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EDITORIAL

Check for updates

Doing economics otherwise, from one crisis to the next

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This is a fated, if fraught time, to offer some thoughts on the state of the community that surrounds the *Journal of Cultural Economy* (JCE). When I originally conceived the idea of writing an editorial in my new role as co-editor-in-chief in the early weeks of 2020, I imagined calling it 'Doing economics otherwise, or how to predict the next crisis.' It was an uncanny twist of fate that as I turned my attention to reviewing work published in *JCE* about the financial crisis of 2007–2009, this new one fell upon us. Needless to say, my focus on prediction shifted to a focus on the present, on how the complex field of cultural economy could speak to and inform the way we collectively deal with the current economic, health, and governance crises. In the more than a decade since the financial crisis, *JCE* has published a wide variety of research and commentary on culture and economy. That crisis galvanized a community of scholars – among whom I count myself – who contributed a wealth of scholarship on the cultural economy of finance. And yet, there is no doubt that the long tail of that scholarship has flattened over time and become less of a focus than it once was. This is not bad; the diversity of cultural economy work is one of its greatest strengths. And yet, there is something fruitful about having one or more central foci around which thinking, research, and writing can coalesce, if even for a short time.

I had imagined thinking through what new issues or crises might become foci for the journal in coming years. There will be many. But it is clear that one that we must urgently take up is the pandemic itself. Economists have already done this. Just as pre-prints of medical research have been rapidly published online since the pandemic began, economists have been quickly offering research on such topics as inflation in 'covid consumption baskets' (Cavallo 2020), labor market impacts of school closures (Rojas 2020), and the impact of the pandemic on firms' expectations of credit availability (Ferrando and Ganoulis 2020), among many others.

But the current crisis is a complicated one. It erupted into a moment in which democracy was already in crisis, with notions of truth, authority, and conviviality in flux and unsettled. It is occurring alongside an inflection point in the struggle for racial justice in the US and beyond, one undoubtedly impacted by the political and economic upheaval the virus has caused, but with the mechanics of that connection unknown. And it is evolving alongside income inequality and climate change crises that already threatened the health and wellbeing of billions. Cultural economy is an umbrella for research into economies and economics that is broad, nuanced, and not beholden to the limiting disciplinary constraints of the dismal science (Pryke and du Gay 2007). *JCE* should be a home to scholarship that, like the research that followed the financial crisis, responds to the moment, refutes economistic and duplicitous narratives about the relationship between the virus, culture, economy, and society, and creates knowledge about the cultural constitution, material practices, and political impacts of the coronavirus and responses to it. It should also do this with a clear accounting of the crises that are still to come, so that we can – as we are uniquely situated to – be a source of wisdom and action in the face of those crises.

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We must do this quickly. So far, we have published a commentary by Julius Kob (2020) in which he applies the notion of curation to Covid-19 science and policy responses to the pandemic. Like an art exhibition, science about the coronavirus needs curation so that governments can 'derive action from epidemic models' (p. 646). Kob reviews the impact of political forces on pandemic responses in Germany and the UK and suggests that '[curational] practice would create a space, which allows for an inclusive scientific discourse that has not yet ingested the power dynamics of the public political and institutional political realm, while at the same time striving for transparency' (2020, p. 248). His insight draws not only on the art world, but also empirical analysis of catastrophe risk markets, demonstrating the unique approach cultural economy can bring to understanding the pandemic. JCE co-editor-in-chief Liz McFall has begun a collective project with a number of postgraduate students of capturing and memorializing various responses to the coronavirus in Scotland, including civic expressions in street art, small business adaptations to stay-at-home orders and pandemic fears, and negotiated responses to vanishing tourism. But we must do much more, and so in this editorial I imagine some additional ways JCE authors might take up the urgent question of the coronavirus crisis.

* * *

This reflection on how the *Journal of Cultural Economy* can rise to the challenges of our current moment fits into an accumulating set of meditations on the fuzzy boundaries of the journal-as-institution. The first issue of the first volume of *JCE* was accompanied by such an editorial, as was the eighth, and tenth. This is the first issue of volume 14, so the timing seems right for another check-in on who we are, and who we can imagine ourselves to be. The idea that *JCE* is a place to broaden what could be conceived of as economics, to analyze the economic in materially, culturally, and socially attuned ways, i.e. to do economics otherwise, was asserted in that very first framing editorial. Bennett *et al.* (2008) characterized the articles in the first issue as sharing 'an investment in work that has sought to make sense of economic practices from outside the discipline of economics. They thus form a central part of the multidisciplinary effort that has helped disrupt the partitioning off of the economy' (p. 4).

What economics otherwise might be was left deliberately broad, with an acknowledgement that it would draw on already existing 'traditions in promoting heterodox work that is concerned with the operation of practices and relationships that traverse the traditional categorical divisions of the social and cultural sciences' (Bennett *et al.* 2008, p. 3). Even so, in her (2015) iteration, current co-editor-in-chief Liz McFall notes that the 'the range and scope' of what was actually published in the journal in its first 7 years 'proved much broader than anticipated' (p. 3):

> The 'material politics' (Law and Mol 2008) at play in the interactions of infrastructures, objects, knowledges and practices have been traced in sites from medical research, to internet use, ship disposal and datawars using methods including ethnography, historiography, field taxonomy and literary narrative. The concurrent timing of our first volume and the GFC led to a predictable flow of articles and special issue submissions exploring finance but the range of topics, locations and angles has been anything but. Liquidity, fictions, material subjects, historical panics, the world cotton trade, metaphors and flows, high-frequency trading through tunnels in the Allegheny mountains, Andrew Haldane's gambit, Russian legal culture, the Brazil, Russia, India, China and South Africa, an association of five major emerging national economies (BRICS) as classificatory innovation, artisanal revitalisation and anthropology's saving potential … Beyond finance, the JCE's contributors have steadily pushed past the forecast 'dream topics' of cultural consumption and production, expertise, public culture, ethics, technology, economic agency and governance once forecast, and observed a whole host of connections, challenges and matters of concern emerging elsewhere. (p. 3)

McFall makes two other points that look particularly prescient in 2020. First, she highlights medical research as one of the areas that went beyond the 'dream topics' (2015, p. 3) of the journal's original editors, a topic exemplified in the 2011 special issue 'The Value of Transnational Medical Research.' In the introduction to that issue, guest editors Ann H. Kelly and P. Wenzel Geissler explain that the included articles 'illuminate the array of practices, knowledges, and techniques through which the value of medical research is brought into being' (2011, p. 4). The question of the value of medical research is undoubtedly a central one in this moment, as disputes over the funding, production, and cost of coronavirus treatments and vaccines is unfolding. In 2014, the special issue 'Economization of Uncertainty' examined the way that insurance, including health and life insurance, functioned as risk technologies to economize uncertainty, a process that is being problematized in new ways as the radical uncertainty of a global pandemic is undoubtedly wreaking havoc on existing underwriting models (Lehtonen and Hoyweghen 2014). The special issue 'In Vivo Economies: Temporalities of Life and Value' published in 2015 similarly expanded on 'the growing entanglement of life science research and market economies' to 'illuminate the articulation of life and value in the contemporary life sciences' (Cooper 2015, pp. 257, 258). Thus, JCE already has a strong foundation on which to build new understandings of the way that 'systems of value' (Kelly and Geissler 2011, p. 3) intersect and contradict one another during this pandemic, which may be key to promoting life-saving interventions.

Second, McFall (2015) also offers the admonition that 'many academics would benefit from a bit of a world-facing shove to produce work that meets pragmatic standards of practicality, usefulness and humility' (p. 6), i.e. our research must respond to the exigencies of the moment. Cooper and McFall (2017) reiterated the commitment 'to be a little faster to respond to world events' (p. 1) just two years later in the third self-reflexive editorial published on the 10th anniversary of the journal. This commentary meditated on the connections between cultural economy and cultural studies. Cooper and McFall show that the debates that produced foundational cultural economy collections (du Gay and Pryke 2002 and Amin and Thrift 2004) are debates in and with cultural studies. They argue that even when the term 'culture' recedes from view, cultural economy is concerned 'with the problems that are being missed through an over privileging of economic, technical and material processes' (Cooper and McFall 2017, p. 4). Indeed, Cooper and McFall argue, only weeks after the 2016 US presidential election, that this return to the cultural is exactly what is needed, as the election showed definitively that the best big data modeling and prediction could not account for the cultural processes that led to Donald Trump's victory.

Today, from within the coronavirus pandemic, cultural economy must operate in the same overlap of urgent pragmatism and cultural emphasis that *JCE* editors have been highlighting for years. And while the current crisis is clearly different from the global financial crisis (GFC), parallels exist. In the years since the financial crisis, hyper-partisan realities have grown, and starkly politicized versions of medical science are now being shared through mass and social media. The agency tasked with controlling disease in the US, the Centers for Disease Control and Prevention, has been constrained since the pandemic began, contributing to a stark lack of national leadership (Associated Press 2020, Perez 2020). And the economic impact of the pandemic is larger and unfolding faster than that of the GFC, with early 2020 unemployment figures eclipsing the worst job losses from the financial crisis in a single month (Long and Van Dam 2020). And yet, during the financial crisis there were also multiple interpretations of what was afoot, with official sources citing 'moral hazard' (Acharya *et al.* 2009), while critical commentators pointed to neoliberalism and financialization. When Congress had the opportunity to regulate over the counter derivatives in 2000, potentially stemming the worst of the coming crisis, it demurred, instead passing the Commodity Futures Modernization Act that protected such instruments from government regulation (Morgan 2010). And the devastating impact of rippling unemployment and foreclosures during the financial crisis, particularly on black and poor communities, is still evident today (Chancel 2019). The contexts of these two crises are, therefore, not so radically different after all. It is worth examining the scholarship published in this journal that unpacked the 2008 financial crisis, to think about possible forms new scholarship on the coronavirus might take.

