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Responsible research and innovation? From FinTech’s ‘flash

crash’ at Cermak to digitech’s Willow Campus and Quayside

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ABSTRACT

Contemporary innovation destroys more value than it creates by

three effects. First it mimics already existing basic technologies

(phone, camera, directory, games) adding little value but

displacing while disrupting existing services. Second, it exploits

human rights to security, privacy and truthful reportage without

seriously regulated or legislated accountability. Third, social media

– the main offender – takes prodigious profits at huge social cost,

by facilitating the grooming of terrorists, vulnerable persons and

enabling varieties of criminality; it feloniously steals private

property, notably human identities for advertising revenue; and it

facilitates dissemination of fake news, research and propaganda.

To parody Mark Zuckerberg’s injunction to his company’s

corporate mission and its achievement of ‘monopoly advantage’

the company was, until recently, officially driven to ‘move fast and

break things’1 (i.e. the law).

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Introduction

Today, disaffection with innovation has possibly reached ‘peak overdose’ as experts, critics

and other naysayers join an argument that the slogan has been hyped far too much and

way beyond its capacity to perform conceptual, practical or policy work. In November

2017, the UK’s Conservative government issued its ‘Innovation Strategy’. A journalist –

having read all 255 pages – recorded that the strategy document contained 502 references

to the word ‘innovation’ (Osborne, 2017). Thus from performing as a stick with which to

advocate regional and national ‘competitive advantage’ (Porter, 1998) ‘innovation’ finally

descended into meaninglessness and oblivion. Simultaneously, the global obsession with

‘innovation performance’ has recently been shown to be subject to a woeful mistake at

least for EU data. Thus according to Edquist and Zabala-Iturriagagoitia (2018), in the

European Commission’s European Innovation Scoreboard, the performance measure

simply averages inputs and outputs. The average is distorted where, as in most of the

EU leader countries, a disproportionately large amount of R&D expenditure yields a

low result in innovation outputs. As in Sweden and Finland, for example, this is a

measure of low rather than high performance in productivity, efficiency or innovation

performance.

Even though such a questionable rationale was always used as a stick to beat the ‘innovation

laggards’ it transpires that quite innovative but low R&D spending countries like

Denmark and Italy could better be at least presented as innovative. Obviously a defective

method must be replaced, but until then statistician claims that even if it is firms not

regions that actually ‘compete,’ innovation is now increasingly seen as having turned

from panacea to vandalizing ‘disruptor’ of established social and economic value, not

least in labour markets. As Richard Gordon (2016) pointed out relatively recently:

In the century after the Civil War, an economic revolution improved the American standard

of living in ways previously unimaginable. Electric lighting, indoor plumbing, motor vehicles,

air travel, and television transformed households and workplaces. But has that era of unprecedented

growth come to an end? The Rise and Fall of American Growth challenges the view

that economic growth will continue unabated, and demonstrates that the life-altering scale of

innovations between 1870 and 1970 cannot be repeated … the nation’s productivity growth

will be further held back by the headwinds of rising inequality, stagnating education, an aging

population, and the rising debt of college students and the federal government.

In other words, contemporary innovation destroys more value than it creates by three

effects. First, it mimics already existing basic technologies (phone, camera, directory,

games) adding little value but displacing while disrupting existing services. Since first

drafting this introduction, the feeble reality of twenty-first century innovation has been

re-iterated widely. Thus Luc Soete (2012) argued that innovation now warranted the

epithet ‘destructive creation’ for its promotion of inequality, lessening of overall welfare

and reduction in productive growth. Books by Erixon and Weigel (2016), Lindsey and

Teles (2017), Mazzucato (2018) and, Tepper and Hearn (2019) agree that large enterprises

have become rent-seekers not innovators. More recently, the much-anticipated entrepreneurship

surge to support innovation, job-growth and productivity has failed to materialize.

Thus new technology SME ‘business dynamism’ declined from 70% of US gross job

creation from 1992 to 2011 down to 10% today (Hathaway & Litan, 2018) confirming ‘the

American Dream is now only a myth’ (Stiglitz, 2015). But historically, the value of agricultural

labour was reduced from 90% of GDP to 1%, with manufacturing labour

heading towards the same rate of decline. Now retailing is beginning to move past its

employment peak as the Amazon effect occurs, abetted with artificial intelligence (AI)

and robotics, further desertifying labour markets in services from ‘fintech’ (see below)

to ‘corner shops’ (Ford, 2015; Frey & Osborne, 2013). These authors envisage most

labour markets suffering on average a 47% jobs decline by 2030.

Second, the ‘digital economy’ is widely observed irresponsibly to exploit human rights

to security, privacy and truthful reportage without much seriously regulated constraint or

legislated accountability (as recently re-asserted in DCMS, 2018). Social media – the main

offender – takes prodigious profits by facilitating the grooming of terrorists, vulnerable

persons and enabling varieties of criminality; it feloniously steals private property,

notably human identities for advertising revenue; and it facilitates dissemination of fake

news, research and propaganda (DCMS, 2018).

Third, in the process it massively augments social costs of military action, criminality

and crime detection; substitutes automation algorithms for human employment in a

variety of professions from retailing and journalism to accountancy and legal services –

soon to be joined by driving; and it helps subvert democratic processes through propaganda,

distortion and electoral interference, generating costs of policing hitherto trustful

environments. In Barzun’s (2000) conservative analysis of the ‘benefits’ of such innovation

they amount to a major contribution to US ‘decadence’. To parody Mark Zuckerberg’s

injunction to Facebook’s corporate mission and its achievement of ‘monopoly advantage’

the company was, until recently, officially driven to ‘move fast and break things’ (i.e. the

law).

