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Who, or what, is insurtech personalizing?: Persons, prices and the historical classifications of risk

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Abstract

This paper examines the promises and pitfalls associated with Insurtech – the anticipated innovations in the insurance industry associated with social media marketing, artificial intelligence, big data analytics and more – and focuses in particular on the new methods of pricing and premium setting that are claimed to follow from the availability of self-tracking technologies and new volumes of customer data. Using the examples of telematics data in car insurance, efforts by health insurers to incentivize health behaviours (for example through the use of fitness trackers), and insurance companies' own marketing materials, we assess the current state of play in the field of 'personalized' insurance pricing, pointing to obstacles as well as opportunities associated with its development. We then set these contemporary developments against a longer history of insurance pricing, understood as a history of arranging and classifying objects and persons for the purposes of calculating risk. We show that in its longer history, insurance reflected but also contributed to uncertainties about the distinction between persons and property. Drawing these two strands together, we conclude by assessing the implications of insurtech for future understandings of personhood. While there is scope for new categories of personhood to emerge, we show that there are also important continuities between past and present in terms of the challenge of bringing persons, parts of persons, material objects and pecuniary interests into successful alignment.

Keywords: insurance; insurtech; price; personhood; data; tracking.

I want us to go for that insurance policy.

- Ed: What insurance policy?

The double indemnity. The one Jill's selling. She's, um, convinced me.

- Ed: You saw her? –

We had coffee together.

- Ed: When?

Well, you were so unfriendly to her, I thought I should make up for it.

- Ed: What did she say? –

Oh, just stuff. About the policy. About her. I like her.

- Ed: She's just a Jill hard-selling insurance.

Oh, I think she's more than that, Ed. Don't you?

https://www.springfieldspringfield.co.uk/view_episode_scripts.php?tv-show=philip-k-dicks-electric-dreams-2017&episode=s01e04

Introduction

Double indemnity, as all noir devotees know, is a clause – rich in moral hazard – whereby a life insurer promises to pay out double in the case of accidental death. The extract above is from a 2017 dramatization of the Philip K Dick short story 'Crazy Diamond'¹. The script twists another loop into the noir premise because Jill, the femme fatale character, is not just any old Jill, she is *a Jill*, a non-human endowed with a limited life-force 'Quantum Consciousness'. Jill's ruse is to tempt Ed to steal a Quantum Consciousness to re-endow her failing one while getting his wife to sign up for a contract that will double indemnify his life, a life that will soon be threatened by the existence of the contract. The plot describes a world of cold technology entangled with warm sentiment confronting fragile, contingent futures. The resulting dystopian Philip K Dick pastiche is nearly indecipherable, but peer at it long enough, with soft, half-closed eyes, and the strangest thing in it is the arrangement of persons and objects in the insurance contract. This is a contract in which Jill, a non-human, acts as an insurance person while Ed, a human, is positioned as an insurance object.

Insurance history is replete with such strange arrangements. The objects insured - ships, houses, plate-glass, elevators, mobile phones, Cyd Charisse's legs - are a cypher of value. What is it that, at the present time, has such value that the prospect of its future loss cannot be borne without some restorative mechanism? It is this question that brings the insurance mechanism into being. The generally accepted account locates the origins of insurance in the thirteenth century, among the many commercial innovations, from bills of exchange to double entry bookkeeping, of the Lombardy merchants (de Roover, 1945; Levy, 2012). Restoring the damage wrought to cargo and merchants by *risicum maris*, the perils of the sea, was almost certainly insurance's first job.² That the sea presented difficulties that could not always be avoided made the use case for something that could sort out the losses. The arcane insurance rules that were developed to govern this sorting are a reminder of how high the stakes in classificatory struggles run (Bowker and Star, 1999). Each insurance innovation invents some classification, some arrangement of objects and persons, to allow value, and value practices, to be standardised. In this paper, we explore how these classifications are expressed in insurance and its technologies. What entities, what aspects, elements or combinations of valued human beings and things are currently the targets of classification, and to what ends?

Insurance technology has lately earned its own neologism. 'Insurtech' is cast as the coming disruptor of a huge, rich, unpopular and impersonal industry whose products are bought without enthusiasm or affection, often in response to legal or financial pressure, by customers whose brand loyalty is really just inertia. This is all set to change as the Schumpeterian gale of insurtech dislodges or transforms incumbents allowing insurance transactions to be 'personalized' through innovations in social media marketing, behavioural tracking, big data analysis, Artificial Intelligence, machine learning and more.³

Broadly speaking, personalization involves using data about an individual to tailor marketing strategies towards them (Arora et al. 2008). While the personalization of products, distribution and promotional offers is relatively uncontroversial, the same cannot be said of pricing. The slope of the demand curve indicates that some customers will be willing to pay more than others for the same product and historically, sellers have exploited this to charge different prices to different customers based on their prior relationships and knowledge of them. Pushed along by mass markets and consumer rights advocacy, however, standardised, displayed and transparent pricing became common from the early twentieth century onwards (Carrier, 1994; Moor & Lury, 2018). Still, market situations have persisted- and insurance is one of them - in which price is too complex or fluid to expose patterns in its variations. Such exceptions have been tolerated but the emergence of new techniques, including dynamic, surge and personalized pricing, that use new and sometimes opaque data points to set prices has created a new set of controversies. These controversies are shaped by broader debates about the privacy, security and surveillance of personal data in a context of datafication in which online quantified data, real-time tracking and predictive analysis promise, or threaten, to reshape social action (boyd & Crawford, 2012; van Dijck, 2014).

Pricing structured by personal data has generated extensive commentary about the consequences for fairness and access (Schüll 2016; Lupton, 2016a, 2016b; O'Neill, 2016) – particularly to essential and financial services including insurance and credit – that arise under broad processes of datafication and personalization. Under these conditions new forms of selfhood or personhood are said to emerge (Schüll, 2016; Ruckenstein and Schüll, 2017; Lupton, 2013; 2016a; Moor and Lury 2018). Yet when the diversity and particularity of specifications of personhood are considered historically (for example by looking at the classificatory, material and historical practices of insurance), questions arise about how to think about change in an always contingent category. Relatedly, it is not always clear that the

term ‘personalization’ adequately captures the diversity, particularity, opacity and precarity of insurance pricing practices⁴. Not all forms of personalized pricing, for instance, use data that is all that personal, some are based on usage and some may be anonymous, as when an unknown shoppers lurks around a product on a website or a market stall provoking sellers to issue offers.