The health of economies and human bodies seems to increasingly rest on a complicated nexus of cultural contradictions around such banalities as truth-telling, mask-wearing, and social distancing. These everyday decisions are based on evolving and contradictory representations of the novel coronavirus as just like the flu, or as a hoax, or as the deadliest pandemic in 100 years. Perhaps the largest category of work published in *JCE* on the financial crisis was analyses of the representations and rhetoric of/about the crisis (Cameron *et al.* 2011, Erturk *et al.* 2011, Marsh 2011, Glynos *et al.* 2012, Samman 2012, King 2016, La Berge 2016, Benke 2018, Forelle 2018, Carretero Miramar and Bradd 2019). These articles examined the way that language, mediated communication, and artistic renderings of the crisis impacted the way financial markets were understood and responses to the crisis were constrained. For example, Glynos *et al.* (2012) use Goffman's notion of 'cooling out the marks' to demonstrate 'how key logics in media and policy responses to the financial crisis have operated to marginalize public contestation and narrow down public debate about how to avoid or limit the possibility of a future financial meltdown' (p. 298). Similarly, Carretera Miramar and Bradd (2019) trace

> the history of the language of the plazas from Spain's most important post-crisis protests to the language of institutional change … [revealing] both the profound effects of the global financial crisis as well as the cultural and generational shift in the contemporary political arena. (p. 425)

An accounting of the representations of the coronavirus and responses to it, from 'lockdowns' and 'mandates' to 'stimulus payments,' could contribute to better understandings of how they function to impact personal and governmental policy, and potentially inform ongoing political responses to the crisis.

Another set of articles about the financial crisis sought to trace the genealogies of the boom and bust of the early 2000s (Cooper 2011, Allon and Redden 2012, Nelms 2012, Tellmann 2016, Feinig 2020). These articles might be conceived, in Foucault's (1979) terms, as histories of the present, as they examine the formations of power relations and knowledge that made the crisis and responses to it possible. Taylor Nelms' (2012) 'The zombie bank and the magic of finance' certainly did this. Nelms shows how the emergence of the figure of the zombie in narratives about the crisis reflects the nonlinear history and colonial origins of capitalism, as well as contemporary anxieties about financial speculation. Allon and Redden (2012) do a similar if more recent excavation of 'the cultural rationalities that converge with economic practice to form a culture of continual growth, proposing that they provided conditions of possibility for the GFC' (p. 376). They examine the ways that conceptions of home as a site of wealth accumulation and speculation – driven by not only economic factors but also government policy in the form of George W. Bush's 'ownership society' – overlapped with cultural forms like the popular television makeover genre. They argue that the crisis was driven not only by changes to the technical capabilities of finance itself, but also 'shows like Extreme Makeover Home Edition, [which] take an existing cultural obsession with ideals of home ownership and reiterate them' (p. 385).

Histories of the present pandemic are sorely needed to make sense of the complex relations of power and knowledge that are exacerbating the health and economic impacts of the coronavirus. Those histories might include understanding the longstanding relationship between class, race, and health, as states and municipalities in the US begin to publicly name racism as a public health threat. The virus has laid bare the racial dimensions of precarious work, with black and brown people overrepresented both as 'essential workers' and as people with pre-existing conditions, leading them to die from coronavirus at more than twice the rate of white Americans (AMP Research 2020, Gould and Wilson 2020). The pandemic therefore adds a new, deadly, and specific risk to the set of contingencies – health insurance, retirement provision, consistent work schedule, paid leave, etc. – shifted from corporations and governments to low-income and precarious workers in recent decades (Hacker 2008, Langley 2008, Hardin 2014).

Other genealogies are needed to make sense of contradictions evident in government responses to the coronavirus. The stimulus payments sent to US citizens through the CARES Act highlight the complicated history and shifting cultural tensions around the notion of government financial assistance. While 'universal basic income' was actually endorsed by Richard Nixon on the advice of neoliberal booster Milton Friedman, it has more recently become a progressive cause. In the

Reagan-Thatcher years, the ideas of 'welfare' as a force of evil and personal responsibility as the only solution to poverty took hold in conservative policy and popular discourse (Cooper 2017). Because of this, the idea of a guaranteed wage became as politically polarized as abortion or universal healthcare. And yet, the direct stimulus mandated by the CARES Act looks more like UBI than any successful legislation in decades, not only because of the large (adjusted for inflation) citizen stimulus checks, but also the $600 per week in guaranteed federal unemployment relief (United States Congress 2020). That figure, $600, corresponds to a $15 wage for a 40-hour work week, more than double the federal minimum wage, and the precise number around which the progressive Fight for $15 campaign is centered (Fight for $15). Analyses that unpack how and why political commitments to particular economic programs are changing now, and how culture mediates these dynamics, might help advocates and activists understand how to bring about lasting change.

Lastly, the GFC spawned a number of theoretical explorations of finance that have changed our understanding of the way financial markets and economies operate (Thompson 2011, Clarke 2012, Gillespie 2013, McClanahan 2013, Bryan and Rafferty 2016, Erturk 2017, Jefferis 2018, Beckert 2020, Wullweber 2020). Joscha Wullweber recently argued that 'the shadow banking system has come to occupy a central position in the financial system [and] states and their central banks are interacting with the financial market on an entirely new level and in a radically redefined relationship' (2020, p. 13). Central banks are regularly acting as dealers of last resort in 'a new state–market hybridity' he names the 'post-laissez-faire constellation' (Wullweber 2020, p. 13) This new normal is on display in Federal Reserve actions taken in response to the pandemic, which were much faster and greater in scope than those taken during the financial crisis (Cheng *et al.* 2020). How will the role played by states and central banks further evolve as the fast and massive economic fallout from the coronavirus turns into a long-simmering recession or depression? It is clear that financial markets are being buoyed by state intervention already. Is this more of the same, or a new normal?

Theoretical explorations of the coronavirus pandemic can help us understand what economic logic might be at work when the virus is left to spread relatively unchecked by federal/national intervention. They can help us think of the rates of infections among essential workers and nursing home residents as issues of valuation (Kelly and Geissler 2011, Cooper 2015) with deep racialized and classist histories in capitalist societies generally, and insurance and underwriting specifically (Baucom 2005, Cooper 2011, Kish and Leroy 2015). They can tell us how post-truth, anti-mask, anti-vaccine logics – all of which are understood by their proponents as logics of resistance – are entangled with rapidly recovering stock markets, languishing unemployment, and rising coronavirus cases. The pandemic could even represent a last, transformational shock to an idea that has very often graced the pages of JCE: neoliberalism.

Jens Beckert (2020) suggests that neoliberalism is strained and tenuous. He develops a new theory of 'promissory legitimacy' to refer to 'the legitimacy political authority gains from its effectiveness in achieving results' (p. 318). He argues that the promissory legitimacy of neoliberalism was broken by the financial crisis, as it proved the impossibility of market self-regulation and exacerbated social inequality along multiple vectors. Yet even in the absence of that legitimacy, neoliberalism persists based on the strength of business interests and institutional structures, leaving society in a state of 'anomy.' Beckert asserts that 'there is no politically viable alternative to neoliberalism on the horizon' (p. 327). But with the shocks of the pandemic and the Black Lives Matter protests bringing social and cultural contradictions to the surface in unprecedented ways, the horizon may be changing. If it does, the long dominance of neoliberalism as policy and theory may be shaken. What comes after? Cultural economy is perhaps the best community to offer, critique, and debate ways to theorize the economic formation that follows neoliberalism.

It bears saying explicitly that scholarship on the coronavirus cannot be limited to the north Atlantic region. Analyses of the differential experience of the pandemic and responses to it in places like China, Brazil, Ghana, Kenya, and beyond are all desperately needed. Work on the emergence of the coronavirus in China and its subsequent policies, the impact of the pandemic on strained health infrastructure and tourism in developing countries, the crisis of coronavirus denial in Brazil, the early approval of a vaccine in Russia, and the geopolitical implications of global vaccine development and pricing would strengthen understandings of, and potentially responses to, the global pandemic.

This work will take time to develop. The longer temporalities of academic work can feel out of step with the day to day emergencies of our time. And yet, that has often been the case. It was in 1992, when anti-racist struggle, feminism, and 'the battle against AIDS' (p. 720) all urgently pressed on society and academia alike, that Angela McRobbie (1992) reminded us that cultural studies requires 'a sense of political urgency' even while the work it undertakes, in particular theoretical work, 'need not always lead so directly to politics' (p. 721). The current set of contradictions and deadly impacts of the pandemic should give the *JCE* community such a sense of urgency to create scholarship that takes on the coronavirus crisis in all its dimensions. That will take time we do not have, to create knowledge that we do not know will help, but it will nevertheless contribute to a complicated but necessary collective endeavor to continue doing economics otherwise.

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Umbrella platform of Tencent eSports industry in China

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ABSTRACT
China has embarked on a radical transformation of its online and mobile games industry since its government announced its ambition to be a global sporting power. This study investigates Chinese electronic sports (eSports) in the context of platform governance and platform capitalism, through a case study of the platformization of Tencent, one of China's largest media conglomerates. We employ a boundary analysis of platform documentation, a document analysis of policies, financial data, and ethnographic interviews to examine the interactivity and flow of power arising from direct state control and the processes of commercialization and professionalization. To support our proposal that the state and corporations, while genetically different, are mutually constitutive, we explore concepts of the platformization of infrastructures and infrastructuralization of platforms. This study proposes that the Chinese eSports industry has an umbrella-like structure and challenges the assumption that China is an authoritarian system with a one-size-fits-all policy. Our results imply that games industry professionals invite funding bodies to work jointly with government to develop alternatives for the eSports industry. Meanwhile, we show how Tencent utilizes its expansion of capital fluidity and data-driven multidimensionality, moving toward an ecosystem of platform dependency, organizational homogenization, and deep power asymmetries.