So this paper seeks to show how what was until recently considered a benign objective

of business advice (i.e. to innovate), rapidly became transformed into a malign set of

ethics, incentives and illegal business practices with monopoly power that neoliberal regulative

slackness and pro-market propaganda has allowed to fester, infecting aforementioned

cultural, social and economic value and values. Thus the following section

outlines a different way of thinking about, including examples of practical principles,

namely ‘Responsible Innovation’ or ‘Responsible Research and Innovation’ (RRI). This

is a sufficiently urgent policy challenge that the sum of €100 million has been allocated

to the issue by the EU. Numerous articles have appeared on RRI in recent years, many

focused on corporate responsibility, safe manufacturing, food hygiene and provenance,

ICT systems and environmental and medical practices inter alia (Blok, 2018; Blok &

Lemmens, 2015; Oftedal, 2014; Scholten & Blok, 2015; Scholten & Van der Duin, 2015;

Von Schomberg, 2018). After that two further sections are provided on the confrontation

between ‘Illicit Innovation’ and RRI alongside implications for society of that clash in

policy and planning terms. Thereafter, we engage in a brief Conclusions section.

On some origins of practical thought on RRI

Critique of the kind of egregious innovation outcomes, some of which were listed in the

introduction to this contribution, arose most tellingly in recent policy debates invoked by

academic and policy, not corporate, protagonists. A simple reason why researchers must

pay attention to the failures of corporate innovators is because they wilfully seek to break

the law on the principle that if the law has yet to wake up to their misdemeanours, it is

assumed ‘move fast and break things’ as a principle prevails. Some illustrative case material

follows on norm-transgression in ‘digitech’. Consider a recent example of Google yet again

being litigated against (in July 2018 the EU hit Google with a £3.8 billion antitrust fine). In

December 2017 it was reported that millions of Apple iPhone (smartphone) users warranted

compensation based on a legal claim against Google for harvesting personal data

from Apple handsets.. The class action claim by UK consumer group Which? seeks settlement

of at least £1 billion for the 5.4 million users from whom Google unlawfully collected

personal information. (Compare FB/Cambridge Analytica; Cadwalladr, 2018)

The case alleges that from 2011 to 2012 Google secretly embedded algorithm code

inside iPhones to deceive the handset Internet browser into revealing user website

visits. Google is accused of using this unlawfully obtained data to sell targeted advertising.

In 2012 Google was fined $22.5 million by the US Federal Trade Commission for precisely

the same infraction. In 2015 Google settled a similar claim by a smaller group of UK

iPhone users after accusations that the firm caused some users psychological distress by

breaching conventions on disclosing personal medical histories to targeting advertisers.

Thus, not only once does Google, as a repeat offender monopolist break the law in two

jurisdictions, but three times in five years for the same precise offence. The lead litigant

charged that Google’s repeat offending simply, deliberately and repeatedly broke the

law. Various judicial, regulatory and consumer defence actors who were signatories to the

class action case agree that anyone using the Safari browser at the time warranted some

£300 compensation for the crime. This is valued at a compensation cost to Google of

£1.62 billion. It pales into insignificance against Google’s reported 2016 profit of $80

billion from advertising. A consumer group supporter reported that consumers’ ‘good

faith’ in the advertiser had been rewarded with personal information being harvested

without their consent. In 2018 Facebook stood accused of similar practice on Android

devices (Bridge, 2018). Google’s reality-distorting response was to admit: ‘ … we have

defended similar cases before. We don’t believe it has any merit and we will contest it.’(Elison,

2017).

After the preceding taster, and moving on, what follows is a schema of candidate RRI

conventions that is advanced based upon the foregoing discussion. In most cases Google

(and its subsidiaries) fails them but so to varying degrees do the other digital media or

advertising monopolists, namely FAGAMi (Facebook, Amazon, Google, Apple and

Microsoft). So this thinking has universal appeal to those who would wish to see an

end to such lawbreaking. The specimen approach evolved in the field of policy analysis

and is based on considered, empirically based albeit principled critique, of ‘normal practice’.

Some of this ‘principled thinking’ has been influenced by three proximate sources.

The first is a model of evolutionary complexity-informed policy making after Mitleton-

Kelly (2003) who proposed ten ‘generic principles of complex evolving systems (CES)

[showing] how they relate to social systems and organizations… ’ This provides us

with the underlying reason for studying complexity. It explains and thus helps us to understand

the nature of the world – and the organizations – we live in.’ (Mitleton-Kelly, 2003,

pp. 23–26, emphasis in original). The second is also tangentially related to post-sustainability

‘green policy thinking’ as represented in action-research conducted by OECD

(2015) and its policy client Region Flanders to introduce responsible innovation practice

to (green) regional innovation system (RIS) policy thinking. Finally, the third, most direct

influence has been the work sponsored by the European Union on RRI defined as follows:

…a transparent, interactive process by which societal actors and innovators become

mutually responsive to each other with a view on the (ethical) acceptability, sustainability,

and societal desirability of the innovation process and its marketable products (in order to

allow a proper embedding of scientific and technological advances in our society)…

A leader of this policy perspective is Von Schomberg (2011) and academic supporters like

Owen et al. (2013). A sizeable and growing literature on RRI can be found in the food

security, environment, medical industry and business process management related to outsourcing

and supply chains. Irresponsible sub-contracting has recently arisen – as a case in

point – from neoliberal policies practised by the UK government in directly outsourcing

numerous hitherto public functions to the private sector. This led in the 2017–18, and

onwards, scandal of outsourcing corporations, often – like Carillion – originally from

the construction industry, becoming bankrupt. Contracts to complete hospitals, schools,

transportation schemes, management of prisons as well as cleaning and maintenance of

schools and other public facilities, failed. In the public investigation of the Carillion collapse

it was revealed that accountants KPMG, Deloitte, PWC, and Ernst & Young (EY)

‘feasted on the carcass’ worth £72 million (€80 million) in mis-auditing Carillion 2008–

2018 (BEIS/WPC, 2018)We propose briefly to run through these complementary

perspectives seeking to disclose the underlying threads in an applicable RRI policy framework.