In what follows we are concerned with how persons and objects are classified and arranged in insurance, and with how human agency is made to fit with existing and emerging industry techniques and measurement practices. We begin by describing a few recent ventures in insurtech. These ventures, notably the adoption of fitness-tracking techniques, are reconfiguring risk and responsibility in ways that appear about to personalize insurance transactions, but may not do so in quite the way intended. What insurtech is already doing, however, is testing how insurance treats and classifies persons and objects. Reviewing these classifications historically, the task of the following section, exposes the variety and contingency of forms of specification of who, or what, counts as a person, or as an object, under what circumstances and to what ends. What purposes does it serve to identify some individual humans, and not others, as an insurance ‘person’? This raises the rarefied question of what, exactly, the concept of person is referring to. Personalizing processes are assumed to be acting on a pre-existing, stable, complete, conscious, free human being – but is this true? We ask this not just because it's an appropriate question for a special issue on price, but because it goes to the heart of debates about what personalization in insurance specifically, and in marketing and pricing more generally, is about.

The response-ability of Insurtech

What is the right amount of human? It's not zero, but it could be a lot lower than it is.
Hugh Terry, Founder, *Digital Insurer*⁵

Insurtech is a clumsy portmanteau. It is harder to say than fintech, its better known sibling, and has a fading rival in the earlier alternative ‘insuretech’⁶. Names, definitions and classifications matter everywhere and in insurance they cause their own kind of trouble. There is insurance and there is assurance, terms separated by a technical distinction reserving insurance for events that *might* happen (fire), from assurance for events that *will* happen (death). Then there is life insurance that applies when death *might* occur, as in a given time frame. There is the fact that not all Anglophone territories use the term ‘assurance’ at all and those that do mix them up in practice. Beyond life insurance there is insurance on all sorts of objects, against all sorts of events but, for a global industry, there is surprisingly little agreement on what to call the types. What is known as general insurance in the UK, Australia and many parts of Africa and Asia, is called property and casualty insurance in the US and non-life insurance in the rest of Europe. In the UK, the word insurance invokes a commercial and privatised contract for mitigating risk but in other parts of Europe it could just as well refer to the contributory mechanism that socialises risk. Insurance might be defined as a legal contract, as an organised practice and as a political rationality. It is all of those things, but at the most basic level insurance is a technology, a technology for doing risk.⁷ Through insurance technology payment responsibility for the risks of illness, injury, death, accident, crime and so on can be spread across a defined group.

If this is right, and insurance is *always* a technology, what does the new term designate? Insurtech is typically taken to refer to technology-driven innovation in insurance. More specifically, it is associated with the disruptive role accorded to actors originating from outside the sector, notably from the digital technology industries. Hyperbole surrounds insurtech start-ups modelled along Silicon Valley lines and particular data-driven innovations in products, processes and delivery models. Among the latter, the most established insurtech innovation is in car insurance, where telematics devices or ‘black boxes’ combining

telecommunication, wireless and vehicular technologies are used to monitor individual driving behaviour and price accordingly. These devices soften actuarial prices, which have historically used limited data points (usually driver age, gender, vehicle type, and licence penalty points) to assess the future cost of claims associated with particular groups of drivers. Actuarial pricing means that younger drivers face higher prices based on the claims history of the whole group⁸. Telematics policies use an alternative model to set premiums by augmenting these datapoints with individual driver data including vehicle location, speed and behaviours like acceleration and braking.

These policies are an emblematic example of individualised or personalized insurance and they have set the terms for the debate about insurtech. By provoking concerns about discriminatory surveillance, covert commercial control and the delegation of human responsibility to objects, black boxes seem to portend a profound change in the relationship between insurance and technology. Yet the character of that change cannot easily be derived from the relationships between people and objects that arise in telematics. For one thing, price personalization is not a straightforward proposition for an industry that is reputation sensitive, heavily regulated and built around the classification of group risks (Minty, 2018). As Swedloff puts it ‘insurers set prices by predicting the probability that any group of observationally identical individuals will suffer a loss ... [they] individuate those prices by determining whether the particular observable characteristics of a particular insured correlate with particular harms’ (2014: 4).

But the telematics narrative also risks distracting from the range and peculiarity of person/object relations embedded in insurance. In keeping with its origins navigating sea risks, insurance has a watery resistance to fixed definition. It always applies technologies to classify and distribute risks and responsibilities across persons, objects, properties, even God, but beyond that lies a whole atlas of variations. Insurtech is not about insurance engaging

with technology, it's about an encounter with outsider technologies, technologies that were not developed with insurance in mind but threaten as with the hotel and taxi industries to 'uberize' the sector⁹. This is an historic break that expands the atlas way beyond the new structure introduced in telematics policies. Insurance firms were close partners in the development of information processing technologies (Yates, 2005; Campbell-Kelly, 1992) and before that in the development of all sorts of mercantile instruments. Insurtech turns on an encounter with the digital technology industries, with products, platforms and processes that were designed with something else entirely in mind. This takes insurance imaginaries into distant territories, territories in which even science fantasies or speculative fabulations (Haraway, 2016) involving non-humans plotting double indemnity fraud, are worth considering.

This may seem far-fetched, but insurtech is embarking on a series of projects that seem speculative or fantastical partly because they introduce new distributions of risks and responsibilities between persons and objects. These are distributions that query who, or what, is the bearer of responsibility, who or what is positioned as 'response-able' in future contingents. More precisely, they raise the question about the locus of nominally 'human' capacities for instance consciousness, self-representation and reflectiveness (c.f. Hirst and Woolley, 1982). Consider for example the following scenarios. Telematics devices can detect a wide range of driver behaviours including phone use and alcohol levels that are identified risk factors. The US National Highway Traffic Safety Administration has trialled a Driver Alcohol Detection System for Safety that will prevent a car from starting if it detects the driver is over the limit¹⁰. If insurers adopt these features it will create interesting questions about responsibility in the event of the technology failing (for instance, by not detecting a drunk driver or recording a false positive and preventing an urgent trip).