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Introduction

As China has experienced what Kirkegaard and Caliskan (2018, p. 1) describe as a piecemeal and experimental capitalist transition from Maoist communism to a socialist market economy, these strategies evolved into a multifaceted global search for investment opportunities in key economic, cultural, and creative industries. As part of a drive to establish China as a leader in the digital arena, the State General Administration of Sport of China approved eSports as the country's 99th official sport in 2003 (modified as 78th in 2008) (Yu 2018), and it has rapidly emerged as an essential component of contemporary digital youth culture in China (Xu 2012). In 2018, revenue from online and offline PC and mobile eSports and games in China exceeded RMB 91.2 billion (USD 13.63 billion), and the over three hundred and fifty million consumers playing mobile eSport and games comprised 52.9% of this revenue (Iresearch 2018). In 2016, China surpassed the United States as the world's largest digital gaming market. This growth is occurring in the context of debates about the expansion of Chinese digital platforms—or digital media intermediaries—in the Asia-Pacific region and eSports's expanded popularity.

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First described by Hemphill (2005, p.199) as alternative sport realities for electronically extended athletes in digitally represented sporting worlds, eSports has rapidly developed into a gigantic, worldwide industry (Seo 2013, Skubida 2016, Tomazic *et al.* 2019). Hemphill later expanded his definition to include electronically extended human actions in computer-mediated or -generated sporting worlds (Hemphill 2015, p. 346), significantly broadening the understanding of eSports within a more complex sociocultural context. The development and scale of eSports has generated substantial research about issues of interest to both academics and entrepreneurs (Yang *et al.* 2011, Skubida 2016 Lu 2017)—including the business of gaming (Seo 2013), gaming's effects on public relations and advertising (Tomazic *et al.* 2019), and the social effects of gaming (Hollist 2015, Skubida 2016, Lu 2017) including the toxicity of gaming culture (Euteneuer 2019). Numerous studies describe China's overhaul of policies governing eSports in China, germination of local professional clubs, and enthusiastic embracement of foreign professional coaches and players (Xu 2012, Seo 2013, Skubida 2016, Lu 2017, Yu 2018). However, the complex relationships between the state, the platforms themselves, and other professional sectors in eSports are largely neglected by researchers.

This study aims to investigate platform governance and platform economy in the Chinese eSports industry by offering in-depth insights through a case study of the platformization of Tencent, one of China's largest media conglomerates. This research questions the role that the Chinese government and Tencent play in building their own platformization of infrastructure ambitions towards the eSports industry. Therefore, this research suggests ways to affect changes from within by studying how Tencent eSports and the Chinese government worked together to manage both eSports's platformization and their own infrastructural expansions.

This paper is organized as follows. We first review the literature on two theoretical approaches—infrastructure studies and platform studies—that cross-articulate an understanding of the expansion of digital media. We then address economic, regulatory aspects and their relationship to the concept of platformization. We follow outline debates about regulatory platformization and digital media to contextualize the rise of eSports, digital platformization, and related regulations in China. We then present our qualitative methodology and our study's findings, which suggest a comprehensive theoretical framework- umbrella platform- is necessary to understand eSports's infrastructural expansion ambitions, expanding boundaries, and effects on social, economic, and political life through Plantin *et al.*'s (2018) concepts of the platformization of infrastructure and the infrastructuralization of platforms. Finally, we conclude and suggest implications for planners and avenues for future research.

Literature review

Platformization of infrastructures and infrastructuralization of platforms

The surrounding environment (Meyrowitz 1997, p. 60) of digital media is described by Plantin *et al.* (2018, p.1) as widely accessible systems and services, often provided or regulated by governments in the public interest. However, this is also an environment where various dominant Internet enterprises have broken the boundaries of their platforms by restructuring their business activities (Van Dijck *et al.* 2018) or their platform community or societies (Gillespie 2010, Tiwana 2014, Nash *et al.* 2017)— concepts familiar to platform studies. Infrastructure studies (Hughes 1983, Bowker and Star 1999, Graham and Marvin 2001, Edwards *et al.* 2007) are rooted both in information science and in science and technology studies, whereas platform studies are similarly formed by media studies (Nieborg and Poell 2018, De Kloet *et al.* 2019, Nieborg and Helmond 2019) and information science. This data-driven and technical supportive environment and its multiple contexts previously obscured the relationship between two conceptual approaches—infrastructure and platforms studies—which are genetically different and sometimes compete, but are mutually constitutive.

Star (2002, p. 116) noted that previous research viewed infrastructure as something run on things substrate to events and movements—railroads, highways, electricity and more recently, the information superhighway. This concept was eventually regarded as too shallow and absolute, and evolved into three categories of infrastructure—corporate information, business sectors (such as an infrastructure supporting a manufacturing supply chain), and universal services (such as the Internet) (Hanseth and Lyytinen 2004), then expanded to include information and data infrastructures. Hanseth and Lyytinen (2004, p. 4) describe information infrastructure as a shared, open (and unbounded), heterogeneous and evolving sociotechnical system (installed base) consisting of a set of IT capabilities and their user, operations, and design communities. Data infrastructure is defined as sociotechnical systems implicated in the creation, processing, and distribution of data, hosting a variety of platform instances including app and website instances.

The concept of platforms is not fully developed in different disciplines. The literature in the technical industry in the early 2000s on platforms refers to digital intermediaries to match people, information, and goods, and is synonymous with computing architecture. In information science, platforms began to be frequently viewed either as software-based platforms as an architectural construct, or as an online marketplace. Tiwanna *et al.* (p. 675) defined platforms as the extensible codebase of a software-based system that provides core functionality shared by the modules that interoperate with it and the interfaces through which they interoperate. Conversely, economists and business scholars perceive platforms from the perspectives of business models and assets as either matchmakers (Evans and Schmalensee 2016), or according to McAfee and Brynjolfsson (2017, p. 137), as a digital environment characterized by near zero marginal cost of access, reproduction, and distribution. Platform studies in media and communication extend from content-sharing to social media applications (van Dijck 2013, Helmond 2015)—for instance, Srnicek (2016, p. 25) defined platforms as digital infrastructures that enable two or more groups to interact, and further categorized several kinds of platforms in his book *Platform Capitalism*— including advertising, product, lean, industrial, and cloud. Hence platform studies in media and communication strive to broadly capture how communication, online activities, and expressions are capacitated and constrained by digital media (Plantin *et al.* 2018).

Infrastructure and platforms are evolving and growing. This literature elucidates the co-constitution of platforms and infrastructures—both studies examine structures that underlie something more salient and share the features of invisibility, extensibility, and broad coverage (Plantin *et al.* 2018, p. 2), and both help theorists frame and understand the expansion of digital media (Apperley and Parikka 2018, De Reuver *et al.* 2018, Nieborg and Helmond 2019, Plantin *et al.* 2018, Tiwana 2014). However, others claim that interfaces—including their semiotics, data streams of platforms, and algorithms—should be viewed with an infrastructural focus, both differing from and resembling platform studies (De Kloet *et al.* 2019).

Helmond's (2015) conceptualization of the platformization process involves extending a platform into a web and dragging the web data back to the platform (Nieborg and Helmond 2019). Significantly, Plantin *et al.*'s study (2018) demonstrates the entanglement of platformization and infrastructures, investigating how Google, Facebook and the open web have exploited the power of digital technologies and supported the splintering of modern infrastructural ideals (Graham and Marvin 2001) by offering cheaper, more diverse, and more competitive options, which have facilitated both the replacement of monopolistic government infrastructure and the transfer of wealth and responsibilities to private corporations—Plantin *et al.*'s so-called platformization of infrastructures. Plantin *et al.* further assert that emerging digital technologies and competing tools and services provide the potential for their so-called infrastructuralization of platforms—thus, Plantin *et al.*'s (2018) theoretical bifocal platform-as-infrastructure and infrastructure-as-platform concepts. Nieborg and Helmond (2019) likewise develop an analytical framework for understanding digital companies' economic growth and technical expansion, and examine how Facebook Messenger's platformization evolved to have infrastructural properties—in particular, how it emerged as a data infrastructure that operates dynamic platform instances through data interactivity and connectivity. Both Plantin *et al.* (2018) and Nieborg and Helmond (2019) show how the platformization of infrastructures and the infrastructuralization of platforms have, together, tipped the delicate balance between what has traditionally been understood to be in the public interest—as shown by infrastructural studies—and what has traditionally been understood to be the remit of corporate power—as shown by platform studies. Hence these concepts are discrete yet mutually constitutive and these researchers demonstrate how digital platforms' underlying characteristics imply that they should not be understood as a single category consisting of platform studies and infrastructural studies (Nooren *et al.* 2018).

Both Plantin *et al.* (2018) and Nieborg and Helmond's (2019) research suggests the benefits of studying the evolution of infrastructralized platforms in the digital age as they are platformized on capital-intensive infrastructures through information technology—in particular, by examining the impact of commercial platforms on current scholarship of infrastructures and the dependencies of large technical platforms on platformization and capitalization. Hence the concept of platform economy and relevant business literature clarifies the insights into the economic and managerial mechanisms of platform markets and the process of platformization.

Platformization: economic, regulatory and its relationship

The platform economy describes online platforms that provide peer-to-peer exchange markets for rentals, parking, and services—a platform company acts as an intermediary between the providers and consumers, but facilitates this in a more communicative way than older offline analogues (McKee 2017), and is associated with the sharing business model, which is supported by access rather than ownership (Gansky 2010). Further, McKee (2017) asserts that the legitimacy of the platform economy is rooted in liberal ideals of markets, family, and technology, as platforms operate on two levels—as market participants and as market creators.

