entirely and wisdom may be the scarcest resource of all. During this time we've also acquired the Dark Net, Internet scams, widespread identity theft and, of course, the threat of utterly unwinnable cyber wars.

None of the above can be blamed on the Internet pioneers who built early versions of these systems and devices. Many appear to have believed that what they were doing was useful and constructive (Taplin, 2017). Unfortunately, however, once the new tools were released into wide use the aims, ambitions, values and so on of the pioneers counted for little.<sup>2</sup> New, poorly understood, world-shaping forces came into play. Yet the power apparently granted to the latter does not, in fact, reside with innovators and disruptors. In a more considered view it resides in the domain of 'the social' from which countervailing power (for example in the form of sanctions or legitimation) may eventually arise.

### 2.2. The entrepreneurial marketplace and a new arms race

In the meantime, and left to the vagaries of 'the market,' further waves of high-tech innovation will continue to generate highly polarised consequences. It doesn't really matter what the high-tech gurus and the Internet oligarchs like to claim at any particular time in terms of the efficacy and usefulness of new products and services. Nor does it matter how glossy the marketing, how many times stimulating or provocative TED talks are viewed on YouTube or how enticing the promises appear. *The very last entities to entrust with the future of humanity and its world are those who make 'innovation' their ultimate value and selling their core profession.* High-tech promises based on pragmatic, utilitarian and commercial values overlook or omit so much that's vital to people and societies that they have little or no chance of creating or sustaining open and egalitarian societies. (The ideology of 'value-free technology' is discussed below.)

Proponents of the IoT, however, seek to convince the public that it will be widely useful. Homes can be equipped to respond to every need, whim and requirement. Owners won't need to be physically present since they can communicate remotely with their home server. What could possibly go wrong? The honest answer is: just about everything. Perhaps the greatest weakness and enduring flaw in the IoT is this: *connecting devices together is one thing, but securing them is quite another.* As one well-qualified observer put it 'IoT devices are coming in with security flaws which were out-of-date ten years ago' (Palmer, 2016). Another acknowledges that 'there's a lot to be said for a properly networked world.' He adds 'what we've got at the moment, however, is something very different – the disjointed incrementalism of an entrepreneurial marketplace.' He adds that:

There are thousands of insecure IoT products already out there. If our networked future is built on such dodgy foundations, current levels of chronic online insecurity will come to look like a golden age. The looming Dystopia can be avoided, but only by concerted action by governments, major companies and technical standards bodies.

(Naughton, 2016)

Even now private e-mail cannot be considered secure. One slip, one accidental click on a nasty link, can initiate a cascade of unwelcome consequences. There's no reason to believe that anyone's wired-up electronic cocoon will be any different. Consider this:

<sup>1</sup> This is not because Trump has supported Neo-Conservatism directly. His antagonism towards it is well known. Nor is it because Silicon Valley has entirely abandoned its leaning toward Libertarian values. In the former case it is rather that a rich minority has thrived under Trump that remains deeply immersed in the 'Neo-Con' world from which it continues to derive significant financial and other benefits. In the latter Silicon Valley exhibits a profound disconnect from Democratic politics and the growing social costs of its own activities. The Neo-Cons therefore remain free to go about their business in the absence of any serious constraints.

<sup>2</sup> On the other hand one could argue that such a stance embodies an all-too-common moral naivety. Many innovators, then as now, tend to inhabit a kind of 'social bubble' that makes it more difficult to recognise that the consequences of their idealism and their work could also have serious 'downside' consequences.

Two years after it was revealed that a creepy Russian website was allowing users to watch more than 73,000 live streams from unsecure baby monitors, the UK's data watchdog has warned that manufacturers still aren't doing enough to keep their devices safe from hackers. Incidents involving parents stumbling upon pictures of their kids online ... continue to occur, with images clearly being snaffled from Internet-enabled cameras that have been set up in people's homes.

(Mendelsohn, 2016)

In the absence of careful and effective system-wide redesign what remains of our privacy may well disappear. First world societies are on the cusp of being caught up in the classic unwinnable dialectic of an offensive/defensive arms race. Currently, few understand this with sufficient clarity. It's therefore likely that many will continue to sign up for this new, interconnected fantasy world with or no little idea of the dangers involved or the precautions required. Some will ask why they were not warned. The fact is that such warnings have been plentiful but have fallen upon deaf ears.

### 2.3. Internet ideology

No discussion of the Internet and its pervasive effects is complete without reference to a persistent – some would say extreme – view that technology is 'value free.' Technology is said to be 'neutral,' what matters is how it is applied. That this represents a distinct philosophical position supporting a specific worldview eludes many, especially in the U.S. where such issues tend to remain occluded. So it's not surprising that the limitations, not to say defects, of such a view are, on the whole, seen more clearly beyond the U.S. and far removed from Silicon Valley (Beck, 1999). For those who have absorbed the pre-conscious assumptions of U.S. culture the 'IT revolution' and its products are more likely to be described in glowingly positive terms (tinged, of course, with varying degrees of national self interest). Yet such views are far from universal. Wherever healthy forms of scepticism thrive it's obvious that information processing – once restricted to the world of machines – has already colonised the interior spaces of everyday life to an unwise extent (see Zuboff, 2015, below). Allowing it to penetrate ever further into human life worlds is clearly fraught with adverse consequences.