The use of telematics data in car insurance premium setting has also provoked concerns that self-tracking health apps and devices are being, or soon will be, used to similar effect in health and life insurance.¹¹ The proliferation of data available from genomes, the self-tracking of sleep, exercise and diet patterns, is taken to mean that insurers ‘will increasingly calculate risk for the individual and free themselves from the generalities of the larger pool’ setting premiums accordingly (O’Neill, 2015: xx; Lupton 2016b). Given the increasing prominence of insurance schemes that offer incentives to policyholders using fitness-tracking devices this seems a reasonable conclusion to draw. The South African insurance company *Discovery* has been incentivising healthy behaviours since the 1990s (French and Kneale, 2009) through a variety of rewards, for example cinema tickets, discounted food and gym membership. More recently, under the brand *Vitality*, which is traded in the UK and US, it has begun to offer Apple watches at heavily discounted rates to customers who meet monthly ‘activity points’ targets. Oscar Health, a start-up launched in the US to trade in the new marketplaces set up in 2014 as part of the Affordable Care Act (or Obamacare), offered members free *Misfit* fitness trackers with the incentive of Amazon gift card dollars for those who met individualized, algorithmically determined, step targets.

On the face of it, these schemes imply a discriminatory financialization of personal habits. ‘What if’ Forbes’ Steven Bertoni (2014) asked, ‘thanks to wearables, health insurance began to work like car insurance where every health infraction (say a bar bender, Thanksgiving feast or sedentary Sunday of Netflix binge) hurt your health score and rocketed your health premiums?’ But a few leaps are being made here. *Vitality* and Oscar Health offer rewards and incentives for consumption in a way that parallels retailer loyalty schemes. Offering bonuses or rewards to those who reach fitness targets clearly influences price but that is not the same as using self-tracking data to assess and price individual risk. The latter is fraught with practical, regulatory and reputational obstacles (Arentz and Rehm, 2016;

McFall, 2017; Minty, 2017). Insurance is a closely regulated field with a patchwork of legal and voluntary prohibitions limiting the types of personal data that can be used to price risk. In addition, while driving habits have a measurable and therefore, in Knightian terms, priceable relationship to accident (Knight, 1921), the relationship between the number of steps taken and overall health risk is highly uncertain. Determining health risk at an individual, rather than a population level is near guesswork – there will always be random 100 year old smokers (Davey Smith, 2011) and the clinical evidence to support the health benefits of self-tracking is patchy (Neff and Nafus, 2016). In a competitive field, companies are also protective of their brands and cautious about any reputational damage that could arise from being associated with uses of personal data that might be seen to discriminate against legally protected characteristics.¹² For those reasons, self-tracking devices, unlike telematics devices, have not been transformed into insurable risk bearing objects.

Brands matter a great deal in insurance. In the eighteenth and nineteenth centuries brands were built to convey solidity, respectability and a flash of mythology –amidst the Prudential, Equitable, Provident virtues there were Phoenix, Pelicans, Pearls and Rocks. By the twenty-first century brands were corporate, consolidated and much less lively in a market context distinguished by low levels of brand differentiation and customer trust. The path to the present can be traced backwards through an example like Aviva, the largest British multinational general and life insurer. Aviva was chosen in 2002 as the new name for a company formed from the merger of Norwich Union, Commercial Union and General Accident and over 100 other companies named after lions, oceans, planets, professions and places all the way back to the earliest, the Hand in Hand Fire and Life formed in 1696. Aviva is a palindrome based on the Latin for alive. It was meant to sound memorable, snappy and global but it entered a conglomerate lexicon of equally forgettable names. Like other major insurers, Aviva commissions research to inform its branding and product development

strategies. One of its most recent reactions to this undifferentiated landscape is a product called ‘Ask it never’ which aims to provide quotes without asking customers any questions relying instead on digital footprint data to underwrite the risk being presented (Minty 2017b)¹³.

‘Ask it never’ is one of many data-driven underwriting innovations. Another, SelfieQuote.com, is the result of a collaboration between Legal and General America (LGA) and a science and technology company, Lapetus Solutions Inc¹⁴. Customers upload a selfie and Lapetus’ facial analytics technology analyses age, gender and BMI to inform LGA’s indicative quote. Both Aviva’s Ask it Never and LGA’s selfie.quote.com summon a different looking insurance world in which risk can be assessed from opaque footprint or jpeg data. Digital technologies here appear to take the place of lively ‘human’ capacities for determining risk and responsibility. Yet the initial quotes in both cases are followed up with more traditional underwriting questions. There is insurtech innovation here, but much of it is in promotion and presentation. SelfieQuote.com and Ask it Never look different, livelier; characteristics they share with many other insurtech start-ups. Oscar is another case in point. The company’s strongest distinction is not the self-tracking feature but its brand. The company was named after founder Joshua Kushner’s great-grandfather in an overt effort to differentiate and humanise the brand that is expressed across its ‘HiOscar.com’ url, its product packaging, cartoon advertising and Apple-esque office design. Across the insurtech landscape the names – Lemonade, Bought-by-Many, Spixii, Brolly, InMyBag – are quirkier, friendlier – more human. These are brands designed with personalities. If anything, it is brands, not prices, that are being ‘personalized’ here. The direction of travel may seem to be towards the distribution of more person-like qualities for calculating, transacting, and assessing risk onto technologies and objects, but as we show in the next section, that route is more crooked than straight.

‘Am I not a man and a brother?’ ‘Am I not a woman and a sister?’ On property and persons in insurance

These quotations are recognisable as the mottos of the British abolitionist movement of the late eighteenth and early nineteenth century. They were embossed above Josiah Wedgwood’s image of a suppliant, kneeling slave on numerous pottery plates, brooches and medallions and credited with swaying the public and political argument for abolition first in Britain, and later in the United States where a printed rendition of a kneeling, enslaved woman circulated widely. In their double signalling, as political and as brand advertisements, the tokens are uncomfortable commemoratives, marking the actions of abolitionist reformers over those depicted as passively enslaved. The tokens, and the brutal history they hint at, is familiar enough. Less familiar are some of the legal, financial and commercial arrangements that made the slave trade viable. Insurance has its own distinctive place in this history as can still be discerned in how its terminology and classifications emerged and were put to use.

Developing a mechanism to repair losses at sea likely defined insurance’s first purposes but the traceable history of marine finance instruments from around the thirteenth century is messy. There is a period of overlap between sea loans, in which a seagoing merchant takes a loan from a land-borne merchant to cover losses if the vessel fails to reach its destination intact, and marine insurance proper, in which the seagoing merchant, ‘the insured’, pays a premium to the land-borne merchant, ‘the insurer’, who in return agrees to pay out a given sum in the event of a disaster at sea. The latter format, with ‘stereotyped’ policies and terminology was settled by the fifteenth century and changed little for over three hundred years (de Roover, 1945: 198). During the same period, the structure of mercantilism changed. A system of trade conducted through chains of agents and partners emerged and cargoes sailed with captains rather than merchants. ‘Difficulties to avoid in the sea’, *risicum maris*

were transformed into risk or *risque*, an object and a form of private property, that was isolated from physical goods and could be traded independently from those same goods.