Business scholars have studied the strategies that platform holders utilize to maintain pricing structures, and Rochet and Tirole (2003, p. 99) note that the multisided characteristics of the platform are subject to indirect network effects as actors joining (or leaving) one side of the platform indirectly affect the (perceived) value of the platform for actors on the other side. Thus, the money side of the market covers the costs of the subsidy side (Evens and Schmalensee 2016). However, political economists largely ignore both these complementary effects and the related issues of platform governance and infrastructure (Nieborg and Poell 2018). Even as the user-driven model is explicitly thriving, it is subsumed by the wider economic regime of platform capitalism (Srnicek 2016). Nieborg and Poell (2018) observed the example of users' behavior when access to Facebook is free but subsidized by businesses—either through click-through fees, or through another accessible computation infrastructure, such an app (Tiwana 2014).

Two major schools of thought shape research about the relationship between platform power and state regulations and laws. The first asserts that digital platforms—such as Google and Facebook—have sovereign power (Moore and Tambini 2018). Political economists criticize the inherent accumulative tendency of their capital-intensiveness, their corporate concentration, and the distributive consequences of their platform power (Srnicek 2016). Further, some digital platforms do not define themselves as media companies—preferring to be described as technology companies-—which marginalizes the cultural dimension of their operations (Napoli and Caplan 2017). The second school of thought is represented by Flew *et al.* (2016, pp. 9–10), who assert that even though the role of the state has shifted from control of the media to maintaining, coordinating, and facilitating developments through the provision of a regulatory framework, it still remains the dominant policy actor. Studies in this second vein have, for example, compared digital platforms in Europe and the United States and found that American regulations are narrower and more reactive (Moore and Tambini 2018). These two perspectives are conflicted not only by public perceptions of the desirability, regulatory disruption, and potential conflicts arising from state involvement and industry-driven self-regulation (Barwise and Watkins 2018, Nooren *et al.* 2018), but also by the absence of a cross-disciplinary dialogue among businesses, political economists, and media scholars (Nieborg and Poell 2018). Both of these perspectives should be further examined, as should perceptions of users' magnanimity and the context-bounded nature of participation via digital platforms.

Digital media and eSport practice in China

Studying the ambitious platformization of digital media in China, Nieborg and Poell (2018, p. 4279) points out the concentration of media ownership in a few major platforms and the evolution of multisided markets. Meanwhile, political–economic experts (Woetzel *et al.* 2017, Hong and Goodnight 2019, Zhang 2020) and sociocultural academics extensively scrutinize user regulatory practices, digital architectures, platform affordances, market structures, and platforms' culture in Chinese digital platformalization and investigate social media infrastructure and platforms, (e.g. WeChat) (Plantin and de Seta 2019, Wang and Sandner 2019) video streaming platforms, (e.g. iQiyi) (Wang and Lobato 2019), e-commerce platforms and infrastructure (e.g. Alibaba) (Zhang 2020), transportation platformization (e.g. Didi) (Chen and Qiu 2019), and food delivery platforms (e.g. Baidu Deliveries) (Sun 2019) in China. These researchers question what the emergence of the monopolistic tendencies inherent in platform markets means for China and what China means for our understanding of the structure of platform societies.

Research about Chinese digital platforms and infrastructure is dominated by two narratives. The first regards Chinese digital platforms' rapid development as a natural outcome of their embrace of the Internet's programmability, adaptability, and modularity (Woetzel *et al.* 2017, Plantin and de Seta 2019) and generally follows the Western platform economic model. The second regards Chinese digital platforms as the ultimate mechanism of state power and argues that this rapid development is guided by techno-nationalist media laws and regulations (Qiu 2010) and an increasingly transparent Internet censorship agenda (Yelli 2017). This second narrative implies that China's digital development is taking place within a new theoretical bifocal model, namely, platform-as-infrastructure and vice versa . Plantin and de Seta (2019) extend Plantin *et al.'s* (2018) ideas to examine WeChat—developed by Tencent Holdings—and succeed in developing the infrastructuralization of platforms model alongside the techno-nationalist model of Chinese Internet governance to examine WeChat's infrastructural expansion and broader sociopolitical effects. They argue that the Chinese model should neither be reduced to platform capitalism with Chinese characteristics, nor be dismissed as the outright authoritarian control of digital media (p. 14). Their arguments have inspired consideration of the strategy and social consequences of the state's regulation of such digital platforms in light of multiple studies that have raised concerns about the state's power to effect digital platformization via media regulations and laws (Flew *et al.* 2016, Moore and Tambini 2018, Nooren *et al.* 2018, Enli *et al.* 2019).

Research about eSports benefits from the rigorous and phenomenological perspectives of actor-network theory (ANT), which is rooted in science and technology research (Latour 2005, Witkowski 2012, Shim and Shin 2016, Borges and Oliveira 2020). Hanson *et al.* (2016, p. 2) state that ANT concentrates on the conditions, constraints, and modifications of agency within networks and is situated in terms of post-structural or post-modernist anti-essentialist materialist orthodoxy. Witkowski (2012, p. 350) notes that ANT's approach to the themes of human movement, balance, composure, haptic engagement, and the sensuousness of networked bodies and technologies can help researchers understand the underlying combinations and interactions accompanying the rise of eSports. Thus, the network between a player and a machine, multiple players, and multiple technologies is a space rejecting any sundering of human and nonhuman and social and technical elements, and ultimately determines how the participants interact and their performance (Taylor 2009, Alcadipani and Hassard 2010, Witkowski 2012). Hence eSports breaks down boundaries through the integration of digital tools and services (Helmond 2015, Tomazic 2016) and produces commercial value in ways that are shared across various platforms.

ANT provides a lens to reveal the dynamics of a technology-driven industry—from 2000 to 2016, as the number of *wang ba* (Internet cafés) in China increased from 40,000–152,000, eSports's growth surged (Wei and Wen 2015). These cafés nurtured China's eSports infrastructure from its inception—equipped with technical infrastructure and functioning as social communities and networking spots, they have become sites where professional game designers test their designs and prototypes (Yu 2018). Shim and Shin (2016) note that recently, the infrastructural heart of eSports has moved from Internet cafés to sports stadiums and video/live streaming platforms—this is the dynamic process of technological innovation that ANT elucidates—thus, remediating the business model while reworking infrastructures across various platforms in China.

This research helps us understand how the rise of Chinese eSports has taken place alongside the enclosure of proprietary digital ecosystems and the expansion of digital platforms via a state-centered approach to regulatory platformization and the digital economy (Tomazic 2016, Yu 2018). In other words, the relationship between the state and booming industries run by the private enterprise in China—such as Artificial Intelligence or eSports— is inextricably embedded in its own character of governance (Xia 2012, Kshetri *et al.* 2011). In particular, Schneider (p. 225) asserts the significance of the state's role in setting the parameters of discourse but allowing diverse actors to negotiate its exact meanings.

This study focuses on two major platform infrastructures. The first is Tencent eSports, which recently expanded its value chain by investing in the eSports market and related assets. The other is the traditional Chinese monopolistic supplier of infrastructures—the Chinese government. This study asks the following research questions: What are the roles of Tencent eSports and the Chinese government in managing both eSports's platformization and their own infrastructural ambitions? Do they complement, oppose, or compete with one another? Or are they completely unrelated vis-à-vis the evolution of the eSports industry and the platformization of infrastructure?

Materials and methods

This study takes on the challenge of critically engaging the rise of platform capitalism in Chinese eSports and the Chinese government's contradictory policies toward eSports. Drawing from Nieborg and Helmond's (2019) study, the present study employs multiple methods, including a boundary analysis of platform documentation and a document analysis of policies and financial and investment data (Bodle 2011, Helberger *et al.* 2018, Nieborg and Helmond 2019). We also conducted ethnographic interviews to complement these analyses. Data collection and analysis were conducted at three levels:

- *The policy level*, consisting of a evidence-based investigation (Dai 2019) grounded in historical documents—including national, regional, and provincial regulations and policies.
- *The enterprise level*, consisting of document analyses of games companies' public financial statements (Tencent's investor data), and a boundary analysis to investigate the relationship between the features of Tencent's archived data sources and digital properties and its platform business strategies (Bodle 2011).
- *The individual level*, consisting of insights gained from ethnographic interviews made between June 1, 2018 and July 31, 2019, with 35 entrepreneurs, chief coaches, managers, and professional players from 16 clubs based in Shanghai, Chengdu, Beijing, Guangzhou and Hangzhou in China: OMG, D7G, AG, CL, DR, EDG, IR, WE, TOP, BLG, FUN PLUS X, XIA, QG, ESTAR PRO, SNG, and JDG. These participants were all males aged between 17 and 28, and were all professional players who had retired between one and five years ago.

Our three-level analysis can not only compare and contrast managerial statements with the data from Tencent's platform documents and information systems—thereby examining the role of and the relationship between the Chinese government and Tencent in managing the platformization of eSports infrastructure—but can also closely examine the voices of major stakeholders, their views on and experiences of the governance and its significance in eSports platforms, and how

Tencent's platformization has evolved into a major power in its own right in the Chinese eSports industry.

The umbrella platform of Chinese eSports

This study applies a conceptual 'umbrella' platform in considering how the platformization of eSports in China has built its infrastructure. This conceptual platform helps contextualize the culture of Chinese eSports, and is made up of various stakeholders—including the Chinese government, monopolistic enterprises, clubs, the media, coaches, professional players, and so on—making China the world's largest eSports umbrella platform. The next section has three parts. First, it examines the interactivity and flow of power arising from direct state control of regulatory platformization of infrastructures. Second, it investigates how this fits with the evolution of platformized infrastructure and multisided platforms by examining the development of whole value chains. Third, it investigates the digital properties and technological expansion of infrastructuralization of Tencent eSports's platforms.