Greenfield has considered how these processes operate at three scales: the human body, the home and public spaces. To take just one example, in his view the rise of 'digital assistants' ... 'fosters an approach to the world that is literally thoughtless, leaving users disinclined to sit out any prolonged frustration of desire, and ever less critical about the processes that result in gratification' (Greenfield, 2017). They operate surreptitiously in the background according to the logic of 'preemptive capture.' The services they offer are designed to provide the companies concerned with 'disproportionate benefits' through the unregulated acquisition (theft) of personal data. Lying behind such operational factors, however, is 'a clear philosophical position, even a worldview ... that the world is in principle perfectly knowable, its contents enumerable and their relations capable of being meaningfully encoded in a technical system, without bias or distortion.' When applied to cities Greenfield regards this as:

effectively an argument that there is one and only one correct solution to each identified need; that this solution can be arrived at algorithmically, via the operations of a technical system furnished with the proper inputs; and that this solution is something that can be encoded in public policy, without distortion.

(Greenfield, 2017)

Hence 'every aspect of this argument is questionable.' Similarly, the view that 'anything at all is perfectly knowable' he regards as perverse since so many aspects of individual and collective life cannot be reduced to digital data. Differences of value, identity, purpose, meaning, interest and interpretation – the very attributes that make human life so rich and varied – are overlooked or eliminated. It follows that,

The bold claim of 'perfect' knowledge appears incompatible with the messy reality of all known information-processing systems, the human individuals and institutions that make use of them and, more broadly, with the world as we experience it. In fact, it is astonishing that any experienced engineer would ever be so unwary as to claim perfection on behalf of any computational system, no matter how powerful.

(Greenfield, 2017)

In summary, claims for 'perfect confidence' that appear in any and all claims for the social applications of digital systems is 'incommensurate with everything we know about how technical systems work.' In other words the dominant ideology behind the rapid expansion of the IoT and related systems is clearly unfit for many of the purposes to which it is currently being applied. Or to put this differently 'hard' empiricism involves systemic reductionism that works directly against the wider human and social interests outlined above.

### 2.4. Fiction informs foresight

It's no secret that high-tech nightmares exploring the dark side of 'progress' have been a staple of science fiction (SF) for well over a century. Far from being idly 'negative' they can be viewed as useful reminders to, for example, not proceed too far too fast with these powerful, seductively networked technologies. H.G. Wells attempted an early expression of this concern in his 1895 novel *The Time Machine* in the contrasts he drew between the effete and vulnerable Eloi and the brutal Morlocks (Wells, 1895). Then in 1909 E.M. Forster made an even more deliberate attempt to identify the likely effects of becoming over-dependent on technology in his novella *The Machine Stops* (Forster, 1909). More than a century later it still carries a forceful message that is both credible and explicit. Then, in the early 1970s, J.G. Ballard began his decades-long explorations of ennui and decay in the ruins of high-tech

environments – the abandoned high-rise, the empty swimming pool and so on. One of the most evocative is a short story in his 1973 collection *Vermillion Sands* called ‘The thousand dreams of stellavista’ (Ballard, 1973). It portrays a house constructed to exquisitely mirror the needs of its inhabitants in real time. Unfortunately it turns out that a previous occupant was insane. Over time the house begins to exhibit similar symptoms – which places later owners in peril of their lives. This is obviously not merely a metaphor. Daniel Suarez’ *Daemon* picks up the familiar theme of runaway technology and gives it a powerful new twist. He draws on a wealth of IT know-how to explore how a dormant entity – or daemon – is activated, becoming a self-replicating, highly destructive virtual menace (Suarez, 2010). Finally Dave Eggers’ prescient 2013 novel *The Circle* brings the story up to date in a highly relevant and insightful critique of the digital utopianism that arguably characterises the current thinking and practice of IT corporations (Eggers, 2013). It’s a salutary tale in which human ideals become subordinated to an ever more dominating technical infrastructure. This is, of course, only a small sample of a vast literature exploring almost every aspect of technological dystopias.

Futurists and foresight practitioners often recognise such sources as essential background. But they also earn their living by scanning the environment for more specific and empirically based ‘signals of change.’ The art and science of ‘environmental scanning’ is, however, arguably more advanced in theory than it is in broad, commonly accepted, practice. In terms of social governance in a digital era, this is a serious oversight. Consequently *the relative absence of high quality foresight places entire societies at significantly greater risk than they need to be*. Here, for example, are a couple of ‘scanning hits’ on surveillance and the IoT.

Surveillance is central to the construction of consumers and markets. ... Many contemporary markets ... rely on the collection, analysis and application of consumer data to place advertising, define market segments and nudge consumer behaviours. Consumer surveillance is also an enactment of corporate power, attempting to align individual preferences with corporate goals. (Ball, 2016)

And again,

The Internet of Things is the household system, already well advanced, that will integrate all your domestic electrical goods into a single app-controlled matrix. Your fridge will order your groceries online, your fuse box will call a sparky, your coffee machine will buy more Vittoria. To do any of these things, your devices will have to tell those on the other end who you are, where you live and how you’re going to pay. It will be a two-way street. Internet of Things transactions linked to the same identifier are traceable, and ultimately make people also traceable, hence their privacy is threatened.