Later on, we will comment on the pathological nature of most contemporary digital

and some other innovation. As a prelude and in the current context of so-called ‘fake news’

and ‘post-truthfulness’ we make reference, as an overarching principle, to Robert Merton’s

(1942) key tenet: the centrality of ‘scrutiny’ as the arbitrating practice and acid-test of all

valid truth-claims, whether scientific – where his greatest social scientific contribution

resided – or legal knowledge. The corollary of both, which underpins many benign cultural

principles of civilized discourse (e.g. also journalism) is the relationship of ‘scrutiny’ to

‘evidence’. As may be anticipated, this rules out most ‘information’ carried by social

media. In the discussion we show how most social media is at best propaganda and at

worst libellous.

So, returning to Mitleton-Kelly from a complexity theory perspective, one of the most

poignant insights of research findings on complex adaptive systems (Lane, 2009) is they

actually have no ‘global controller’ but rather evolve in a ‘self-organizing’ manner. This

‘rebelliousness’ towards norms of social-embeddedness is one of the keystones of complexity

analysis. As a feature, it is both ‘creative’ and ‘destructive’ as studies of ‘normal accidents’

(Perrow, 1999) show. Self-organization is expressed in ‘emergent’ behaviour or

practices by social agents engaged in ‘mindful deviation’ from the perceived norms promulgated

by would-be ‘global controllers’ or governors (Garud & Karnoe, 2001). This

embodies the sense of ‘creative destruction’ that is at the heart of motivations for most

innovation. Following March (1991) this is the ‘exploration’ phase of creativity, which

is always succeeded by an ‘exploitation’ phase as imitators and emulators seek profit

over time from the insights of the creative minority. The ‘move fast’ and break things’ iconoclasm

(Introduction: above) was used as a corporate mantra by CEO Zuckerberg as a

parsing of the irresponsible attitude of software engineers cutting corners to write often

sloppy software code to meet deadlines. The Facebook usage of the injunction was jettisoned

because it reflected badly on user experience of its own operating system. As was

self-evidently absent from this ‘move fast and break things’ mentality is the ‘examination’

phase typical of clinical testing in medicine or trialling in engineering fields like aeronautics

or automotive safety. Until the financial crash of 2007–8 it was also absent from

financial innovation (FinTech) until regulators belatedly required banks to undergo

‘stress testing’ of balance sheets, though relatively few banker fatalities had been incurred.

So three incisive norms of RRI are already identified. First, transparency, which

involves recognition of the impact on society of co-evolutionary system change. Sharing

foresight on the everyday implications of a macro-scale shift from one hegemonic

socio-cultural and politico-economic perspective (e.g. analogue communication) to

another (e.g. digital communication). This would entail having to monitor, explain and

if needed, regulate to mitigate how it was the newspaper office, the corner bookstore

and the lower-order clerical occupations in accountancy and legal departments disappeared.

For such were selectively obsolesced by the likes of Amazon and can likely be envisaged

from the effects of artificial intelligence (AI). The second transition has occurred

around the idea of ‘horizontality’ or ‘relatedness’ in the processes of innovation and creativity

in general (see, for example, Cooke, 2012). This ‘crossover’ or ‘recombinant’

(Schumpeter, 1934) way of thinking (‘creative destruction’) is only dimly understood

even by innovators locked-in to a linear rather than a recombinant paradigm (Siilasmaa,

2019). Thus, to repeat, a smartphone is not just a phone, it ‘recombines’ some twelve or

more core technology fields including telephony, photography, batteries, identification,

encryption, face recognition, artificial intelligence, positioning, gaming, localization,

switching and microprocessing.

Finally, the third concerns ‘path dependence’ which in the case of early smartphone –

or broader – digital technology revolved around ‘monetisation’ of the ‘search’ and ‘selection’

phases of technologies perfected by the likes of Google. The irony was that finding a

business model meant irresponsibly stealing the ‘eyeballs’ of device owners or users to sell

them often unwanted advertising. Thus algorithms were developed through combinations

of data harvesting, Big Data analytics and predictive text (or voice). FAGAMi companies

thus harvested customer data by maximizing user on-line activity. This might take the

form of a Facebook ‘like’, a Google search, or even how long the mouse hovers over a

segment of a screen. Pairing such traces with those of millions of a consumer’s others

meant companies could discover patterns that helped determine a specific profile and

set of preferences, including likely voter-behaviour. Since 2017 this also involved psychometrics

to induce addictive behaviour from smartphone or tablet users towards their

device. The success of this discovery in business model path creation and the unwillingness

to adhere to old norms is testified to in the fact that together Facebook and Google

received in 2016 a staggering 76% of online advertising revenue in the United States

(Tarnoff, 2017). This could have been nipped in the bud by a monitor, explain, mitigate/

regulate RRI model in preference to supine ‘asleep at the wheel’ irresponsible

regulation.