Umbrella cloth: regulatory platformization of infrastructures

Chinese eSports has the attributes of entertainment, media, and sport, and thus is significantly influenced by various policies (Dai 2019). However, its rise has not been smooth. The Chinese government can be described as the 'umbrella cloth' of the infrastructure of digital platforms because it determines both the life cycle and the expansion of Chinese eSports and video games. Six ministries[1] have launched a series of regulations and policies to cover game content, game licensing, gaming competitions, education, coaches, and professional players.

The most significant policy relates to eSports broadcasting. In 2003, eSports World began broadcasting on Channel 5 of China Central Television (CCTV-5). However, the State Administration of Press, Publication, Radio, Film and Television of China (SAPPRFT) issued a ban on online games, and CCTV-5's eSports World program was suspended. Consequently, eSports broadcasts have been limited to the Internet since 2004. This resulted in significant changes to the value chain of the market and makes the Chinese eSports model significantly different from Korea's, which offers game-completion-TV broadcasting. Following a difficult decade (2004–2015), eSports' growth and

Table 1. An overview of major policy events in the Chinese eSports industry from 2003–2015.

Date	Event
November 2003	eSports became the 99th formal sports event recognized by the General Administration of Sports of China.
February 2004	The first China eSports Games took place, supported by the General Administration of Sport of China and organized by the China eSports League with Sports.CN (www.sports.cn) as the distributor.
February 2007	CCTV was accused by netizens of 'under-the-table dealing' as the *World of Warcraft* player Li Xiaofeng (Sky) failed to be selected as one of the most influential figures in sports.
October 2007	eSports appeared in the 2nd Asian Indoor Games; this was the first time that eSports had been included in a comprehensive international sporting tournament.
2008	Chengdu, China, successfully bid for the WCG 2009 Global Finals.
August 2010	The Ministry of Culture's prohibiting the launch of game products without official permission served as a useful 'catch-all' to limit content.
2012–2013	The WCG were successfully held twice in Kunshan, Jiangsu Province (eastern China).
2013	A 17-member eSports national team organized by the Ministry of Sport represented China at the 4th Asian Indoor Games.
January 2013	*Sports World*, on CCTV-5, produced and broadcast a program named *Running on the Road of Chasing the eSports Dream*.
2014	Yinchuan, a city in northwest China, became the permanent host of the World Cyber Arena and its advertising was broadcast on CCTV-5.
February 2015	*Perfect World Games* announced a strategic partnership with Huayi Culture Co. Ltd (http://www.cdhypr.com). They launched the first domestic game program to be broadcast on a popular TV channel. It was broadcast simultaneously during prime time in 20 large provincial capitals in China.

development followed a meandering path and generated a complicated environment (see Table 1) until China's State General Administration of Sports reviewed the existing sports in China and redefined eSports as the 78th officially recognized sport in 2008.

In 2016, eSports in China entered in a new stage—the Chinese government reacted to eSports' global popularity (Lu 2017) by signaling a newfound willingness to actively solve problems within the eSports industry. China's four[2] administrative states launched four regulations which 1) covered support for importing digital technology from other Chinese states; 2) encouraged the industry to improve the development of mobile games, live-streaming services, and virtual reality technology; 3) founded initiatives to organize international and national professional eSports tournaments; and 4) encouraged Chinese colleges and universities to offer professional eSports courses. Conversely, two SAPPRFT regulations[3] issued in March and May 2016 prohibited game content which subverted state power and disturbed the social order. These regulations temporarily halted the licensing of gaming products imports to China, particularly those judged unhealthy and having poor taste content—thus, these regulations only serve to support the launch of domestic games. For instance, the game *PlayerUnknown's Battlegrounds* was banned in 2018 due to its gory animation. Shaped by techno-nationalist media laws and regulations (Qiu 2010), such regulations represent a multifaceted, strategic signal and an ambiguous attitude from the Chinese government toward the eSports industry.

This study extends the existing research about Chinese government's regulatory infrastructure regarding eSports by identifying how other, non-governmental stakeholders perceived these developments. We found that these policies and regulations gave rise to a major practical concern—that the government's regulatory infrastructural synergies serve the techno-nationalist eSports industry.

Consequently, eSports clubs have criticized these policies for enhancing the government's political performance rather than increasing its political efficiency. Some of our interviewees explained why the government favors the eSports industry and indicated that the government has constructed several eSports towns (e.g. Taicang, Chongqing), and that these have been ineffective in growing and regulating eSports: '… the government only offers policies to attract more investment aiming to balance the disparity between the rich and the poor, thereby improving its own political performance, but in fact no one really wants to move to these urban towns. The government does not care, so these eSports towns are almost empty' (Wuya, 20, CEO and Chief Coach). Similar responses from other stakeholders indicate that Chongqing eSports town has received RMB 1.4 billion to attract clubs and tournaments, but cannot host appealing events 'owing to the town being … far from all amenities' (Little P, 22, CEO).

Two more representative regional critiques described the regulatory infrastructure and platformization of eSports given in the following way:

> Xi'an is the only city I know that provides welfare policies for local clubs, including tax reductions and exemptions and funding support … One of the most influential regional policies was named 'Xi'an Qujiang New District's Support for the eSports Industry'[4], which included the release of RMB 100 million as the top reward for a local eSports club. However, the exact criteria for this reward are unclear, and none of the clubs I know have been rewarded by such policies (Cat, professional player, 17).

Stakeholders' critiques can be summarized in the following way:

> Since the policy was implemented, vast quantities of local or regional investment has been directed towards our eSports industry; these regulations and policies serve as a capital exporter, which only helps the enterprise to be aware of where the political boundary is—it is a political signal! But just a signal! (Xiao Mao, 20, CEO and Chief Coach).

These stakeholder critiques seem to indicate that Chinese eSports regulations and policies are shaped by techno-nationalist architectures and affordances of the governed platforms (Hookway 2014, McVeigh-Schultz and Baym 2015, Plantin *et al.* 2018). However, these regulations and policies function ambiguously—even though the government's politically driven attempts to attract industrial synergies are obvious. When considering the perceptions of user practices (Nieborg and Poell

2018), this ambiguity results in a decline of authorities' political influence on users, which is often considered a hallmark of authoritarian society. Moreover, the political economy of platforms, according to Couldry and Hepp (2017), should be considered in further explorations regarding of the second research question—do Tencent eSports and the Chinese governments roles in managing eSports's platformization and their own infrastructural ambitions complement, oppose, or compete with each other? It is useful to investigate the interactions between the authorities and the largest stakeholder—Tencent. Plantin and de Seta's (2019) findings show that the their engagement in China is shaped by markedly techno-nationalist media regulations and an increasingly overt cyber-sovereignty agenda.

Umbrella stand: the growth of the value chain and multisided platforms

Tencent has worked diligently to develop its own platforms by operating in tandem with the Chinese government. This paper argues that Tencent eSports acts as an 'umbrella stand' for the growth of the value chain and multisided platforms, thereby driving Tencent's model of capitalism and maintaining its enormous economic power in the eSports platforms in China.

We begin our analysis with the upper stream of the eSports value chain. Tencent facilitates its business infrastructure as the main producer of video game content in China, including popular games such as *League of Legends*, *Arena of Valor*, *CrossFire* (distributor), and *Survival of the Last Jedi*. However, the Chinese state's support of Chinese eSports changed in 2016. In December 2016, Tencent eSports was established and soon became the largest of Tencent's four[5] business matrices of pan-entertainment.[6] Yu (2018, p. 95) observes that Tencent has moved, consolidated, and built up its platformized infrastructure internationally through part or complete ownership of the world's leading games publishers and developers of popular games. (Table 2) For instance, Tencent bought 100% of shares in the American frontier developer Riot Games, and 10% of the American company Activision Blizzard's eSports branch. In 2016, it bought Finland's Supercell, whose *Clash of Clans* was a mobile gaming hit. Between 2010 and 2013, online PC games contributed 57.2%, 71.3%, 45.7%, and 55.1% of Tencent's annual revenue. However, between 2014 and 2017, mobile games emerged as a major source of revenue. Mobile games represented 55.6%, 38.5%, 34.9% and 28.4% of Tencent's annual revenue in those years. In 2017, Tencent's total revenue from online games approached RMB 97.88 billion, and 64.2% (RMB 62.8 billion) of this revenue stemmed from mobile games—Tencent has grown to become the world's largest gaming company

Table 2. Tencent's major investments in external gaming companies (2006–2018).

Year	Mergers and acquisition target	Shareholding ratio	Value	Games
2006	GoPets (Republic of Korea)	16.9%	CNY 32.813 million	
2007	PvP (Shenzhen, China)	100.0%	CNY 452.9 billion	
	Horizon 3D (Beijing, China)	63.9%	Unknown	*X5.qq.com*
	Vina Games (RoK)	30.2%	Unknown	*BnB* (*Bubble and Bubble*)
2008	Outspark (the USA)	Unknown	USD 11 million	*Lord of the Century* (世纪领主)
2010	Youxigu (Beijing, China)	68.0%	CNY 168 million	*7.QQ.com*
	Eyedentity Games (RoK)	Unknown	KRW 3.999 billion	*Dragon Nest*
2011	Roit (the USA)	100.0%	CNY 1.679 billion	*League of Legends*
	Epic Games (the USA)	48.4%	CNY 2.08721 billion	*Gears of War*, *Fortnite*
2013	Activision Blizzard(US)	24.7%	USD 1.4 billion	*Call of Duty*, *World of Warcraft*, *Starcraft*, *Diablo*, *Hearthstone*, *Overwatch*
	iDreamsky games (Shenzhen, China)	20.4%	USD 15 million	*Fruit Ninja*, *Temple Run*, *Subway Surfers*, *Monument Valley*
2014	CJ Games (RoK)	28.0%	USD 500 million	TBC
2016	Paradox Interactive (Sweden)	5.0%	CNY 138 million	*Mount & Blade*
	Supercell (Finland)	Unknown	USD 9 billion	*Clash Royale*, *Boom Beach*
2017	Xishanju (Zhuhai, China)	9.9%	USD 143 million	*Sword Net* (剑网), *World of Sword*
2018	Shengda Games (Shanghai, China)	Unknown	CNY 3 billion	*Legend*, *Million Arthur*
	Bluehole (RoK)	10.0%	KRW 588.2 billion	*PlayerUnknown's Battlegrounds*
	Ubisoft (France)	5.0%	EUR 370 million	*Assassin's Creed*, *Rainbow Six*, *Rayman*

(iResearch 2018). Gaudiosi (2015, p. 34) confirms that Tencent partially controls about a third of the revenues generated by the top ten global companies, according to game revenues.