(Deakin University, 2016)

The article from which these two quotes originated deals primarily with the increasingly widespread practice of customer surveillance in stores (and other points of sale) when people unwittingly accept offers such as ‘free Wi-Fi.’ In so doing they agree to ‘terms of use’ that they neither read, nor understand. This is clearly analogous to where entire societies now stand in relation to the IoT – the actual ‘terms of use’ remain out of sight and unavailable to all but the most persistent and technically adept.

## 2.5. A plausible trajectory

During these dangerous and uncertain times much is at stake – not least of which is how to manage a world severely out of balance. More competent, imaginative and far-sighted leadership would help, as would a growing society-wide resistance to the values and, indeed many of the products, of the high-tech giants. Strategies of this kind would contribute toward a thorough re-appraisal of various pathways toward viable futures (Floyd & Slaughter, 2014). Those who are fortunate enough to be living in still-affluent areas are being asked to go along for the ride, to distract themselves, to still their growing fears for the future through the many diversions provided by new generations of technological devices. But the above suggests that it’s time to push back and seek answers to questions such as the following:

- Does it make sense to accept the current, deeply flawed, vision of the IoT that promises so much but ticks so few essential boxes, especially in relation to privacy and security?
- Are whole populations really willing to passively submit to a technical and economic order that it grows more dangerous and Dystopian with each passing year?
- To what extent can time, resources and attention be focused on the kinds of long-term solutions that preserve human and social options? (Slaughter, 2015)

If things continue to proceed along the present trajectory the system is likely to misbehave, to be hacked, militarised, fail just when it needs to work faultlessly. In this eventuality domestic users may start backing out and rediscovering the virtues of earlier analogue solutions. Although simpler and less flexible, the latter could gain new appeal since they lack the ability to exact hidden costs and turn peoples’ lives upside down in unpredictable ways. Some might well opt wholesale for a simpler life (Kingsnorth, 2017). Early adopters of the IoT are, however, not restricted to householders. They include businesses, government agencies and public utilities.<sup>3</sup> Given the overall lack of effective social foresight, as well as the parlous state of government oversight in general, present

<sup>3</sup> It is often forgotten that the latter are *structurally predisposed* toward greater socio-political complexity – which also contributes to the growth imperative. Thus, according to Tainter, large-scale organisations are unlikely to pursue deliberate simplification strategies while at the same time becoming increasingly vulnerable to collapse (Tainter, 1988).

modes of implementation may proceed unabated for some time. Security breaches on an unprecedented scale would then take place, disruptions to essential services would occur and privacy for many would all-but vanish. The costs would be painful but they would also constitute a series of 'social learning experiences' *par excellence*. At that point serious efforts to raise standards and secure the IoT are likely to become unavoidable.

### 3. Farewell to driving?

The advent of 'driverless cars' has been regularly announced for some time. They refer to one type of 'autonomous vehicle' (AV) already being tested on the streets of various cities. Others are operating in closed environments such as mines and industrial sites. Airports have used 'autonomous trains' for some time, safely moving thousands of passengers around from one terminal to another. Road testing of city-to-city AV fleets are not far behind. Such vehicles are another in a series of 'disruptive technologies' whose benefits are said to outweigh the possible costs. It's claimed that the current system of independent vehicles driven by fallible humans is so expensive, dangerous and out-dated that it needs to be replaced. At first glance, it's not hard to see why. Such a system could be more efficient, less wasteful and safer. The outlook appears sufficiently compelling that the longer-term goal of creating fully automated systems is being widely debated and planned for.

Several levels of autonomy are envisaged. At level 1, single functions are to be carried out by the vehicle in restricted circumstances. At level 2, the vehicle can operate multiple functions with the driver actively monitoring. At level 3, the vehicle can cover all driving functions but refer back to the driver if/when needed. At this level, however, the 'hands off' issue becomes a safety concern. So level 4, or complete vehicle autonomy within system-wide limits becomes the preferred goal. At level 5 in-vehicle systems replace all driving functions in any circumstances, indicating true autonomy (King, 2017). Such apparently positive conclusions appear to be supported by World Health Organisation (WHO) statistics that recorded a staggering 1.25 million road deaths in 2015 alone (WHO, 2015). Or, as one writer put it: 'the only difference between a human driver and a machine driver is the speed and accuracy of perception and reaction, and the machine wins that one easily' (Walsh, 2016). This is one of several arguments. Others include the following. If AVs were to become standard then chaotic and crowded road transport systems might well be rationalised. Traffic jams could become a thing of the past. Car ownership per se would decline since fewer vehicles would be needed. Roads could be smaller and less intrusive. The space in cities presently devoted to parking would be reduced making these same areas available for other uses. Then again, since the new AVs would run on electric power there'd be an increase in energy efficiency with corresponding reductions in exhaust fumes and pollution. (That noted, the makeup of energy systems – coal, oil, gas, nuclear vs. renewables – used to power electric vehicles would obviously have a significant impact on the overall energy profile.) From a popular viewpoint, cities could return to being 'clean and green.' On the other hand all these assumed benefits turn out to be highly contestable. For example, it's doubtful if such a multi-dimensional transition could occur as quickly as proponents suggest. Then there's the huge question of costs – not only to manufacture smaller, lighter batteries but also to drive down the cost the sophisticated electronics such vehicles require. Equally, the question of complexity has barely figured in current narratives. But it will take heroic levels of reliability to keep such vehicles operating safely. There's also another side to this story.