So we can parse the bad practices as ‘non-transparency’, ‘passive hindsight’ and ‘reactive

irresponsibility’ as counter-norms. In what follows we briefly offer as an illustration a

contrasting schema, developed for real policy analysis in a context of ‘responsible green

innovation.’ This is activated in five steps. First, more socially responsible thinking proposes

to adjust the Innovation Policy paradigm away from its narrow technical path

dependence towards more emphasis on ‘Greening’ in general. Second, the task is to link

specific innovation policy support with greening policy support of relevance to regional

needs. So if regional pollution is shown to be caused by, for example, three obvious industrial

processes (e.g. productivist agriculture, chemicals, and construction – Flanders’ main

polluting industries) focus upon their mitigation. Third, focus on ‘Responsible’, ‘Public’

and ‘Social’ innovation much more than ‘Commercialisation’ for private markets as in

the past but creatively formulate responses that allow profitable activity (e.g. circular

economy or ‘industrial ecology’ markets). Fourth, further the aim of achieving transitional

change or ‘System Innovation’ by building a Green ‘Regional Innovation System’ (RIS/

GRIS). Such a GRIS would require more ‘joined-up-governance’ among regional departments

and multi-level integration with other regions, the national and supranational

policy levels (as in the Gothenburg Model of the EU’s Lisbon Strategy). Finally GRIS

actions would emphasize clearer and further transparency by more Communication to

citizens and stakeholders on International, National and Regional ‘Green Good Practice’

(OECD, 2015).

Accordingly, this programme was ‘framed’ within a policy structure informed by the

theory of RRI as adumbrated by Von Schomberg (2011) and others. Accordingly, ‘Responsible

Innovation’ transparency involved engagement with Region Flanders policy users. In

pursuit of the better ‘joined-up-governance’ aspiration better policy interaction between

the Flanders Department of the Environment and its Department of the Economy was

needed to tackle the crisis faced by the three key polluting Flanders industries. These still

remained ‘reaping the whirlwind’ of decades of ‘sowing the wind’ of irresponsible environmental

exploitation as they pursued scale economy competitiveness norms that were

clearly now unsustainable. Innovation by a transformed RIS now re-purposed as a

GRIS would be an underpinning necessity informed by RRI. Responsible innovation is

defined as:

…a transparent, interactive process by which societal actors and innovators become

mutually responsive to each other with a view on the (ethical) acceptability, sustainability,

and societal desirability of the innovation process and its marketable products (in order to

allow a proper embedding of scientific and technological advances in our society)…

(Owen et al., 2013)

This RRI approach included more focal attention to new forms of value-chain thinking

based on a less rigid and ‘Fordist’ division of labour where, instead, all skills need to collaborate

to accomplish, for example ‘Passivhaus’ standards in construction or zero ‘food

miles’ in consumption and zero carbonization and pollution in production.

To conclude this sub-section we may briefly return to Von Schomberg’s (2011) consideration

of the ethics and regulation of new technology and innovation in the contemporary

era. This is not least because it reflects back on the initial context of this paper

which deplored the ‘move fast and break things’ recklessness of much innovation, but

especially that in 4.0 era Industry like social media, AI and robotics which impinge so

penetratively on socio-cultural and politico-economic norms of everyday life to the

concern and anxiety of many (Liao, Loures, & Ramos, 2018; Lu, 2017). An important distinction

drawn is between new technology and innovation. Von Schomberg begins as

follows:

…Whereas technological inventions were, historically, controlled by a central agent to avoid

abuse, modern innovations are distributed through market mechanisms whereby property

rights allow, in principle, the further improvements of the innovations by other market operators

over time. Economic exploitation of innovations implies a loss of a sole control agent;

yet the state demands from industrial operators that they address the so called three market

hurdles of efficacy, quality and safety before they can legally market their products or processes.

(Von Schomberg, 2013)

So, according to regulatory conventions or protocols – distinct from rules or laws that are

enforceable – much innovation is allowed to be reckless ‘in the breach’ of trust that innovations

coming on to commercialized markets display efficacy, quality and safety. As we

have already demonstrated prodigious weaknesses infect these three assumptions. It

remains only to say that our examples of Facebook, Google and Uber plus many of

their subsidiaries like YouTube and others patently fail the protocols of ‘efficacy’

(massive negative social externalities), ‘quality’ (minimal value gain to innovation, invasion

of privacy, stealing private information) and ‘safety’ (trolling, bodily harm, induced

addictiveness) (Galloway, 2017; Srnicek, 2017; Taplin, 2017) . Accordingly RRI is fatally

weakened by markets that further and do little to prevent reckless and even lawless

digital and other technology firm practice. Hence the purportedly legally sanctioned

market ‘hurdles’ over which each player is supposed to jump. In that case jurisdictions

are obliged to indict all such infractions as the EU did with genetically modified organisms

(GMOs).

FAGAMi: with or without ‘global controllers’

To summarize the argument so far there is precious little responsible research and innovation

(RRI) as the digital tech (Cooke, 2017a) 4.0 Industry Era has taken hold on

advanced and other globalized economies. By 4.0 Industry is meant the package of knowledge

intensive services that includes: research (R&D), financial technology (‘fintech’), software

and systems design, cybertechnology (from cybersecurity to cyberwarfare), artificial

intelligence (digital technology or ‘digitech’), robotics, biotechnology and genomics, and

cleantech. By informed introspection on the above, we can further elaborate the normative

‘dark matter’ schedule by which selected 4.0 FAGAMi firms, particularly the advertisers

Facebook and Google transgress. These RRI anti-norms show (1) zero transparency to

consumers, societies or juridical regimes in which they operate. (2) breach of trust (do

no evil) (3) stealing private property (hypocrisy over data harvesting) (4) lawlessness, personal

insecurity, (fraud) and (5) recklessness (negligible beta testing). We will try, in the

space available, to observe the working out of these anti-norms in three separate contexts

in what follows. First, we focus on ‘Fintech’ because of the 4.0 Era AI practices evident in

financial services, specifically High Frequency Trading (HFT).

Fintech

The Wharton FinTech website gives ‘granular’ guidance on some examples of ‘Fintech’, as

follows.