Regarding the middle streams of the eSports value chain, tournament operations represent the industry's core resources (Xu 2012). Tournaments' importance is best exemplified by the World Cyber Games (WCG), which demonstrate the material integration of media, sport, and participants (e.g. the audience and professional players) (Hutchins 2008). Tencent values organized competitive gaming and has radically expanded its platformalized infrastructures to capitalize on organized gaming's potential profitability. First, Tencent has become a major executive of gaming leagues (including the KPL, KCC, and KOC) and runs many significant tournaments, such as LPL (LoL Pro League) and LSPL (LoL Secondary Pro League). Second, the Tencent Games Arena (TGA) Grand Prix, founded in 2010, covers various gaming genres and integrates organizational, physical, and interactive digital technologies into tournaments. The total prize pool of the Grand Prix is approximately RMB 18 million. Third, we found that the top clubs of China's LPL were supported by Tencent, which aims to build up its physical infrastructures by locating these clubs in six of the top so-called first- and second-tier cities in China.

Livestreaming is among the bottom streams of the eSports value chain. Livestreaming is the key means of reviewing and distributing games and expanding and engaging game audiences and experts (Johnson and Woodcock 2019). Between 2012 and 2018, Tencent deployed domestic livestream and broadcasting platforms, escalated commercialization and media expenditures, and thereby improved its major structural effects. Supported by rapid expansion in the availability, capabilities, and popularity of the interactive digital technology revolution, these enabled livestream and broadcasting platforms to *liu liang* (gain traffic)and *liu liang lv* (conversion rates) in the eSports industry. Hence in 2016, Tencent both deployed domestic live broadcasting platforms (Table 3) and launched numerous live broadcast products (Table 4), both of which established the live broadcast industry chain in China.

In 2018, Tencent not only set up a mobile eSports brand (Penguin eSports) but also invested in Douyu and Huya, two leading livestream broadcast platforms. In the first half of 2018, live broadcasts of professional events in the LPL tournament area generated 7.09 billion views and over 1.38 billion hours of viewing time. The finals of the 2018 Mid-Season Invitational had more unique viewers than the Season Seven final, and in 2017 the King Pro League (KPL) attracted more than 10 billion views. The spring 2018 regular season saw a year-on-year increase of 100% to 34 million LPL spectators. Thus, Tencent's livestreaming both responds well to the expanding role and needs of eSport audiences and also embodies the new interactivity between production and consumption in its gaming platforms.

Digital properties and technological expansion of infrastructuralization of platforms

To further understand how the rapid development of Tencent's eSports capitalized platforms works with Tencent's digital structures, which underlie the more salient changes to its platformilization, this section draws from a combined framework developed by Plantin *et al.* (2018) to analyze

Table 3. Tencent's deployment of domestic live broadcasting platforms (2012–2018).

Year	Mergers and acquisition target	Shareholding ratio	Value	Financing round
2012	guagua.cn	16.03%	CNY 75 million	A
2014			Unknown	B
	longzhu.com	20%	CNY 300 million	A
2015			CNY 278 million	B
2016	ingkee.com	0.90%	CNY 310 million	B
	douyu.com	18.98%	USD 100 million	B
			USD 1.5 billion	C
2018			USD 630 million	Strategic investment
	huya.com	unknown	CNY 460 million	B

Table 4. Tencent's major launches of live broadcast products in 2016.

Name	Orientation
egame.com	Tencent's official live gaming platform
live.qq.com	Video and live broadcasting of sports events
now.qq.com	National social broadcasting platform for live videos
v.qq.com	Concert live broadcasting
qzone.live.com	Social live entertainment
huayang.qq.com	Interactive live entertainment broadcasting platform

Tencent's eSports archived data sources and digital properties. Such technical information can clarify how Tencent has expanded beyond the traditional boundaries of digital platforms, and acknowledges the heterogeneity of Tencent eSports in three ways. First, by introducing new technical resources and frameworks, such as a new content delivery network, digital acceleration, and networking. Second, through the products, functionality, and development options that Tencent provides. Third, through Tencent's own guidelines for the technical implementation of Tencent eSports.

Table 5 provides in-depth insights into Tencent's technical infrastructural and eSports platform-based expansions—starting up social media platforms instances such as QQ, encoding eSports online and social related activities into data for further processing, cross-articulating digital media properties, performing infrastructural, and its business extensions to promote Tencent's own interests.

Table 5. Summary of Tencent's eSports infrastructure and platform properties.

	Infrastructure	Platform	Examples	URL	scope
Architecture	Client end and service end systems; Network speed up using dyanmic CDN (Content Delivery Network) systems;Voice and video media systems	Reliable and elastic loud computing system;Portal servers for user authoration; Runing game on block servers which divide players into different blocks; Dynamic CDN systems based on hundreds of datacenters in every province of china,which lead players connenct to the fastest net route;	QTtalk Product: CDN Product: DSA	qt.qq.com cloud.tencent.com/product/cdn intl.cloud.tencent.com/product/dsa	technical, bussiness
Relation between components	users reach out and lock in	Customer relationship management analysis, then plug in Video, Comic, Online Literature owned by Tencent	Tencent Video Tencent Comic Tecent Online Literature	v.qq.com ac.qq.com book.qq.com	technical, bussiness
Market structures	Close loop consists game production, account systems, social media platform, payment systems advertisement system and live stream	Game studios produce and operate games; WeChat and QQ provide account systems for authoration; In game for purchasing use WeChat payment;Cross promotion through differet games;Social promotion using viruses-like spreading model through WeChat friend circles and QQ-zone; douyu live stream	QQ WeChat QQ-zone douyu	im.qq.com weixin.qq.com qzone.qq.com www.douyu.com	technical, business
Focal interest	company revenue and activeness of users	Company revenue by in-gamepurchasing and advertisement ;Promote adhesiveness of users by MOBA games and social media	League of Legends	lol.qq.com	business
Temporality	Decided by the lifetime of games and the popularity of online social ecology	3-5 years popular time for each top games; Sustainable output new games by entertainment business group; Online game ecology based on IM apps such as QQ and WeChat	DNF	dnf.qq.com	business
Scale	Large to very large; widely accessible	may grow to become ubiquitous	the greatest global game vender/agency/operator and the second largest social media company	https://www1.hkexnews.hk/listedco/listconews/sehk/2019/0401/ltn201904012134_c.pdf (page5, 8, 10)	business
Funding	Revenue from games,advertisement,game broadcasting	Company revenue by in-gamepurchasing, advertisement income from other game venders, and commission fee received from game broadcasting;	cross fire	cf.qq.com	business
Agency of users	none	none	none	none	None

These findings illuminate Tencent eSports strategy of implicitly striking against the traditional markers of the infrastructure of platforms (e.g. authoritarian governance) and eventually challenging the state-led Internet management itself—this not only illustrates the problem of conceiving of platforms in monolithic terms, but also illustrates how we can reconceive supposedly monumental entities as not-so-monumental by breaking down digital boundaries from the inside out. Most importantly, these findings clarify how Tencent facilitates its own evolving umbrella platforms through technical interactivity and the digital properties associated with the data infrastructuralization of platforms-including architecture, relationships between components, market structures, focal interests, temporality, scale, funding, and the agency of users.

Discussion

This infographic illustrating the conceptual metaphor of umbrella platforms (Figure 1) is useful not only for documenting eSports capitalist platforms growth, state-managed infrastructure, and multisided platform integration in the eSport industry, but for understanding the rapid development of the Chinese eSports industry from its initial state of disorder and confusion. It also normalizes the ambitions of platform capitalism, tracking the digital platforms' expanding boundaries. The present research allows for a critical inquiry while examining the 'umbrella cloth'—regulatory platformization of infrastructures governed by Chinese authorities and examines how the 'umbrella stand'—that is, Tencent's value chain and multisided platforms as well as technical dimensions have empowered themselves. Even though this umbrella is initially supported from, and enmeshed with, the umbrella cloth (e.g. the Chinese state), it is not an intrusive role in the process of rapid development. Hence the state only takes direct control on bottom-line sensitive issues, and provides