#### 3.1. Unemployment and the myth of perpetual internet reliability

The most obvious and immediate drawback is the rapid decline in employment for large numbers of people who currently earn a living through driving. In the UK, for example, there are close to 300,000 Heavy Goods Vehicle (HGV) drivers alone, most of whose jobs would disappear (Ashley, 2017). And this is without counting bus and taxi drivers. Yet little is heard from policy makers or AV promoters about these deteriorating prospects. John Harris describes the issue like this:

There are 3.5 million truck drivers in the US, as well as 233,000 cab drivers (an official estimate, which seems low), 330,000 Uber drivers and 660,000 bus drivers. In the UK, at the last count, there were 297,600 taxi or private-hire-vehicle driver licences in England alone, and 600,000 people are registered drivers of heavy goods vehicles. The traditional logic of the job market has made sitting behind a wheel a fallback option – if all else fails, you can always drive a cab. But no more...

(Harris, 2016a)

The beginnings of a solution are likely to involve income redistribution on a wide scale. Proposals for a *social* innovation – a universal basic income (UBI) – to reduce the strain on what Paul Mason calls 'the precariat' do crop up occasionally but are a long way from being implemented (Mason, 2016). The political will is minimal, the economics challenging and the issues complex. Yet it's fair to say that little could be further from the minds of those who favour the introduction of AVs. While most are caught up in the ever more unequal distribution of wealth, measures to *moderate* such extremes are few and far between. These are matters of real public concern. Yet industry innovators, and those who speak for them, are remain preoccupied with technical issues. So they don't view the structural decline in employment and a corresponding rise in public unrest as any concern of theirs. They are focused on capturing as large a slice as possible of emerging markets. So questions like 'should we do this?' give way to 'can we do this, how fast and where?' Framing issues in such ways certainly simplifies things.

Yet pursuing the single-minded pursuit of 'innovation' on the one hand, while ignoring wider consequences on the other, delegitimises any pretence to objectivity or detachment. Acknowledging and understanding these links therefore becomes a vital public concern. More people would then appreciate the extent to which corporate and social interests have been poorly aligned for many years (Bakan, 2004; Higgs, 2014; Klein, 2007, 2014). It was suggested above that privileging technological innovation above all else looks increasingly like a dangerous mistake. On the other hand, costs and disruptions can be moderated or prevented if they are

detected and publicised in good time. This is obviously one of the key functions of high quality foresight work in the public interest. If and when the political will is found, more equitable solutions can emerge.

There is, however, no ready-made solution to what may be the Achilles Heel of all AV systems – their dependence on *perpetual Internet integrity*. At the very time when key players are preparing for ubiquitous cyber warfare, the faultless continuity of IT-related systems remains a convenient myth. In this view, complexity becomes a social trap and reliable security a delusion. Yet, as things stand, the pragmatic worldview and raw instrumental power of the main players suggests that they will push ahead regardless. They're uninterested in permission, regulation or negotiating any diversion from the humanly tragic and debased futures they are creating (Harari, 2015).

### 3.2. Systems rationality, artificial intelligence, privacy

Since most governments lack even the rudimentary means to evaluate the emerging tides of new technology – let alone make informed decisions about their social implications – the question of who will take responsibility for large-scale breakdowns, power-outages and disruptions, whether caused by actual accidents or by malign cyber attacks, remains open. What is clear is that to the extent that AV systems are progressively installed the torrent of data that they'll require and generate will become too vast and complex for humans to manage. New levels of automation capable of processing vast amounts of 'big data' in real time will be needed. Human control over these systems will therefore diminish. Humanity will have taken another step toward the era of 'systems rationality' where notions like 'autonomy' and 'choice' become emptied of meaning.

One option that can be explored as an alternative to a full on 'big data' scenario would reflect the difference between artificial intelligence (AI) and Intelligence Amplification (IA). In the former case the goal is to *replace* human intelligence with machine equivalents, whereas in the latter it is to *augment* human capabilities. Driver assisted vehicles are not merely less threatening and problematic, they already exist in significant numbers. So it may be possible to explore a similar process of augmenting human capability and, in so doing, bypass some of the hurdles mentioned here. Yet this is by no means a foregone conclusion. Within a 'growth at all costs' corporate worldview optimal solutions appear less appealing than grand visions in which limits have little or no place.

Currently we're a long way from figuring out how society as a whole can begin to deal with the unending flow of data. Effective AV systems would necessarily be designed to eliminate as much uncertainty, ambiguity and choice as possible. It would record the full details of each and every trip, making it possible for anyone with access to know exactly where and when people have been. Unlike with today's smart phones whose 'tracking services' can still be switched off, no such option would be available. Some criminal activities such as car theft might possibly decline but at the cost of ratcheting up the level of surveillance to unprecedented levels. One observer sees it this way. He writes:

Shrouded in secrecy, swallowed up by complexity and scale, the world is hurtling toward a new transnational electro-dystopia ... Localisation doesn't matter that much. The Chinese Internet model and the American giant server farms are proof of the dangerous fact that digital automation is inherently coupled with the efficiencies of integrate centralisation and control

(Keane, 2015, 33).

### 3.3. AVs are safer for whom?

The issue of safety is one of the key drivers behind the emergence of AV technology. Yet the conversation thus far has taken place within an affluent 'first world ghetto.' It's here that the finance is available and the greatest rewards are expected. Yet the closer one looks the more the whole process appears to have more to do with notions of greed than of need. So it's worth asking a different question – where are these promised new levels of safety most needed? The answer is – in the very places where they are least likely to occur. The WHO statistics on road deaths make this clear. The following sample is for deaths per 100,000 people in 2013.