This maritime history is the root that connects risk practices to nineteenth century liberal notions of self-directing, free persons (Poovey, 1998; McFall, 2007; Levy 2012). Marine insurance was designed to compensate financial losses incurred when a merchant's cargo never made it to its destination. This might imply that insurance in this period was primarily addressed to covering things, objects or property, not persons or 'lives', but this is where insurance classification practices are murkiest. As Levy has it; 'before men became the proprietors of "risks" on their own free selves, they first owned the "risks" on the bodies of their slaves' (2012: 22). Insurance on slave cargoes dates back at least to the fifteenth century and it was, in terms of head count, the largest share of the nascent life insurance business even before the transatlantic slave system was developed (Clark, 2013). The business was so well established that by the time abolitionist arguments were being articulated in the late eighteenth century, insurance was part of a proliferation of commercial contracts that treated *some* human lives as commodities. Slave insurance has been read as a bizarre legal exception, a particular confusion between personhood and property in the course of defining how to insure persons. This doesn't hold, as Clark pointedly observes, because 'as a legal matter and a social fact, individuals had long been construed as property' (2010: 53). What marked out Atlantic slavery he argues, was not the confusion of the categories of person and property, but the ruthlessness of the system's disregard of the norms that had formerly applied to legal relationships involving human property.

This is clear in the catastrophic case of the Dutch ship, the *Zong*, that Clark discusses. The fate of the *Zong*'s human cargo memorialised in Turner's famous painting of 1840 'Slavers Throwing Overboard the Dead and Dying, Typhoon Coming On' records an event that took place almost sixty years earlier¹⁵. The *Zong* left Africa for the West Indies with 442

slaves on board. Disease broke out and by the time the ship reached the Caribbean more than 60 slaves and 7 crew members were dead and many more were gravely ill. Faced with dangerously low supplies of drinking water, Luke Collingwood, the ship's captain, claimed his order for 133 of the sickest slaves to be flung overboard was made only in an attempt to save those he could.

What happened on board the *Zong* was a brutal expression of the terms of the slave insurance contract. Marine insurance policies on slaves excluded claims resulting from 'natural' deaths on board but they admitted claims for those arising from an attempt to save the ship or its crew. When the case went to court Collingwood's argument that his actions were motivated by a water shortage was undermined by his financial interests in a share of the profits if the ship completed its voyage - or, if it failed in an *insurable way*. Slaves dying in an emergency jettison were recoverable losses. For the purposes of insurance, the shipowner's lawyer argued, slaves 'are goods and property, whether right or wrong, we have nothing to do with it' (quoted in Clark, 2010: 56).

This argument was a calculated gloss on the entwined histories of insurance and slavery and the legal norms that existed to regulate the treatment of certain categories of persons as property. English law in the middle ages recognised an inalienable form of property in people who were not accorded the rights of fully, autonomous individuals but who were not quite chattels either (Clark, 2010). Wives, children, apprentices and servants were understood as a form of property for their masters but not a tradeable one.

Although the common law did not support the buying and selling of persons, it did support the general principle that one person could own certain kinds of property in another. While commercial legislation simply opposed the class of persons, who by definition have certain rights, to the class of things, which by definition do not, the common law's emphasis on status traditionally presented another, mixed category, that of a right-bearing subject who is also the property of another. (Michals, 1993: 201)

Clark (2010; 2013) elaborates the peculiarity of the norms governing property and persons through the case of insurance contracts issued on the lives of enslaved woman made pregnant by their owners or another man. These contracts appear to have been used to hedge against fines issued in late medieval Barcelona, Genoa and Rome on slaveowners for causing, or allowing, the pregnancy. Under some statutes the fines were issued, or the amount doubled, if the enslaved woman died during pregnancy or childbirth. The statutes convey a sense of the injury as a public affront to the hierarchies of social relations and property holding. In Clark's reading 'an enslaved woman's death owing to pregnancy or childbirth represented the very worst outcome of a social and moral transgression' (2010: 59).

Such cases show how delicately the distinctions between property and persons were pinned in legal, commercial and specifically in insurance practices. This remained the case into the eighteenth century even as the patterns shifted and commercial life assurance began to settle into a more stable and regulated institutional form. One of the key moments in this long process of stabilisation was the 1774 Life Assurance Act. This Act was also known as The Gambling Act in a double naming that gives away the overlap in practice between insurance and speculation. Following the issue of a sequence of notorious insurance contracts made by third parties on the lives, and in one instance the sex, of others, over whom the insured had no pecuniary interest, European governments in France, Amsterdam, Genoa, Germany and the Netherlands prohibited insurance on lives (Murphy, 2010). In England, the Life Assurance Act attempted instead to temper the capacity of insurance to, as Clark has it, 'create property willy-nilly through a rarefied trade in abstract contingencies' (2010: 68) by stipulating that an economic, 'insurable' interest be demonstrated by the contract's proposer in the life named on the policy.

Insurable interest requires that individuals have a reasonable expectation of pecuniary loss through the death of another person and that the sum assured is in line with that loss. It

curtailed the proliferation of morally hazardous contracts and was adopted widely. Insurable interest regularised some speculative insurance practices but not quite all. Policies were, for instance, auctioned to speculators on the legal technicality that insurable interest only had to apply when the policy was issued, not if it was later traded (Murphy, 2010). Auctions were not the only tolerated exception. Another branch of the life business, known as industrial life assurance, disregarded insurable interest entirely.

Industrial life assurance policies began to be sold, and weekly premiums collected, by agents working from door-to-door around the 1840s (McFall, 2014). By the end of the nineteenth century industrial companies were trading on a scale that dwarfed the business of the older ‘ordinary’ life assurance sector which catered for the middle and upper classes. Industrial business was targeted at the poor, the ‘industrious classes’, and was designed initially as a mechanism to restore expenses associated with the never distant contingency of a funeral in the family. This meant that the majority of policies were taken out on ‘lives of another’ – on husbands and wives but also on parents, children, aunts, uncles and grandparents - in whom the proposer might, or might not, have an insurable interest. The absence of insurable interest was quietly disregarded throughout the nineteenth century because of the small sums involved, in deference to the social importance of funeral provision and in tacit acknowledgement that these expenses might otherwise fall on the public purse. By 1910, the industry was colossal and clamouring for a correction to be made to grant legal standing to millions of policies. Over the coming decades, several laws attempted to retrospectively whitewash these policies. But legislators struggled to make law that recognised how industrial policies classified the variety of familial and object relations at play in financing funerals. They struggled to define the sums that might be commensurate with funeral costs and struggled even more to specify where the line should be drawn between direct burial costs and allowable expenses associated with wakes, mourning clothes,

travel, lost earnings etc. Even specifying the sort of relations between the proposer and the life assured that might be permissible as a special type of insurable interest was confounded by confusion surrounding cases of illegitimate, step, adoptive, foster and informal familial relations.