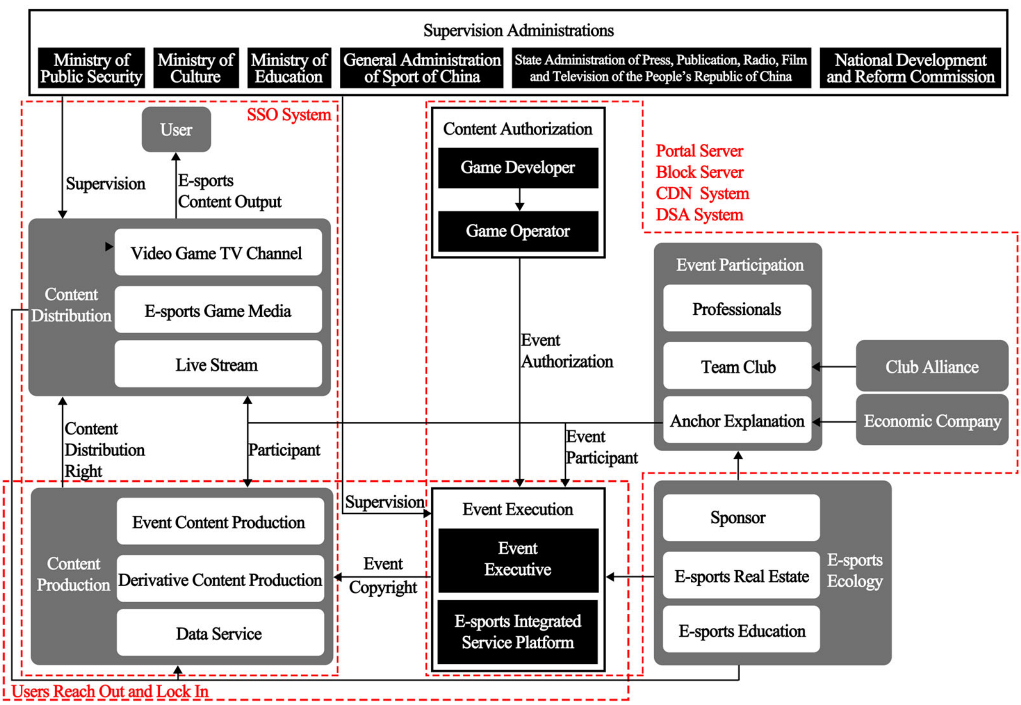

Figure 1. Combination of technical expansion and value chains of the Chinese e-sport umbrella platforms. CDN: content delivery network; DSA: dynamic site accelerator; SSO: single sign-on.

more space to invite other stakeholders like Tencent to act as a strong umbrella stand to support and negotiate the exact meanings of the industry.

Tencent eSports industry has closed the loop between platform-owned and government and plays multiple roles simultaneously to proactively establish its multisided platforms, including authorizing, producing, and distributing content, acting as the executive body of a number of leagues, and posing as a monopoly power enterprise and dominant market player in the Chinese eSports industry (Yu 2018). Most eSports clubs and athletes see Tencent as the industry leader, and see the industry as driven by platformization—Tencent has saturated the digital market with its media, enabling it to manipulate the market and other media (Noam 2018). The Chinese umbrella platform of eSports and the platformization of infrastructures that Tencent facilitates makes it nearly impossible for eSports professionals to opt out of participating in Tencent eSports because the lost opportunity cost is extremely high, while the digital properties of the infrastructuralization of platforms and the platformization of infrastructure make Tencent a formidable force in the profit-motivated process of platformization. The prevalent platformized infrastructure model successfully transformed from a traditional, monopolistic infrastructure model to a more splintered infrastructure through the sophisticated management of large enterprises, and competition and cooperation across Internet platforms (Kahin and Keller 1997, Abbate 1999). Thus, Tencent's activities challenge the prevalent assumption that China is an authoritarian system which offers one-size-fits-all regulatory policies—instead, the state and corporations are mutually constitutive and in need of each other. On one hand, this suggests (for some) that government works hand in hand with market power within an era of techno-nationalism (Hong 2017, Hong and Goodnight 2019), and on the other hand, Tencent eSports, through its multisided platforms (data infrastructures) has successfully operationalized its infrastructural agendas. Additionally, our study implies that professional eSports clubs and athletes actually invite funding bodies to work jointly with authorities to develop alternatives to Tencent's eSports umbrella platform.

As observed, Tencent has transformed its media platform from one of pan-entertainment to a new cultural creative industry—an integration of culture, industry, and digital technology consistent with Hutchin's (2008, p. 865) implication that this is sport as media or so-called eSports, signifying the seamless interpenetration of media content, sport and networked information and communications technologies. Our interviewees noted that this new cultural creative industry has seamlessly garnered the full support of the government and become associated with what President Xi has described as sharing the Chinese story globally. Consequently, Tencent eSports has transformed itself according to what Noam (2018, p. 1097) called the three stages of industrial-media conglomerates—politics-driven in the first stage, synergies-driven in the second stage, and investment-model driven in the third stage. These three stages are reflected in our notion of an umbrella platform driven by technical expansions.

Conclusion

Although China's eSports industry is indisputably state-led, it provides an opportunity to explore and reveal the interaction between the state and capitalist enterprise showing that the two are in need of each other and challenging the impression that business in China is a top-down process. Therefore, our *umbrella platform* encourages researchers to focus on boundaryless infrastructural power and platform capitalism. Our analysis of Tencent demonstrates how its expansion of capital fluidity—for example, its closed-loop value chain—and data-driven multidimensionality and technical support environment—for example, its infrastructure and platform properties—move it toward a new ecosystem of platform dependency, organizational homogenization, and deep power asymmetries (Nieborg and Poell 2018). Further research is critical for meaningful policy and sustainable development.

Our study also showed how other stakeholders—those under the so-called umbrella—are both poorly regulated in terms of their self-development and self-regulation and manipulated by capital-driven regulatory platforms. According to Plantin *et al.* (2018, p. 295), the platformization of infrastructure and infrastructuralization of platforms leads to increased tensions, which arise when media environments increasingly essential to our daily lives (infrastructures) are dominated by corporate entities (platforms). The results of these trends prompt deep concern and calls for new ways to understand and frame the complexity, dynamics, and risks experienced by creative laborers in the light of the relationships between the digital economy, mental health, and digital technologies. Future studies should examine how media conglomerates such as Tencent can reassert the importance of what Plantin *et al.* (2018, p. 18) refer to as widely available, universal, and relatively stable infrastructure as a foundation of social justice and investigate whether digital platforms with sovereign power can protect the public interest (Nooren *et al.* 2018).

Notes

1. The Ministry of Public Security; the Ministry of Culture; the Ministry of Education; the General Administration of Sport of China; and the State Administration of Press, Publication, Radio, Film and Television of the People's Republic of China; National Development and Reform Commission
2. The Ministry of Public Security; the Ministry of Culture; the Ministry of Education; the General Administration of Sport of China; and the State Administration of Press, Publication, Radio, Film and Television of the People's Republic of China; National Development and Reform Commission
3. 'Internet Publication and Service Management' (*wangluo chuban fuwu guanli guiding*) and 'Online Mobile Games Publication and Service Management' (*guanyu yidong youxi chuban fuwu guanli de tongzhi*).
4. http://lol.duowan.com/1808/397146906901.html.
5. Tencent Animation, Tencent Literature, Tencent Film and Tencent eSports
6. Pan-entertainment is a significant concept, the term having been coined by the vice president of Tencent, Mr. Chengwu, in 2011. It refers to the fan economy of celebrity intellectual property and is based on the multi-domain symbiosis of the Internet and the mobile Internet.

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Sites of qualification: the motorcycle rider airbag and the production of safety

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ABSTRACT
The paper mobilises the distinctive notion of 'sites of qualification' as a means of providing an expansive understanding of how innovative products are designed, produced and brought to consumer markets. We focus on the development of a new safety product for motorcyclists, the rider airbag, in which inflatable body protection is either incorporated into, or worn underneath, textile jackets and leather suits. The paper follows the airbag's trajectory across a range of different sites, including lead firms and their territorial settings; MotoGP racetracks, mobile laboratories and professional riders; courts of law; and showroom and archive locations. The paper's sites of qualification approach expands understandings of innovation by constructing a dialogue between two sets of literatures: actor-network approaches to the qualification of products; and narratives which understand economic innovation as emerging through clusters of agents and firms within industrial districts. The conclusion emphasises that sites of qualification are integral to the ways in which technical products such as the rider airbag are made social.

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Sites of qualification; innovation; safety; rider airbag; product qualification; motorcyclist

Introduction

This paper focuses upon the development of a new safety product for motorcyclists, the rider airbag, in which inflatable body protection is either incorporated into, or worn underneath, textile jackets and leather suits. The development of the rider airbag has involved high levels of technological innovation through laboratory testing, including the performative field practices of elite motorcycle racers. Rider airbags are now available to ordinary consumers; and the complex intelligent technologies of the airbag are being adapted for other protective retail products, ranging from skiing, cycling and equestrian sports, to health and mobility services and construction worker clothing (Ridden 2017, *Motorcycle News* 2019). Although developed and marketed in European and North American economies, rider airbag manufacturers are seeking to expand into global mass markets, particularly Southeast Asia (Research and Markets 2017) and India (Overdrive 2013a, 2013b).

The airbag, therefore, is a culturally important object with significant safety implications and life-saving potential across a range of consumer uses. For professional motorcyclists, this high technology product has proved successful in preventing significant injury and death. In turn, the development of airbag technologies is instigating material change to broader practices of motorcycling, as everyday consumers increasingly come to embrace the qualities of this device. Consequently, our choice to examine this distinctive safety object and its emergent sociologies of

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market attachment has a moral and political purpose. In this regard we follow McFall's (2009, p. 280) argument that

> if materialist pragmatic research has the capability to uncover the conditions in which particular forms of agency and economic life emerge, it also has the capacity to be political and politically informed about the objects in question.

Moreover, in using the case of the motorcycle rider airbag to trace the 'situated, distributed and material character' (McFall 2009, p. 280) of its development, we provide a wider conceptual contribution focussed on the importance of attendant spatialities, revealing how particular places and geographies are integral to the sorting and framing of product qualities and consumer attachments.