FinTech is an economic industry composed of companies that use technology to make

financial systems more efficient. Examples include a wide range of sub-industries, from

crowdfunding and peer-to-peer lending to algorithmic asset management and thematic

investing. FinTech companies also operate in payments, data collection, credit rating, education

lending, digital currency exchanges, working capital management, cyber security

and even quantum computing. Despite operating in such a diverse set of domains, these companies

share a common attribute: they build and implement technology which is used to

make financial markets and systems more efficient. (Wharton FinTech, 2016)

We can also interrogate the claim in RRI research that fintech firms, like digitech firms

altogether:

(as quoted above)…they address the so called three market hurdles of efficacy, quality and

safety before they can legally market their products or processes. (Von Schomberg, 2013)

First, we attend to some key nuances in the ‘morality’ of FinTech as part of the digitech

conspectus by exploring the nature of the ‘pipelines’ (Lyons, Coronado Mondragon,

Piller, & Poler, 2012) by which HFT microgeographies are shaped. They not only need

ultra-fast connectivity, as shown below, but although opaque to outsiders they operate

with ‘glass pipelines’ to so-called ‘flash-traders’. When exchanges or Alternative Trading

Systems (ATS) cannot identify a willing seller for a security at the best publicly quoted

price, they flash the order to a select group of its market participants – those equipped

with the requisite high-speed technology – to seek out sellers who do not publicly

display their sell price. Accordingly, HFTs can respond instantaneously with their own

order to execute in response to the flashed order. Market participants armed with the

appropriate algorithms, thereby enabled to view such flashed orders, can take advantage

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of possible price arbitrage opportunities or other financial benefits, including fees and

rebates for using different exchanges or ATSs. Already, this system caused several big

stock market scares, most notably the ‘Flash Crash’ of 6 May 2010, in which $1 trillion

was wiped off the value of markets in the space of 10 min. This most dramatic such

ATS event was expressed as a sudden huge fall – and then almost as rapid a recovery –

in prices, which led to a widespread disruption of trading. Cermak (a Chicago suburb)

was where the crash began, triggered by a set of electromagnetic signals – originally generated

by an investment-management firm in Kansas City – encoding a big sell order. As

MacKenzie (2014b) describes what occurred next:

…At Cermak, the order entered a complex electronic ecosystem of trading algorithms,

which would usually have been able to absorb it. For reasons that remain unclear, it didn’t

do so on 6 May, so the shock then travelled from Cermak down the fibre-optic cables connecting

it to the data centres in New Jersey in which shares are traded, spreading chaos as

they arrived. (See, Cooke, 2017b for map)

Yet, despite such chaos, observers of these practices learned a depressing truth: a fortress of

legislation protected the stock exchanges and powerful traders (mostly banks and hedge

funds) designed by lobbyists and politicians. Immoral as these practices might seem,

they were no more illegal than had been the packaging of sub-prime mortgages into tradable

securities prior to the crash of 2008–2009. Incidentally, FAGAMi firms supply

FinTech with cloud computing, customer-facing AI and numerous data analytical algorithms.

As Tooze (2018) reveals, such interactions meant that by; ‘ … the early 2000s 35%

of all profits in the US economy were earned by the financial sector’ (Tooze, 2018, p. 65).

Second evidently, the rise of ‘dark pools’ as modern trading venues means order books

are not visible to those trading on them. This implies there are order books other than that

of the exchange in whose data centre an order is running. Given the competitive deregulation

of US exchanges, trading of shares is spread across some sixty US trading venues.

Accordingly, a change in one venue’s order book for a particular stock usually alerts

traders to the likelihood of changes in the others (MacKenzie, 2014a). It is because of

this nanosecond near simultaneity of market movement that HFT firms need the fastest

possible communication links between data centres. This is to seek out the execution of

an order after it has been made (morally dubious at best and illegal in other gambling

spheres, like the ‘front-running’ in George Roy Hill’s The Sting) but before it has been

fulfilled. Currently such time economy access, which routinely would require contact

between sixteen exchanges, including NASDAQ’s data centre in New Jersey and that of

the Chicago Futures exchange in Aurora, Illinois, was in 2014 available to HFT traders

by NASDAQ at between $7,500 and $10,000 between 100 and 190 microseconds per

month. Accordingly, HFT firms need the swiftest possible communication links

between data centres. Thus an HFT programme trading shares in NASDAQ’s data

centre in Carteret, New Jersey (Cooke, 2017a), would usually need a microwave link to

the CyrusOne (CONE) global data centre’s electronic trading centre in Aurora, Illinois

near Chicago. Similarly, it would need access to the order books of the other exchanges

on which the target company’s shares are traded.

One related and morally dubious area that had once been legislated against and in 2010

re-legislated for is the practice of ‘spoofing’. On 21 April 2015 the financial trader Navinder

Singh Sarao was arrested in Hounslow, near London airport. The US Department of

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Justice had filed an extradition order to put him on trial in Illinois after charging him for

his practice of ‘spoofing’ futures markets. This meant entering orders without genuinely

intending to buy or sell, which contributed to his trading profits of about $40 million

between 2010 and 2014. Part of the explanation of the criminalization of spoofing is

that regulatory attitudes to it changed with the rise of electronic trading. Spoofing was

harder to accomplish in a traditional Chicago public trading pit, where, as in a poker

game, bluffing was not thought of as wrong, immoral or illegal. Rather, if it was accomplished

successfully no punishment occurred. However, as MacKenzie (2015) points out:

…few markets have ever been places of untrammelled competition; they nearly always

contain at least fragments of moral order. Spoofing might have been acceptable [in a

Chicago trading pit], but if you reneged even once on a deal with another pit trader (deals

were either verbal or agreed by eye contact and hand signal, and thus not realistically enforceable

in law), you risked being informally shut out from trading by everyone else, perhaps for

good. Instead of face-to-face markets based on direct human interaction, we now have something

more like the ‘perfect markets’ of some economists’ imaginations: individualistic, atomistic,

and anonymous. Moral questions, however, have been displaced, not eliminated.