Germany 4.3	Central African Republic 32.4
Norway 3.8	Democratic Republic of Congo 33.2
Netherlands 3.8	Iran 32.1
Singapore 3.6	Libya 73.4
Sweden 2.8	Rwanda 32.1
United Kingdom 2.9	Thailand 36.2 (WHO, 2015)

If, in this already one-sided technical view, part of the 'value proposition' is that 'human life is valuable therefore we should reduce the road toll' then it's clear that *countries with the greatest need for technical assistance are the least likely to get it*. The unfortunate truth is that there's little or no profit to be made from poor and destitute nations. Hence the argument about 'making driving safer' clearly rests on 'first world' privilege. It depends on (a) excluding the poorest nations and (b) therefore ramping up even further the already unsustainable gulf that exists between rich and the poor. So far as the corporates are concerned poor people can continue dying in their thousands so long as they gain access the most profitable markets. Obscured by the growing chorus of approval for AVs in the rich West this sad reality has been widely overlooked. Yet its antecedents are well understood. They were described a decade ago, for example, in Klein's detailed account of what she called 'the rise of disaster capitalism' (Klein, 2007).

### 3.4. Summary

This section has argued that the full costs of any thorough going implementation of AV technology brings with it very significant costs. These include:

- mass unemployment and few serious attempts to deal with it;
- the further erosion of privacy;
- an impossible commitment to the myth of perpetual Internet integrity;
- the assimilation of people, societies and cultures into a world dominated by machines and governed by the abstract demands of 'systems rationality'; and,
- a further increase in the unsustainable gulf between rich and poor.

Rationales in favour of the rapid implementation of AVs are therefore not as persuasive as they may first appear. It follows that the rush to implementation needs to be slowed down and perhaps halted – at least for a while. This view is partly about values including those of prudence and compassion. It strongly supports the view expressed in the previous paper that new technologies should be seen and understood in their wider contexts. They are not merely 'stuff'; each has human, social, cultural and geopolitical dimensions, positive, negative and ambiguous outcomes. The arguments and justifications put forward thus far appear to depict issues in the simplest and most positive ways thus obscuring alternatives and understating the wider costs.

High-tech companies have become surprisingly casual about embarking not merely on one or two but a whole series of frankly outrageous projects that, at base, serve to re-shape the world in their own image. But there's sufficient evidence to take a stand against careless innovation with ramifying social consequences. It's now clear that a high-tech world fashioned by and for the corporate sector becomes progressively less fit for people (Klein, 2014; Higgs, 2014; Harari, 2015). There are many other alternatives awaiting our collective attention (Alexander & McLeod, 2014; Rees, 2014).

### 4. What drives Silicon Valley?

The previous paper suggested that well-grounded critique opens up new areas of insight that can inspire viable responses and inform policy-making. This section suggests that further insights can be gained from a better understanding of the human and cultural interiors of organisations and individuals. After all, it is from the interior dynamics of values and worldview commitments that real-world structures, innovations and consequences emerge into the light of day. Developmental psychology has opened up many ways of achieving greater clarity regarding interior structures and processes and Integral methods have proved particularly useful here. In brief, they embody a fusion of the work of many different people that helps us to understand more of what is occurring 'beneath the surface' of contested issues (Slaughter, 2010). Here they shed new light on some of the interior sources or 'drivers' that operate in Silicon Valley.

An indicative example can be found in Mark Zuckerberg's admonition to the staff of Facebook to 'move fast and break things' as it reveals much about both. Jonathan Taplin draws on this statement to show how such imperatives arose within the specific conditions of American society and culture. Three influences can be mentioned here – Shumpeter's notion of 'creative destruction', the normalisation of aggressive entrepreneurial practices and, last but by no means least, the pervasive influence of Ayn Rand's radically individualistic right wing ideology (Freedland, 2017; Taplin, 2017).

These are among the historical and social forces that created Facebook, Google, Amazon, among others, and helped them become what Rushkoff calls vast 'monopoly platforms' (Rushkoff, 2016). These organisations currently have as much, if not more, wealth and power than many national governments. John Harris puts it like this:

Increasingly, the orthodoxies of government and politics are so marginal to the way advanced economies work that if politicians fail to keep up, they simply get pushed aside. Obviously, the corporations concerned are global. The amazing interactions many of them facilitate between people are now direct – with no role for any intermediate organisations, whether traditional retailers or the regulatory state. The result is a kind of anarchy, overseen by unaccountable monarchs: we engage with each other via eBay, Facebook and the rest, while the turbo-philanthropy of Mark Zuckerberg and Bill Gates superficially fills the moral vacuum that would once have pointed to oversight and regulation by the state.

(Harris, 2016b)

Mason comments what must be obvious to many that as 'monopolies (they) should be broken up.' He adds, 'if Facebook were a bank, it could not exist; nor Google if it were a supermarket.' In this view an underlying reason why that has *not* occurred is due to 'the structure of hedge-fund-driven modern capitalism (which incentivises the creation of monopolies), together with political cronyism' (Mason, 2017). During the last quarter of 2016 Facebook reportedly earned a cool US\$8.8 billion and counted close to two billion people, or about half of the world's Internet users, as its customers (Cadwalladr, 2017). Yet such gains also impose equally huge losses on publishers, newspapers, authors and a wide range of associated professions. Over time its customers become used to the dumbed-down alternatives that pour forth from countless unverified sources. Vital questions about where Facebook's power ends, where its limits lie and to whom it is accountable have eluded successive U.S. governments that, at minimum, have failed to apply their own anti-trust rules and regulations. Inscrutable algorithms, deep penetration into the texture of so many human lives and vast wealth appear to make Facebook almost invulnerable to top-down intervention. There are, however, are other possibilities.