Implicit in this was a deep uncertainty about whether the poor could really be specified as the free, conscious, self-governing persons of nineteenth century liberal thought. The disregard of insurable interest in industrial assurance was partly a consequence of this uncertainty. At the least, the economic contracts of the poor were regarded as different in kind and involving different sorts of relations. This is evidenced in the enduring hysteria over industrial assurance contracts taken on children's lives (McFall, 2014a; Zelizer, 1981). For seventy years or more a connection was drawn, in the press, courts and parliament, between these policies and deliberate neglect or murder. The small sums at stake betray a persistent belief, in the absence of supporting evidence, that the poor did not possess the attributes necessary for self-government in market relations. They were regarded as particularly susceptible to moral hazard, a category of person for whom even a moderate financial incentive could lead to infanticide.

These cases demonstrate the role the insurance trade in abstract contingencies played in creating a proliferation of property relations involving both persons and objects. Through such practices insurance companies were deeply implicated in the obscure geometry that defined who qualified as a person, who was an objectified form of property, and the sorts of relations that should persist between them. This capacity to articulate, define or summon particular concepts and attributes of the person is not unique to insurance but it is expressed within it. This raises questions about who, or what, 'the person', as the supposed foundation of the insurance contract means.

Who, or what, could insurtech be personalising then? Persons, markets and prices

First, persons

the idea of the person is an insurance policy. (Rorty, 1988: 31)

This remark is part of philosopher Amelie Rorty's dissection of the concept of person. Rorty insists that given the dramatic discontinuities in how persons have been characterised and rendered in moral and legal practices over time and across cultures there can really be no such thing. Human beings, as Marcel Mauss (1979) famously insisted, are specified in all societies but they are not necessarily *individualised* as 'unique entities coincident with a distinct consciousness and will' (Hirst and Woolley, 1982: 118). By describing the idea as an insurance policy, Rorty refers to the work people want the category to do; perhaps being a person secures certain rights, to be treated with regard, as rational, thinking, well intentioned beings. For John Dewey, person could mean 'whatever the law makes it mean [...; it] might be used simply as a synonym for a right-and-duty-bearing unit. Any such unit would be a person' (1926: 656). This, as the legal history of insurance demonstrates, does not mean that every human being lands in the category of person. 'A slave has no juridical personality,' US Justice Roger Taney ruled in 1857, and 'therefore no right to recognition anywhere as a person before the law' (Slaughter, 2014: 274).

Thus far, we have been concerned with the variety of ideas about the person expressed in certain historical types of insurance. Not every human being under these insurance skies qualified as a person endowed with the sorts of attributes and characteristics commonly bundled under the concept. The person as 'the author of their own acts and centred in a unitary, reflective and directive consciousness' (du Gay, 2007: 21) most closely resembles two of the parties to the insurance contract: the insurer, whether an individual or a

corporation, and the insured, the individual proposing the contract. Other human lives, for example, the lives assured by the contract, might be limited forms of property. Prior to 1774, these individuals might have been unknown to the proposer, after 1774 they could still have been unaware of the sums assured under their names if they were poor, wives, children or other relatives insured under the ‘lives of another’ category in industrial assurance.

These insurance cases mark how very particular, ‘all the way up and all the way down’, the contexts which define concepts of person are (Rorty, 1988: 8). Insurance practice was an active protagonist alongside legal, political and commercial systems in negotiating the attributes a ‘person’ should possess. Thinking about insurance practice in this way means taking a deeply contingent approach to concepts of the person, one which sees these concepts as the outcome, not the foundation, of social processes. Historically and anthropologically little can be taken for granted about the attributes that define ‘true’ persons. As Rorty explains, a society’s conception of agency is closely linked to the forms of action that are seen to ‘preserve or enhance that society’s conception of its proper survival and development’ (1998: 30). This means that the range of traits taken to define ‘persons’ inevitably change. Rorty maintains that societies set consequential ‘paradigm cases’ that define the range of agents rendered capable of responsible action whether ‘corporations, human beings, demon possessors, martians or dolphins’ (1998: 30). This is something that emerging insurtech technologies are already caught up in, for instance, in ongoing legal debates about the determination of responsibility for losses or accidents caused by vehicular telematics. Viewed this way, the distribution of person and property statuses among human and non-human individuals in insurance, maps onto the definition of responsible or ‘response-able’ agency established in contemporaneous legal, financial and commercial arrangements.

This argument deserves closer sociological attention than it often gets. The idea that the concept of person has within it the essence of the normative, moral principles that must be defended against political, economic and technological upheaval is powerful. But if there is no single concept of person, it cannot settle disagreements and conflicts about competing values and priorities – or about the consequences of technological change. The social processes, notably here the legal, institutional and commercial rules that govern the operation of markets, have always been party to how persons are specified. If what we understand by the person is the outcome of a network of relations and attachments that includes the laws of markets, should that more actively inform how we think about the ways human users are ‘transformed’ (Lupton, 2016a, 41) by the incorporation of digital devices?

Second, markets

Thus far, we have focused on the contingency of the identification and specification of persons and their attributes but what does this mean in the context of market practices?

Patrick Aspers defines markets as social structures for the ‘exchange of rights in which offers are evaluated and priced, and compete with one another, which is shorthand for the fact that actors – individuals and firms – compete with one another via offers’ (2011: 4). Buyers and sellers face each other and constitute social structures that stabilise as markets over time through an accumulated material and practical history of transactions. This points to the role of particular, visible practices in configuring markets but it doesn’t cover one of the primary questions markets, particularly emerging, ‘disruptive’ markets, raise in practice. How do markets become markets, where do they get their persons from and what attributes and actions qualify an individual as a person for the purposes of markets?