There is a growing sense that the electronic order book, precisely because it is now the

heart of so many financial markets, has to be pure. All orders must be ‘entered in good

faith’; the poker player has no place. (MacKenzie, 2015)

But ‘good faith’ is a matter of intent and not easy to prove or even to identify as the boundary

that divides clever dissimulation or strategy from evident bad faith, and beyond which

bad faith becomes crime. As MacKenzie (2015) concludes: ‘It’s a deep and difficult issue,

and calls to mind an old Marxist word: contradiction.’ He refers to human behaviour

mimicking neoclassical textbook economics as a paradigm case of ‘performativity’ (MacKenzie,

2008).

One RRI finding of the research reported here in the representative HFT niche of that

‘FinTech’ stratum is that an obscuring of the rules of fair play by governments and corporations

has become acceptable. Especially in securities trading, but also in the wider

economy, firms now routinely lie about automotive emissions, fake stories are rewarded

from advertisement ‘clicks’ on social media (Bridge, 2016), energy firms are seen to

have been regularly ‘gouging’ customers and insurance firms increasingly engage in fraudulent

schemes to exploit their customers. Thus, such ‘relational work’ research has been

prescient in seeing how boundary lines between fraudulent and honest behaviour became

blurred. Although first established in the 1980s ‘Dark Pools’ have become routine in securities

investment.

Regulators, it is widely claimed, have been complicit in this process allowing the rules to

be written by expert representatives of those same banks. Thus we showed the impact of

‘warp-speed’ access to electronic information and its associated rewards for HFT by ‘colocation’

in the newly opened data centres to which – and inside – AI traders are attracted.

Once ‘open cry’ trading created a carnival like ‘community of practice’ in traditional stock

exchanges like Wall Street. But now employees are principally virtual machine minders for

the AI algorithms that control price movements. Within the community of practice are

divisive ‘esteem wars’ over moral divides as against economic imperatives. Individualism

is rewarded by a bonus culture that separates the ‘postsocial’ networks that are able to

survive. This has led to new definitions of normal work, like HFT, which bring into question

the modern, especially financial, market’s susceptibility to human control. So, stock

market regulators seem ‘captured,’ often having to interpret blurred ethical and other rules

let alone enforcing them. Meanwhile, traders habitually find new loopholes and technologies

to outwit regulatory intentions. It can be concluded that speed has, in effect, de-moralised

the microgeography of HFT as an early ‘first mover’ in the emergence of a

dehumanized relational work of AI-type market relations. This ‘profession’ is clearly

riddled with ethical irresponsibilities that mean it warrants dedicated research into its

socio-spatial (microgeographic) modes of ethically ‘lawless’ practices. Transparency is

clearly absent from ‘dark pools’ to all but a privileged few. Breach of trust in relation to

the safeguarding of proprietary data and, in effect, robbery from investors, personal insecurity

towards minorities from embedding in the ecosystem culture, fraudulent ‘scams’

towards FinTech investments in bogus insurance schemes and general recklessness

leading to events such as the ‘flash crash’ that wiped one trillion dollars off the market

value of stocks in pursuit of a dollar, characterize this form of postsocial AI world of

work. It is, indeed, a ‘de-moral-ised’, albeit prodigiously lucrative, ecosystem for a few

(Tooze, 2018).

Digital positioning and geolocational analysis

The role of digital technology in ‘Planning the Future’ is a complex and as yet little understood

or yet to be disclosed topic of interest. It is discussed in the next section, but first we

aim to show how digital positioning was developed as geographical information systems

(GIS) that are the origin of ‘surveillance capitalism’ that enormously facilitates the Big

Data harvesting that, even today, operates in a lawless and otherwise irresponsible way

to exploit private identity co-ordinates. As yet, as a subject of little critique from spatial

researchers it remains ripe for consideration and analysis by responsible researchers interested

in the near-future urban and regional spatial development scene. In what follows, we

will briefly survey two crucial roles conducted at specific points in the recent and more

digitally distant past played, first, by geographical (GIS) research, its beneficiaries

(notably, but not only Google) and, second, its current exploiters (including, but not

only Google) of digital technology in creating new built environment utopias. In each

case, norms of transparency, unauthorized data harvesting, invasion of privacy and the

infringement of social norms of fairness, inclusivity and exclusivity with implications

for social polarization and insecurity are transgressed by the instigators. We begin with

the origins of geographical information systems (GIS) and its evolution as an arena of significant

(academic) political conflict.

As Sieber and Haklay (2015) summarize it:

Throughout the development of geographic information science (GIScience) as a field of

study, there was a clear emphasis on the development of algorithms and rules to optimise

geographic data collection. The field was accompanied by claims about accuracy and representational

power emerging from the quality of the instruments (e.g. sensors mounted

on satellites or a total station), the universality and absolutism of accuracy, and the knowledge

that experts in national mapping agencies and other state institutions brought to, for

example, spatial data quality standards. Mirroring domains like computer science and statistics,

truth tended towards the singular (e.g. the most accurate and precise latitude and longitude)

and was sought via Mertonian norms of science, that is, the general expectations of

empirical scientists that were codified by Robert Merton (1942).

This should not surprise contemporary readers. The positivist turn in geography had

reached its apotheosis. The subject had, for once gained respectability among elite political

decision-makers as a potential source of strategic knowledge of value to administrations

seeking global domination. GIS became of key importance to neoliberal progenitors and

Cold War warriors as embodied in leading figures in the Reagan administration such as

Edward Teller and his ‘Star Wars’ scenario of a nuclear defence shield connected in cyberspace

and located in outer space. The major funder of GIS was the US military. DARPA

was on the UCGIS steering committee for the NSF-funded first GIS research programme

based in University of California, Santa Barbara, University of Buffalo and University of

Maine.