While much attention has been paid to the wealth and apparent instrumental power of these organisations, rather less attention has been paid to investigating them from within, so to speak. Yet doing so reveals new ways of understanding them and perhaps



**Table 1**

Summary of quadrants, worldviews and values.  
(Source: Slaughter, 2012)

- 
1. The four quadrants (or ‘windows’ on reality)
    - a. The upper left quadrant (the interior ‘world’ of human identity and self-reference);
    - b. The lower left quadrant (the interior ‘world’ of cultural identity and knowledge);
    - c. The upper right quadrant (the exterior ‘world’ of individual existence and behaviour);
    - d. The lower right quadrant (the exterior world and physical universe).
  2. Four levels of worldview complexity
    - a. Pre-conventional (survival and self-protection);
    - b. Conventional (socialised, passive, adherence to status quo);
    - c. Post-conventional (reflexive, open to complexity and change);
    - d. Integral (holistic, systemic, values all contributions, works across boundaries, disciplines and cultures).
  3. Six value levels
    - a. Red (egocentric and exploitative);
    - b. Amber (absolutist and authoritarian);
    - c. Orange (multiplistic and strategic);
    - d. Green (relativistic and consensual);
    - e. Teal (systemic and integral);
    - f. Turquoise (holistic and ecological).
- 

reducing their dominance. Two previous examples of this kind of work are informative. One is Urry's *Societies Beyond Oil: Oil Dregs and Social Futures* (Urry, 2013); another is Oreskes and Conway's *Merchants of Doubt* (Oreskes & Conway, 2011). Urry deployed his considerable talent in ‘depth sociology’ to understand how ‘carbon interests’ became so powerful and was able to characterise the kinds of futures to which their continued dominance leads. Oreskes and Conway took on the cultural power of the exceptionally well-financed U.S. ‘climate denialist’ clique. They revealed in detail exactly where it started, the techniques and assets it employed and how careers were destroyed en route to establishing denialism as continuing disruptive force in US political life. The point is this: when credible efforts are undertaken by well-qualified people to return some of these hidden interior phenomena back into the limelight there's no turning back. The hand of autocratic power, money and influence is revealed. Motives, purposes and outcomes are identified and called into question. Importantly, in the present context, the knowledge so gained cannot be erased. This is, in other words, a fair and legitimate way for societies to recover from multiple failures of governance and to regain from the oligarchs what was never theirs in the first place – an assumed social licence to operate as they wish.

#### 4.1. Integral perspectives and the Silicon Valley worldview

Integral methods can be used in many ways. Theorists and practitioners can plunge into them in such depth that their investigations become abstracted and lose touch with reality. Here, as in previous work, they are employed lightly to reveal insights that can be taken up and used by virtually anyone.<sup>4</sup> They use three sets of criteria: the four quadrants (windows on reality); four levels of worldview complexity and six values levels (Table 1). In earlier work some key reasons for applying Integral thinking were summarised thus:

While most people and the vast majority of civil and commercial organisations around the world certainly appear to have benefited in the short term from the vast expansion of on-line options and capabilities, a much darker picture is emerging. It concerns not only the extraordinary cultural and economic power being wielded but also the nature of the underlying worldview and values – which are the main foci here – and where these appear to lead.

(Slaughter, 2015, 243)

What became clear over time was that the Internet had morphed into something like an extreme version of Bentham's Panopticon where individuals were routinely subjected to extreme surveillance. Today that merely looks like a first step as entire industries are now feeding off of data traces routinely expropriated and on-sold for exploitation by the advertising industry (Zuboff, 2015). There's little sense among the main players of any compassion, empathy or care for the higher goals or aspirations of humanity. One reviewer concluded that:

The tech elite have created a world view, a political philosophy that corresponds with their goals. They seek to create prosperity and satisfaction by way of the greatest amount of autonomy and the least amount of government possible. It holds that all authority should be viewed skeptically. Indeed, there is little room in this world for regulations or government guidelines.

(Schultz, 2015)

What emerges overall is a picture of societies and cultures becoming hollowed out by extraordinary monopoly power and, at the same time, becoming increasingly polarised and angry. Many formerly proud professions are in decline, unemployment is rising and

<sup>4</sup> A natural corollary is that they can also be used superficially to generate crude and unproductive results. So it is always necessary to consider what levels of complexity and depth are actually required for any particular occasion. This is, of course, a matter of judgement.

criminality penetrates even the most private spaces. A look at three key figures from Silicon Valley – Mark Zuckerberg, Ray Kurzweil and work by Google's chief economist Hal Varian – helps make sense of this perverse reality. In the former case an interview published in *Time* magazine clearly revealed elements of Zuckerberg's interior life. It showed, for example, that he is dismissive of external opinion and equates critique with 'turning the clock back'. He denies that pervasive advertising is in any way 'out of alignment' with his customers and is 'concerned with nuance and subtle shades of meaning only to the extent to which they are useful to him' (Grossman, 2014). Within such a pragmatic and instrumental frame terms like 'values', 'human nature' and 'society' have little or no meaning. This is significant when the broad impacts of Facebook are considered.