In the history of insurance selling, markets are often referred to as sources of ‘prospects’ (McFall, 2014a). Prospects are groups of individuals that may share some

attribute, for example newly qualified drivers, new parents or owners of rare pets, that makes them susceptible to a particular sales approach, proposition or idea. These ‘markets’ are only prospective markets but that is what makes them interesting. To emerge, markets depend on recruiting new prospects to continually extend the chains or networks of relations that will make them durable. In his classic discussion of the path that led to the technological and mass market establishment of the Kodak camera in the nineteenth century, Latour concludes that ‘a chain of associations is more real than another if it is longer’ (1991: 118). Step by step, relation by relation, markets owe their existence and their survival to this extension. What this implies is not that markets must recruit whole, human individuals but rather that markets are involved in configuring certain sorts of attributes and practices that ‘make up’ persons as prospects, as regular customers, as disaffected ‘churned’ consumers etc. Markets, in other words, don’t need or want to see whole or individual persons; they want targetable group categories of customers configured from bits of personal data .

As Hacking (1986) argued, there are instances in which identified, named categories of person seem to emerge synchronously, ‘hand in hand’, with the persons in them. Naming categories of person concerns how practices or behaviour at an individual level meet those of a community of experts. Hacking posits a framework in which this encounter involves two vectors pressing together to create a particular reality. Something similar is rendered in Foucault’s *History of Sexuality*, as two poles, the ‘anatomy-politics of the human body’ and the ‘biopolitics of population’ linked by ‘a whole cluster of intermediary relations’ (in Hacking, 1986: 169). This idea of a cluster of intermediary relations is vital to understanding the encounter that takes place between sellers and buyers. As Hacking acknowledges, the advertising industry is largely engaged in making-up people summoning what he calls our ‘susceptibility’ for roles for which ‘we have no name’ (1986: 170).

What we are suggesting is that the enterprise of marketing, or more broadly, market making mobilises neither a whole person nor a susceptibility for roles, but a blur of attributes that in an unstable, reflexive loop specify us as persons. This is what Hennion, Meadel and Bowker (1989: 208) are getting at when they argue that we are already incorporated, ‘traced out’ within products by dint of the prolific series of intermediary techniques that constitute markets.

Third, price personalization

Now, with the evolution of data science and network computers, insurance is facing fundamental change. With ever more information available - including the data from our genomes, the patterns of our sleep, exercise, and diet, and the proficiency of our driving - insurers will increasingly calculate risk for the individual and free themselves from the generalities of the larger pool. (O’Neill, 2016: 164)

Insurance companies are beginning to develop other ways of incorporating self-tracking data into the calculation of risks and resultant premiums offered to customers. (Lupton, 2016b: 108)

Personalization dynamics in marketing, particularly in pricing, have attracted a lot of attention. Market personalization is one of the more visible outcomes of the combinations of new technologies, correlative analysis techniques and mythologies that define ‘big data’, notably through the use of transactional and purchase histories to make personalized recommendations and offers (boyd and Crawford, 2012; Vargha, 2017; Moor and Lury 2018). This has led numerous authors to raise questions about who is getting access to what data, what sorts of analyses are being conducted and with what effects on different groups and individuals (Schüll 2016; Lupton, 2013, 2016a, 2016b; Neff and Nafus, 2016; O’Neill, 2016; Pasquale, 2016). In the case of insurance, the risk that datafied personalization could

also mean targeting, discrimination and exclusion of minority and ‘underserved’ groups is hardly the stuff of dystopian fantasy for an industry based on the classification and assessment of risk groups (Bouk, 2015; Swedloff, 2015). The use of big data to inform what the industry refers to as ‘price optimisation’ has attracted the attention of regulators in several US states and is currently part of a Financial Conduct Authority review in the UK.¹⁶ It is nevertheless premature empirically to conclude that insurance companies are rushing toward personalized risk pricing (Lupton 2013; 2016; O’Neill, 2016).

The associated claim that datafied, surveillant or ‘dataveillant’ (Ruckenstein and Schüll, 2017) personalization in insurance, as in consumer markets more generally, is creating a new, ‘database self whose truth lies in scattered points, association and dynamic accretions’ (Schüll, 2016: 11), ‘sliced and diced into decontextualized parts, and bought and sold’, (Nafus & Neff 2016: 62) foregrounds this emergent self. The credit reporting agency *Experian* has made the ‘data self’ the focus of its 2018 advertising campaign and visiting almost any website, including those of academic publishers, produces a slew of personalized recommendations that can follow you all over the internet¹⁷. It is almost impossible to avoid being confronted with representations of our selves, our pasts, our preferences hastily assembled from data traces. If, as we have suggested, the traits and attributes that combine to specify persons are the outcomes of a network of relations and attachments, then datafied personalization practices are clearly involved in this business. There is however a danger that foregrounding a new ‘sliced, diced’ database self obscures historical continuities in the way that markets configure only the bits and pieces of persons deemed relevant.

Insurers have never classified or attached risk to whole human individuals. Instead, they have focused on defining qualities or attributes that qualify certain human beings as persons for insurance purposes. Hence, as we have seen, some human beings were categorised as persons, some as property, some as a mixture while some ‘persons’ could bear

legal, insurable responsibilities without being human. The recent foray of insurance into personalization schemes exposes a rather different but parallel disinterest in whole persons. As elsewhere in the market, existing personalizing strategies are not geared towards gaining deep knowledge about persons through the scrutiny of data collection and tracking technologies. Nor do these strategies require the revelation of pre-existing, but previously secret, parts of the self for the purposes of discrimination. It is a process by which new sets of relations between persons, parts of persons, material objects and pecuniary interests are established. These may, or may not, entail ‘discrimination’ against groups with legislatively protected characteristics¹⁸, but they almost all involve making classifying and grouping persons on the basis of identified attributes or behaviours.

To explain what we mean, consider again the use of behavioural data in pricing. There are around 850,000 telematics based motor insurance policies in existence in the UK.¹⁹ The ability to track the driving habits of individuals, and to use this information to offer more variegated prices to members of riskier groups may be considered ‘actuarially fairer’ (Meyers & Van Hoyweghen, 2017) than pricing based on socio-demographically constituted groups of person. And yet the ‘personalization’ at work here does not entail a drilling down into the depths of the person. Instead, it creates a new type of interaction between the driver, the black box and the insurer, predicated on heightened visibility and self-awareness, such that the box performs a dynamic disciplining function on a driver whose pecuniary interests are brought into some kind of alignment with those of the insurer. Behavioural data from self-tracking in health and life insurance is different. Vitality and Oscar Health offer rewards and incentives to participating policyholders but the data is not used to set individual premiums. This doesn’t mean these schemes are completely unconnected to pricing. Oscar and Vitality’s incentive schemes include promotional deals with companies like Amazon, Apple, Starbucks and Virgin and Nuffield gyms, all of which are more likely to appeal to younger and more active

groups with a lower probability of becoming ill. The benefits to the companies lie in attracting younger, fitter customers who are, after all, the main users of wearables (Neff and Nafus, 2016).