The following account, originally researched by this author in 2010, is based on an

exemplar of the role of industry-university-city-regional-state co-operation in the application

of GIS to varieties of market-demand in Europe, the US and globally. It focuses

on ‘Future Position X’ (FPX) an intermediary among the above-noted partners in

Sweden, researched in 2010 (Cooke, 2010). The Swedish Mapping, Cadastral and Land

Registration Authority (Lantmäteriet) had used the well-known ArcInfo architectural software

suite ArcGIS for many years and had a longstanding and cooperative relationship

with the nearby University of Gävle. Accordingly, the University signed a site license

agreement with US data-miner Environmental Systems Research Institute (ESRI) in

2008 in order to use the ArcGIS suite of software in various GIS training courses.

When the ESRI S-Group chose Gävle as their headquarters, the basic agreement was

extended to create an ESRI Development Center (EDC). The EDC was later formally inaugurated

in May 2011. This mimicked its setup next to Redlands University in its California

location of origin. The city of Gävle made a commitment to implement GIS in the majority

of services it provided to the public. EDC was to work together with the city of Gävle, FPX,

local GIS industry and the ESRI S-Group to make this objective a reality. Hence FPX continued

to specialize in R&D and GIS applications. This also exploited Gävle University’s

Geodata research and applications facility. So the corporate partner designed GIS algorithms

to guide Cruise Missiles as ESRI’s (undated) presentation on ‘battlefield’,

‘command & control’ and ‘military operations in urbanized terrains’ presentation

makes clear (Pickles, 2006) in another ‘questionable alliance’.

Digital ‘company town’ planning

To return to the mindset or ‘framing’ of GIS by geoscientists in the 1990s, it was not a

purely positivist ‘assumptive world’, as described above. Even FPX adhered to norms of

public relevance, transparency and social innovation in green, security and healthcare services.

But it was not as easy to lead markets in ways that the US competition sought, often

emphasizing military, global competitiveness and liberal market opportunities (like for

example ESRI or GoogleMaps and Facebook’s Map App). Nevertheless, as Sieber and

Haklay (2015):

When critical geographic information systems (GIS) emerged in the mid 1990s (Schuurman,

2000) and methodologies such as participatory GIS … were developed, they were considered

marginal and in opposition to mainstream GIScience. Adoption of less-than-hard-scientific

and non-authoritative methods of the data collection process were questioned in terms of

scientific legitimacy, and the use of unstructured data or the mixing of qualitative and

quantitative information was not accepted in mainstream GIS material. (e.g. Longley, Goodchild,

Maguire, & Rhind, 2001)

What happened next is that the qualitative analysis overtook the quantitative as behavioural

psychology led to the capability for algorithms to be created that have enabled

specialist firms to supply predictions of emotional states – oppressively used by Facebook

especially in its data harvesting of ‘likes’ to evolve predictive marketing and revolutionize

advertising. This has recently reached the point where face recognition now allows retail

assistants to interpret customer mood as (s)he enters the shop (Silver, 2017).

Rapidly now, with space at a premium, this presages distinctive types of social control or

‘modern utopias’ for work/life re-balancing as part of digitech’s ‘Plan the Future’ vision.

First, Morozov (2017) critiques the prevalent mood of alienation among digital workers

as a quest for authenticity against their current disillusion. He distinguishes two types of lifestyle

choice. The first is a modern heir to the Arts & Crafts philosophy (Cooke, 2015) which

he refers to as the John Ruskin ‘modern artisan’ model. It exists in various ‘hipster’ ‘makerspaces’

and ‘fablab’ niches. The second, termed the De Tocqueville model involves commitment

to working for change from an alienated to an active civil society. The first model

creates social conflict from the urban hipster culture that has excluded poorer social and

ethnic groups from gentrifying urban spaces, as the recent recantation of the ‘Creative

Class’ model by its progenitor testifies (Florida, 2017) who realizes the:

…forces that power the growth of the world’s superstar cities also generate their vexing challenges:

gentrification, unaffordability, segregation, and inequality. Meanwhile, many more

cities still stagnate, and middle-class neighbourhoods everywhere are disappearing. (op. cit.)

The De Tocqueville model is argued by Morozov (2017) to be exemplified by WeWork, a

startup funded by Goldman Sachs and Japan’s SoftBank (UK chip designer ARM’s owner)

for its ‘space as a service’ that melds ‘big data’-harvesting analytics and real estate to customize

life and work space for digitech urbanites. The evident trend in this ‘capitalist

kibbutz’ model is a kind of 4.0 Industry Taylorism as practised in Henry Ford’s earlier

‘utopias’ (Cooke, 2017b). Accordingly, worker living space design becomes the means

of extracting further cognitive surplus from leisure transformed into labour (another AI

‘performativity’ model; MacKenzie, 2008).

That this is being implemented by the likes of Facebook, Google and others is evidenced

by ‘Plan the Future’ involving urban planning designs by ‘starchitects’ like Frank Gehry

and Norman Foster. It is testimony to the overwhelming desire for control of skilled workforces

by their owners or champions (in the case of Cambridge’s ‘Silicon Fen’) involving

exclusive ‘company town’ utopias like Eddington, Cambridge, Quayside (Googleville)

Toronto, Be’er Shiva’s Ottoman City revitalization and Facebook’s Frank Gehry-designed

Willow Campus in Menlo Park dwarfing even Norman Foster’s Apple Park HQ design in

Cupertino. Each cluster began with comparatively local entrepreneurial reach but became

resolutely diversified and international in business scope, including ‘born globals’ (i.e.

small-medium enterprises [SMEs] with early international markets). Cambridge’s ‘Plan

the Future’ option has reached implementation phase:

…Here the University of Cambridge is turning 150 hectares into three thousand homes, half

of them affordable, plus 2,000 postgraduate student bed spaces, 1,00,000 sq m of research

facilities, and the schools, shops, surgeries and the like needed to sustain them … The

plan is now taking physical form and, so far, it is doing what it said it would. The first homes

have been completed in Eddington, which is the name given to the first phase. Residents have

started moving in. A “market square” is complete. A new [supermarket] opened last week. A

primary school has been open for two years. Swirles Court, housing for the graduate students

of Girton College, is also complete. (Moore, 2017)

Elsewhere, Facebook’s need to secure scarce digital labour has led to its ‘Plan the Future’

option enlisting New York architects to design its Willow Campus digital village:

Facebook has announced that architecture firm OMA will masterplan a new village for the

area adjacent to its Frank Gehry-designed campus in Menlo Park, California. The social

media giant enlisted OMA’s New York office to redevelop the former Menlo Science & Technology

Park, a 56-acre property that the social media giant acquired last year, located south of

its headquarters. According to Facebook, the Willow Campus neighbourhood will provide

‘long-needed community services’, including housing and transportation solutions.

(Gibson, 2017)

Finally, Google also announced its development of a new ‘utopian settlement’ on recovered

derelict docklands on Lake Ontario in Toronto.

The project announced last week is a partnership between Sidewalk Labs, an Alphabet

[Google] subsidiary focused on urban technology, and Toronto city government. Sidewalk

Labs will be in charge of redeveloping a waterfront district called Quayside … Mayors

and tech executives exalt urban labs as sites of disruptive innovation and economic

growth. However, this model of creating our urban future is also an insidious way of

handing more control – over people, places, policies – to profit-driven, power-hungry corporations.

(Sadowski, 2017)

So here are some of a growing medley of ‘Plan the Future’ urban designs being crafted by

highly-reputed architectural firms to construct – as Morozov (2017) notes – ‘…what

amounts to the twenty-first century equivalent of the company town, albeit with much

subtler forms of social engineering’ (Morozov, 2017, p. 31).

Conclusions

As space is limited, only three main conclusions may be safely drawn from these two main

narratives – but it could easily be more (e.g. subversion of democracy by psychological

profiling, breaches of military rules by the increasing use of cyberweaponry such as

drones, stimulation of addictive behaviour and promotion of paedophilia etc. by

various streams of digital media). The first of these combines lack of transparency and

breach of trust. This is especially pronounced where absence of transparency is the centrepiece

of the FinTech sector’s reliance upon advantage it takes from exploiting ‘dark pools’

of investment resources and profiting quasi-illegally from AI transactional interchange.

Although neoliberal regulation first allowed this to occur, attempts have been regularly

tried to implement fairer rule in ATS, so far to little avail. Clearly regulatory irresponsibility

is a subject ripe for RRI-type investigation. Social media’s dark pools involve obfuscation,

intransparency and bad faith for users seeing only the rosy propaganda

promulgated by the big data harvesting and socially controlling corporations and their

questionably utopian ‘Plan the Future’ ambitions.

Second we can see great need for RRI assessment of the typical practices of digitech and

social media businesses in respect of the norm-transgressing infractions of ‘lawless’ trust-

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breaking in respect of exploiting investor funds for illicit gains in HFT and general data

harvesting or eyeball scraping of social media consumers. These never signed up to be

‘human donors’ of raw material in the form of profitable Big Data to facilitate global advertising

material. Furthermore the many illicit publishing enterprises hosted by the likes of

Facebook, Google and, increasingly, the others are only now being addressed by jurisdictions

in some countries. From the ‘carrier’ not ‘publisher’ clauses in the US communication

legislation to the dubious tax avoidance schemes fostered by transfer-pricing

legislation all the FAGAMi group are found wanting.

Finally, in the matters of control, propagandizing and electoral fraud, once again

Google and Facebook and their subsidiaries sail close to or against the legislative conventions

of democratic societies. In these and many other cases, the role of investigative journalists

offers a model of good practice in seeking to bring the social media transgressors to

book. Accordingly, in this article a massive research agenda has been sketched in for future

RRI researcher and innovation analysts, to explore – sometimes into their own direct disciplines

– as in the case of the unwritten critical history of GIS and social media’s Planning

the Future – change occurring outside democratic, let alone egalitarian, principles.

Note

1. This is an example that a reviewer found controversial having read the Abstract of this

contribution. However the motto’s removal from the Facebook website occurred on 30

April 2014 https://www.cnet.com/news/facebook-announces-anonymous-login/. Another

difficulty the reviewer had was with the following: ‘large enterprises have become rent

seekers not innovators’. However this sentiment is the subject of the following cited and

referenced books: Erixon and Weigel (2016); Lindsey and Teles (2017); Mazzucato (2018);

Tepper and Hearn (2019). Another is the following: ‘contemporary innovation destroys

more value than it creates’, This is amended to make it clear it is particularly true of AI

and robotics but the Amazon effect is also an obvious case where the buildings, and jobs

of many people were destroyed by its e-business. References like Ford and Frey &

Osborne in text and citations reference this. Another is: ‘the “digital economy” is widely

observed irresponsibly to exploit human rights’, This is factually true in the case of digital

advertisers like Facebook and Google. Fines have been levied on their infringement of

human rights by the European Courts of Justice. Finally the following is queried: ‘in the

process it massively augments social costs of military action, criminality and crime detection;’

we can qualify this by inserting ‘social media’ and its abuse by providers like Facebook’s use

in the ethnic cleansing of the Muslim people in Burma, Russian criminality in distorting elections,

broadcasting of hate crimes etc. are all everyday features of social media as an innovation.

The reviewer’s ‘virtue signalling’ warns that this contribution is not a ‘safe space’

immune from critique.

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