Similar issues arose in relation to Kurzweil, Chief Engineer at Google and well known for his views on the coming 'singularity.' This is supposedly a time when humanity merges with its technology and achieves a kind of disembodied immortality. There are fringe admirers, of course, who eagerly anticipate such 'post-human' futures. Yet a review of various accounts of this work strongly suggest that this perspective can be characterised as 'high technology and hubris' in about equal parts. Reductionism and category errors abound, for example, in Kurzweil's 'theory of mind' where the vast complexity of the latter is reduced to mere 'pattern recognition' (Pensky, 2015). Another concern is the 'constant conflation of biological evolution' with 'technical evolution.' As the author notes:

Kurzweil has set up a narrative in which biological evolution, cultural development, and the advancement of computing technology are all part of the same immutable force, never mind that the will of human beings factors into the creation of both culture and technology. For Kurzweil, the advance of technology is as inevitable as biological evolution and can be plotted on the same graph. (Pensky, 2015)

When technology and biology are 'plotted on the same graph' we know that those who view the world this way are living in their own version of what has been called 'flatland.' Within that diminished frame what is manifestly missing is any appreciation of the power and influence of the interior worlds individuals and of cultures. Also significant is that from a structural interior standpoint the worldviews and values of these key figures are so similar. In terms of the categories outlined in Table 1 both appear to be driven by 'red' to 'orange' values and draw on conventional to inverted (incomplete or, more controversially, 'unhealthy') forms of post-conventional worldviews.

#### 4.2. Zuboff's critique of the 'big other'

Shoshana Zuboff's magisterial treatment of Google's pursuit of 'surveillance capitalism' should be read in the original as it provides a paradigmatic example of an in-depth countervailing view (Zuboff, 2015). Her article 'Big Other' takes the form of an extended critical response to, and evaluation of, material produced by Google's chief economist Hal Varian. Zuboff supports the view taken above that: 'big data is not a technology or an inevitable technology effect. It is not an autonomous process... *It originates in the social, and it is there that we must find and know it.*' (Zuboff, 2015, 75. *Emphasis added.*) This is a crucial point. She continues:

'Big data' is above all the foundational component in a deeply intentional and highly consequential new logic of accumulation that I call *surveillance capitalism*. This new form of information capitalism aims to predict and modify human behaviour as a means to produce revenue and market control. (Zuboff, 2015, 75)

Later in the piece she contrasts Varian's technocratic vision with that of Hannah Arendt who offered more nuanced humanistic view of. She comments that:

In contrast to (Hanna) Arendt, Varian's vision of a computer mediated world strikes me as an arid wasteland – not a community of equals bound through laws in the inevitable and ultimately fruitful human struggle with uncertainty. In this futurescape, the human community has already failed. It is a place adapted to the normalisation of chaos and terror where there the vestiges of trust have long since withered and died. Human replenishment ... gives way to the blankness of perpetual compliance. (Zuboff, 2015, 81).

Zuboff's calm, clear and forensic examination of Google and its operations lead her to conclusions that are valuable in the present context as they help to inspire subsequent actions. For example:

Google's tools are not the objects of value exchange. They do not establish productive consumer-producer reciprocities. Instead they are 'hooks' that lure users into extractive operations and turn ordinary life into a 21 st Century Faustian pact. This social dependency is at the heart of the surveillance project. Powerful felt needs for an effective life vie against the inclination to resist the surveillance project. This conflict provides a kind of psychic numbing that inures people to the realities of being tracked, parsed, mined and modified – or disposes them to rationalise the situation in resigned cynicism. This ... is a choice that 21 st Century people should not have to make. (Zuboff, 2015, 83–4)

In summary she concludes that:

New possibilities of subjugation are produced as this innovative institutional logic thrives on unexpected and illegible mechanisms of extraction and control that exile persons from their own behaviour. (Zuboff, 2015, 85).

Limitations of space preclude further discussion here. Next steps, however, could include applying this kind of exploration to other subjects and creating projects dedicated to revealing the inner worlds of the oligarchs and their leaders in much greater detail.

### 4.3. Silicon Valley – building or undermining the future?

With such examples in mind it is legitimate to ask if Silicon Valley in general and the ‘big three’ in particular are building the future or, in fact, undermining it. From an Integral viewpoint any attempt to ‘build the future’ from structurally deficient and reductive right hand quadrant (empirical) views of reality is at the very least unwise and almost certainly a recipe for disaster. What can be missed by critics, however, is that *the existential risks that have been created by thoughtless innovation and the scaling up of these enterprises to the global level are as dangerous for the U.S. as they are for anywhere else*. In summary, and again referring to [Table 1](#), these examples suggest a broad default or collective profile of the sector, namely that it:

- Arises from ego-, and socio-centric outlooks that serve to privilege ‘me, us and now.’
- Proceeds from a conventional level of complexity (with forays into post-conventional when it comes to, e.g., financial innovation and marketing);
- Expresses a range of values from ‘red’ to ‘orange,’ neither of which provides an adequate basis from which to resolve the issues identified here.
- Largely address the lower right (exterior collective) domain of reality, with an occasional focus in the lower left (for social influence) and upper right (for persuasion and control).