Personalized targeting, as Moor and Lury (2018) argue, is never just personal; it involves generalisation and the production of ‘types of persons’. In insurance it runs very close to risk selection, which applies when insurers use marketing techniques to appeal to targeted groups.²⁰ Covert risk selection applies where insurers are prohibited, for example from differential pricing on grounds of protected characteristics or health status, but there is nothing to prohibit the development of brand personalities like Oscar health insurance that are more likely to appeal to particular groups. Pricing and promotion co-depend and co-vary in marketing strategies in ways that make it hard to disentangle personalized promotions from personalized prices (Moor and Lury 2018). In addition, insurance pricing has to cover the projected costs of risks assumed, be set at a level that attracts sufficient numbers of the right sort of customers and be compliant with policy regulation. Even without the newly proliferating sources of personal data, insurance pricing is never simply derived from actuarial calculations of risk. It depends instead on an almost alchemical dexterity in combining socio-economic, managerial, accountancy, actuarial, clinical and scientific knowledges, figures and tools (Ericson et al. 2000; Van Hoyweghen 2014; Minty, 2017).

Behavioural forms of personalization, such as those in telematics-enhanced car insurance, act *on* the person to shape behaviour. To explore this further, consider another instance of the data-intensive organization of markets to see what kinds of ‘persons’ the market produces when it is *not* apparently aimed at ‘doing personalization’. In recent years, energy providers in various countries have tried to make use of ‘live’, or regularly updated, prices in order to even out fluctuations in demand. This has typically been implemented with the help of in-home technologies – more black boxes – that show users changing prices

throughout the day, with the hope of incentivizing energy use when prices are lowest. Thus an attempt is made to orchestrate persons, behaviours, technologies and pecuniary interests. Such activities are not typically considered as price personalization, however, since they do not set prices based on known characteristics of individual users. If ‘the person’ is understood as an entity with fixed but potentially knowable characteristics, as well as some kind of interiority or personal depth, then that person is protected from scrutiny under this market arrangement. And yet, like more obviously personalized insurance arrangements, it seeks to act on the person and to mobilize certain kinds of behaviour. Moreover it is not clear that this arrangement is ‘fairer’ than one in which aspects of the user are known through data. After all, the ability to respond to fluctuating energy prices, and therefore to take advantages of lower costs at certain times of the day, is limited in ways that are clearly linked to aspects of the person (for example their job or employment status) but over which that person may have very little control. Prices still adhere to persons (or ‘personal situations’); the difference is that here the person cannot realistically do anything to change them.

In fact, by focusing on the possibility of using ‘deep’, data-driven, knowledge of the person to engage in price discrimination, critics of personalization may inadvertently conflate different aspects of the datafication of markets that might benefit from being treated separately. With regard to fairness, for example, the argument that price personalization should not lead to poorer people being excluded from offers, or charged more than wealthier people, makes sense to many. But reversing the argument, to allow wealthier people to be charged more, and poorer people less, involves a different notion of fairness. Since the economic logic of price discrimination is to find and extract the maximum that a given consumer is willing or able to pay; this may in principle benefit poorer consumers, by giving them access to more affordable products and services rather than being effectively excluded by fixed prices. Such an understanding of fairness would, however, be a highly novel one in

most markets, organized as they are around unspoken principles by which market equality and fairness (in theory if not in practice) means the same price for all.

The second issue raised by datafication relates to what institutions ought to be able to know about users, and whether this should depend on factors such as how information is gathered and used. One question is whether people might be willing – or indeed should be allowed – to reveal aspects of their personal identity that could benefit them financially. This issue can overlap with the question of fairness in cases where disclosure of ‘personal’ information might benefit historically disadvantaged groups. The case of insurance is again instructive here, since women drivers are actuarially determined to be safer, and this has led to preferential premium pricing. Such deals have been outlawed in the EU for gender discrimination. This seems strange to some because it appears to allow women drivers as a group to be disadvantaged by rules designed in part to protect them. What has happened in practice is that the gap between men’s and women’s premiums in car insurance has continued to widen, because insurers have found alternative means of covert risk selection through proxies (e.g. occupation, size of car) that correlate well enough with gender without naming it. Such cases reveal something about how market persons are construed when apparently ‘fixed’ aspects of personhood are disregarded, or even prohibited from being taken into account. In effect, ‘personalization’ now involves individual consumers being suspended in webs of data points (occupation, vehicle, income) without ever quite becoming a ‘group’ that could recognize itself as such, nor imagine itself as discriminated against (Moor and Lury 2018).

This links to a final – and relatively overlooked – aspect of datafication in markets, which is what we ought to be able to know about *each other*. Forms of price variation that appear ‘impersonal’, such as variable energy pricing, are interesting in part because while they make discriminations, they do so in ways that are hard to see because they are hidden

behind the proxy of individual choice and freely chosen behaviour. Choosing to use energy at a certain time of day is seen as a behaviour that is entirely separable from aspects of the person, even though it is constrained by ‘personal’ factors such as whether or not one is employed, whether a home worker, a stay-at-home parent and so on. People who cannot take advantage of lower prices during the day can never cohere into a group, and can never take collective action to improve their situation. In fact, markets regularly make such discriminations, and create groups and classifications in ways that are invisible to most of those involved. Michel Callon (2002) has pointed to the emergence of new market ‘populations’ – in one case, ‘cruise goers who live in or near Paris’ – through market research practices, and observes that such categories could never have been anticipated by sociological theory. The point is that such groupings are often temporary, for short-term commercial use only, and, importantly, draw on aspects of the person that the individual to whom they ‘belong’ may not be aware.

What we have been suggesting, then, is that markets have always been involved in making persons: characterizing them, naming them, and endowing them with rights, or alternatively, obscuring them and making their membership of broader reference groups hard to see. At the same time, the contemporary datafication of markets – and the new arrangements that this enables – multiplies the possibilities for fine-grained distinctions. This does not generally require ‘deep’ knowledge of the self. The behavioural turn in marketing that has resulted from ubiquitous data collection means that markets produce persons – and thus engage in ‘personalization’ in at least one sense of the term – not just by ‘knowing’ them, but also by acting on them and incentivizing some behaviours while discouraging others. Furthermore, contemporary personalization practices produce *connections* between persons – chains of associations – that are sometimes visible and sometimes hidden.