Seen in this light the term silicon ‘giants’ appears misplaced since they currently operate more like ethical ‘midgets.’ It follows that if societies are to resolve some of the concerns expressed here then they will want to focus on ways to bring individuals and organisations at every level up and out of these diminished states of being.<sup>5</sup> This is categorically not a question of promoting ever newer and more exciting technologies. Rather, it is finding ways to bring into play more comprehensive worldviews and more sustaining values.

## 5. Conclusion

The crucial thing to note is that the current techno-capitalist worldview is by its very nature unstable and yet highly resistant to any kind of oversight or limitation. The Internet oligarchs have continued to flourish over the very years when it became clear that humanity requires a genuine shift of state, a new dynamic (a transition to sustainability) and completely different direction (a post-growth outlook). The evidence is finally in that high-tech civilisation, despite its real achievements, is on a no-win collision course with the planet ([Das, 2015](#); [Higgs, 2014](#)). It no longer makes sense to deny that the direction we should be collectively pursuing is one that moves decisively away from passive consumerism, the diminished rationality of ‘the market’ and endless growth. This is not to say that genuinely innovative, useful and worthwhile uses of IT have not emerged over this period. Rather, that the ‘IT revolution’ has been undermined and misdirected by an ideology that ignores the human and cultural interiors. Instead of leading to a ‘better world’ it further inscribes the collective slide toward civilisational breakdown and eventual collapse ([Floyd & Slaughter, 2014](#)).

In a more open and egalitarian world new technologies would not be set loose to blindly impact upon complex social systems through one default *fait accompli* after another. Rather, they would be subjected to rigorous questioning and testing long before they were widely applied. Indeed, this was a core purpose of the Office of Technology Assessment (OTA) that, in its brief lifetime, was established to advise the U.S. Congress on exactly these matters ([Blair, 2013](#)). During the Reagan/Thatcher era the all-powerful ‘private sector’ in the US comprehensively abolished such initiatives with predictable results. This is only one of a whole series of failures of governance especially, it must be said, within the U.S. One could imagine, for example, what might have occurred if, instead of repealing the Glass-Steagal Act (to abolish the separation of high street banking and high-risk speculative gaming) Bill Clinton and the US government had put in place the means to probe the implications of high-risk speculative credit-default swaps and the like. The Global Financial Crisis (G.F.C.) would have been less serious or possibly averted altogether. But no such attempt was made. Warnings were ignored, taxpayers of the developed world ended up footing the bill and Wall Street continued much as before. While various attempts to institutionalise technology assessment have occurred, it still remains uncommon ([Schlove, 2010](#)).

With the current American administration these issues and questions have little or no meaning. This means that actions that could be undertaken by enlightened governance are unlikely to occur in the U.S. for the foreseeable future. As one observer notes:

Tech has little to fear from Trump. If his cabinet appointments are any indication, he seems keen to govern as a free-market fundamentalist. Trump’s elevation of ultra-hawkish ex-generals to key posts also suggests that he will aggressively expand the sprawling surveillance state inherited from Obama... No industry has played a larger role in evangelising the neoliberal faith than Silicon Valley. Its entrepreneurs are constantly coming up with new ways to make more of our lives into markets... Trump will run government not merely like a business, but as a business... Defeating neoliberalism will require not just the creation of a movement, but the creation of a new common sense. At its heart must be the belief that some things are not for sale.

([Tarnoff, 2016](#))

Currently, the European Community (EU) is effectively alone in having taken early steps to ensure that ‘some things are not for

<sup>5</sup> This is a core concern of humanistic and developmental psychology in general. Within the domain of integral methodology Chris Fuhs proposes a model for assessing the nature and potential of translative change (change within a given level) in contrast to transformative change (movement from one level to another). This work is partly motivated by a need to avoid earlier ‘growth to goodness’ assumptions that are now understood to be overstated ([Fuhs, 2013](#)).

sale'. It has taken small, but promising steps to regulate corporations, compel them pay more tax and create new rules allowing users to take charge of how their personal data is used, if at all (Drozdiak, 2017). It has even fined Google Euro2.4bn for promoting its own shopping recommendations above those of other companies. This is a beginning. But a great deal of dedicated work will be required before sufficient countervailing power can be assembled on behalf of civil societies to design and implement systems that work for everyone

Fortunately there are multiple ways forward than can be, and are being, pursued by people and organisations of intelligence and good will. In fact the seeds of many solutions to global dilemmas are already emerging. For example, one of many places to begin is Solnit's work on the role of hope in a threatened world (Solnit, 2016). A different approach from Canada is Rees' 'Agenda for sustainable growth and localising the economy' (Rees, 2014). Another is the Rescope project that arose from the legacy of Frank Fisher in Melbourne that explores a range of social, energy and transport options (Rescope, 2017). Raworth's work on a broader and more inclusive model for economics looks promising (Raworth, 2017). As does Fry's impressive work on what he calls 'design futuring' (Fry, 2009). Then, specifically relevant to the issues raised here, are suggestions by Hodson, Taylor and other actors in this virtual space on how, in practical terms, oversight and control can be returned from the Internet giants to individuals, societies and, more broadly, governance in the public interest (Hodson, 2016; Taylor 2014). Having outlined aspects of 'the problem' here in some detail, the third and final paper in this series will focus on a range of possible solutions.

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