Conclusion: Uncanny valley

The history of insurance reveals a process of transforming and classifying objects and persons as risk. This has included treating some humans as objects or property and some non-humans as persons. At a time when liberal conceptions of free, self-possessing persons were reconfiguring the relationship between personhood, status and property, life insurance contracts never simply mapped existing financial interests or social ties: they became part of the very stuff of personal relations, the material out of which complex social and economic ties were built. It is this disturbing intersection – between the tasks of underwriting property and underwriting individuals– that makes insurance arrangements so uncanny and often troubling. In insurtech the distribution of responsibility and risk across humans and non-humans is subtly changing again, raising the prospect of insurable ‘response-ability’ that might be attributed to devices from autonomous vehicles to a whole range of artificial intelligences from facial recognition to alcohol detection.

Our argument is that some claims made about the capacity of insurtech devices to personalize prices by using ‘personal’ data to calculate risk have not paid enough attention to contemporary and historical practices of risk classification. The extrapolation from the use of data derived from vehicle telematics to inform premiums to the role of fitness tracking devices in health and life insurance made or implied in journalistic and academic literatures glosses over the diversity and difficulty of price setting in these sectors (McFall, 2017). The use of incentives, rewards and premium reductions in companies like Oscar and Vitality occupy an ambiguous space between promotion and pricing. Such schemes may suggest prices are being set in accordance with tracked personal data, with all the potential for social discrimination that implies but there is an important distinction to be made between promotional offers that affect price and the use of data to calculate risk.

If our question is who or what is being personalized in insurtech, then our cautious answer is that it is neither the human individual nor price. Insurance has always transformed bits of humans and non-humans into persons for particular legal and commercial purposes but has, in common with other market contexts, shown little interest in knowing or surveilling the whole person. All forms of personalization also involve the establishment of particular relations between a person and a reference group (Moor & Lury, 2018) that is underplayed in the debates about privacy and dataveillance. This relates to a more general issue with the under-specification of personalization as a concept. We have adopted a baseline definition that associates personalization with the use of data about an individual to tailor marketing strategies towards them. While there are plenty of examples of personalization in this sense a lack of clarity persists about what we mean by the person or the personal and therefore what its consequences might be.

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¹ The dramatized version shares the same name but bears almost no relation to the original.

² Etymologically, the concept of risk tracks back from the Latin, *risicum*, to 'a Greek navigation term "rhizikon, rhiza" which meant "root, stone, cut of the firm land" and was a metaphor for "difficulty to avoid in the sea."'

There are always debates to be had about etymologies but still see <http://research.dnv.com/skj/Papers/ETYMOLOGY-OF-RISK.pdf>

³ In this world, personalization is lauded as an almost unequivocally good thing. See Meyers and Hoyweghen for an overview of blog posts on Swiss Re's Open Minds blog platform and the collection hosted at <https://www.the-digital-insurer.com> conferences <http://insuretechconnect.com>. The blogs of start-ups and incumbent accelerators, thinktanks and garages rehearse the same themes. Some are more cautious seeing personalization's potential to 'poison the risk pool' <http://www.theactuary.com/features/2017/10/new-tech-big-data-are-they-good-for-insurance/> <https://ethicsandinsurance.info/2018/03/08/personalization/>

⁴ See Ericson, Barry & Doyle (2000) and van Hoyweghen (2014) for the delicate balancing of investment, risk assessment and demand shaping insurance pricing and Meyers & van Hoyweghen, 2017 for insurance debates on actuarially fair pricing.

⁵ <https://www.raconteur.net/business/why-insurance-is-going-from-boring-to-interesting>

⁶ <https://trends.google.com/trends/explore?date=today%205-y&q=insuretech,insurtech>

⁷ A more specific characterisation of insurance as a technique can be found e.g. in Ewald (1991); Donzelot (1988) and O'Malley (1996). Here we position insurance as a technology more generically as a practical means of 'doing' risk.

⁸ Young, male drivers have historically been the riskiest and most expensive group to insure but since 2012 the EU has enforced rules on gender neutral pricing in car insurance. http://europa.eu/rapid/press-release_IP-12-1430_en.htm

⁹ See for example <https://rctom.hbs.org/submission/uber-ization-of-the-insurance-industry-aviva-embracing-digital-innovation-to-increase-customer-engagement-and-fend-off-digital-disruptors/>;

<http://insurancethoughtleadership.com/the-uberization-of-insurance/>

<https://www.forbes.com/sites/sap/2017/11/07/why-its-taking-so-long-to-uberize-insurance/#1e927b0d1835>

¹⁰ <https://www.theguardian.com/technology/2015/jun/08/cars-prevent-drink-driving>

¹¹ See <https://www.wired.com/2014/12/oscar-misfit/> <https://gigaom.com/2014/12/08/insurance-provider-oscar-will-reward-you-if-you-hit-your-step-goal/> <http://www.bizjournals.com/newyork/blog/techflash/2014/12/oscar-passing-out-fitness-trackers-incentives-to.html> <http://fortune.com/2014/12/09/oscar-health-insurance/> <http://gizmodo.com/an-insurance-company-will-pay-you-to-use-your-fitness-t-1668967153>

¹² Consider for instance the convoluted regulatory responses limiting the use of genetic data in life and health insurance, including the adoption of voluntary moratoria by the industry (van Hoyweghen et al. 2007; Joly et al. 2010).

¹³ Video of TV advertisement available at <https://vimeo.com/254286749>

¹⁴ <https://term.lgamerica.com/selfie-quote/#/>

¹⁵ See <https://www.mfa.org/collections/object/slave-ship-slavers-throwing-overboard-the-dead-and-dying-typhoon-coming-on-31102>

¹⁶ See Minty (2017); <https://www.fca.org.uk/news/news-stories/call-inputs-big-data-retail-general-insurance>

¹⁷ See <https://www.experian.co.uk/consumer/your-data/>

¹⁸ Disability; gender reassignment; marriage and civil partnership; pregnancy and maternity; race; religion or belief; sex; sexual orientation in the UK's 2010 Equality Act

¹⁹ Ralph (2017) quotes 850,000 digitally enabled policies in UK car insurance with quarterly growth between 6-8% <https://www.ft.com/content/894c3f5e-786c-11e7-a3e8-60495fe6ca71>; Deloitte (2016) identify the UK and Italy as European leaders in the field estimating these policies will make up around 25% of the market by 2020.

²⁰ See Arentz and Rehm (2016: 10) 'programs based on wearables seem to be particularly suitable for risk selection, as they appear likely to attract those insured that sickness funds are interested in, the young, wealthy and therefore healthy individuals'.