A key aim of the paper is to mobilise the distinctive notion of 'sites of qualification' as a means of providing an expansive understanding of how innovative products are designed, produced and brought to consumer markets. Sites of qualification brings into dialogue and offers a bridge between two sets of literatures which in differing ways offer valuable insights, but as yet have tended to stand apart. These are, on the one hand, actor-network approaches to the 'qualification of products' (Latour 1992, Callon *et al.* 2002); and on the other hand, narratives focussing on processes of economic innovation as emerging through clusters of agents and firms within industrial districts (Storper 1997, Cooke and Morgan 1999).

The paper begins with an illumination of the concept of sites of qualification. Following a review of methodological strategies, we then analyse the technological characteristics and trajectories of the rider airbag, highlighting its innovative 'active' protection features. In order to deepen our understanding and to develop an extended sense of how the airbag is qualified, the central sections of the paper assess the important sites of qualification where agents and agency coalesce. We show how the product qualities of the airbag are 'attributed, stabilized, objectified and arranged' (Callon *et al.* 2002, p. 199) by human and non-human agents, including motorsport governing bodies; the racetrack; and rider equipment firms, across a series of distinctive spaces. The territorial settings of key lead firms involved in rider airbag design and manufacture provide the first of these sites. The paper then turns to scrutinise the MotoGP (the foremost international premier championship class of world motorcycle racing) racetrack as a (mobile) field test site, and the performative role and embodied practices of MotoGP riders. In subsequent sections, we appraise two further sites around which agents and agency cohere: courts of law; and consumer-facing showrooms and archives. The paper's conclusion emphasises that attention to sites of qualification significantly strengthens understandings of how innovative technical products are created and brought to market.

Regions of innovation and sites of qualification

The concept of sites of qualification helps expand thinking about the social, material and technological processes that shape a product and its trajectories into consumer markets. It seeks to capture the specificities of particular spaces where the qualities, framings and sortings of an object happen and the importance of these places to how this happens. The notion of sites of qualification enables us to think about how diverse networks of agents and agencies coalesce in distinctive spatialities of arrangement. We are inspired by Henke and Gieryn's suggestion that whilst webs of connection across networks often have been portrayed as relatively free floating, 'place has consequence for scientific knowledge and practices'; and that we should pay particular attention to the 'materially-situated and symbolically-encrusted "nodes", the places that serve as endpoints for the links comprising heterogeneous networks in the ANT approach' (2008, p. 355).

The idea of sites of qualification also enables us to extend and develop connections between accounts of regional innovation in industrial districts and literatures on the economies of qualities. Research on regional innovation and industrial districts provides an important window onto the economic geographies of innovation by studying local agglomerations of economic activity and how technical collaborations are seen to emerge in regions with embedded craft and traditional skills

(Storper 1997, Scott 2000). Within this approach, innovation has been seen to stem from strong interfirm ties (conspicuously, among small- and medium-sized enterprises), cultures of competitive co-operation and untraded interdependencies (for recent reviews see De Marchi *et al.* 2017b, Belussi and Hervas-Oliver 2018, Buciuni and Pisano 2018, Delgado 2018). Many narratives also have taken place-specific and localised artisanal, design and/or aesthetic traditions as a starting point, additionally emphasising the role of local working traditions and local institutional support in agglomerations (Storper 1997, Scott 2000). Industrial district approaches, because they foreground understandings of place and territory, therefore offer valuable insights into one particular site of qualification, that is, the firm in its territorial setting, including such dynamics as local production systems, interfirm linkages, knowledge creation and innovation within regional clusters.

However in order to deepen understandings of innovation it is important to more fully trace how a technical product is 'made social' (after Akrich *et al.* 2002a, 2002b) across other sites. A conceptualisation of the qualification of products (Callon *et al.* 2002) significantly assists in understanding the roles of 'diverse networks of agents and sets of reflexive and dynamic processes (stretching beyond the firm through design, production, distribution and consumption)' (Pinch and Reimer 2012, p. 450). Whilst an actor network-based notion of product qualification foregrounds producers' efforts to strategically position goods in relation to competitors, products themselves are significantly understood as process: as constructed through a 'sequence of actions' and 'metamorphoses' undertaken by binding agents who 'by adjustment, iteration and transformation define [product] characteristics' (Callon *et al.* 2002, pp. 197–198). Such an interpretation not only importantly appreciates consumers as calculative actors (Grabher *et al.* 2008, p. 255), but also is effective for our purposes here because it views products as dependent upon 'the joint work of a host of actors' (Callon *et al.* 2002, p. 203). Moreover, as Callon's early work (1991, p. 155, fn 7) emphasised, networks are conceptualised to extend beyond just 'pure associations between human beings' to non-human actants, in order to grasp the capacities and effects of the materialities of technologies themselves and how (or not) they attach themselves to social groups. In Akrich *et al.*'s cognate articulation of 'interessement devices' (2002a, p. 205), the character of innovation decisions 'contribute to defining the social groups concerned, setting up some as allies, others as adversaries or sceptics,' whilst technical devices '[distribute] the forces which will support or resist it.'

A qualification of products approach emphasises contingency and unpredictability in the practices and processes that ultimately bring goods to market (Entwistle 2015, Mouat *et al.* 2018, Spinney and Lin 2019). Crucially, it seeks to explore the 'coordinated set of heterogeneous actors which interact more or less successfully to develop, produce, distribute and diffuse methods for generating goods and services,' requiring close attention to the diverse range of intermediaries 'that escort objects on their travels' (Callon 1991, pp. 133 and 137). It has the potential, therefore, to deliver an expansive view of the diversity of agency through networks and the complex socio-material assemblage of human and non-human agents through which innovative products come into being.

At the same time, however, such insights into the diversity of agents and agency lie at the core of what has been seen as problematic for actor network approaches: how to meaningfully trace and guide analysis though the endless potential networks that connect to a product on its journey to market. As Strathern (1996, p. 522) has argued, the 'auto-limitlessness' of networks can prove challenging for analysis, and interpretation must somehow find a way to 'hold objects of reflection stable long enough to be of use.'[1] In this regard Strathern (1996) identifies the need to 'cut' into networks to discover meaningful moments of agency across network heterogeneity.

Mobilising the notion of sites of qualification can assist in this task of cutting into networks by considering important sites at which a 'constellation of characteristics' (Callon *et al.* 2002, p. 199) coalesce. As foregrounded in the industrial districts literature, understandings of place and territory are crucial to any 'socio-technical complex' (Mitchell 2008, p. 1118). However, by explicitly extending our focus beyond that of the firm and its territorial setting (as identified in the industrial district literature) to the heterogeneous networks of agency identified through product qualification approaches, sites of qualification offers the potential to cut into such networks and attend to important moments of stabilisation and routinisation of practice where agents and agency are situated in space and place.

At certain moments actor network-based approaches do allude to the importance of such sites of qualification. In Latour's original discussion of Pasteur's development of the anthrax vaccine, the relationship between laboratory design and public field displays is paramount (1993 [1988], p. 76). Subsequently, Callon *et al.* (2002, p. 198) emphasised that the

> characteristics of a good are not properties which already exist and on which information simply has to be produced so that everyone can be aware of them. Their definition, or in other words, their objectification, implies specific metrological work and heavy investments in measuring equipment.

Properties 'are "revealed" through tests or trials which involve interactions between agents (teams) and the goods to be qualified' (Callon *et al.* 2002, p. 198). Ibert *et al.*'s (2016) more recent conceptualisation of 'disassociation' also chimes with this observation. Turning on its head economic geographers' work on value construction through associative processes (in which, for example, spatial references may be attached to products and services in order to connote and enhance value), they argue that the little understood mechanisms and performance of dissociation are at least of equal importance in establishing value:

> dissociations denote pro-active relational work undertaken to create value which mainly aims at hiding away potentially problematic aspects of a commodity from the consumers' awareness and seek to conceal or weaken linkages between a product or service and those conditions of provision that will most likely spur moral doubts or discomfort on the consumer's side. (Ibert *et al.* 2016, p. 2)

Nevertheless, a fuller understanding of the specificity within sites, and a fuller appreciation of the range and diversity of sites is required. As Henke and Gieryn (2008, p. 355, emphasis added) indicate,

> There is still a great deal to be learned about laboratories, field-sites, and museums as places of science – however unmoving they might now seem to be – and we argue that the initiative to fold places into *non-geographic* networks actually overlooks important features useful for explaining how science travels.

The reminder of the paper sets about the task of detailing an extended sense of sites of qualification, through an examination of the development of the rider airbag.

Methodological strategies

The paper mobilises the notion of sites of qualification to show how the new safety technology of the motorcycle rider airbag has been 'summoned into being' (McFall 2009, p. 269) to become an established retail product which offers important insights for studying the articulation of culture, economy and value. Our research assembled material from the wide range of print, online and televisual sources through which airbag intermediaries are made apparent, motivated by Callon's (1991, p. 140) contention that 'the social can be read in the inscriptions that mark the intermediaries.' Inscriptions were examined through triangulation of print media trade press and online motorcycle news sources, visits to retail and trade spaces as well as assessment of motorcycle racing broadcasts. As Mouat *et al.* (2018, p. 141) emphasise, newly developing industries 'in the making' frequently make wide use of 'media in all forms,' yielding a rich landscape of textual and audio/visual material, including social media. We assessed news and editorial articles, including 35 publicly-available interviews with managers/executives in airbag firms and motorsport personnel more generally (e.g. riders and MotoGP managers), as well as technical discussions in research papers on airbag technology (e.g. Bellati *et al.* 2006, Cossalter *et al.* 2008, Grassi *et al.* 2018, Lee 2018, Marconi *et al.* 2018). News sources comprised the weekly UK newspaper *Motorcycle News*, monthly magazines *Motorcycle Sport and Leisure*, *Bike,* and *MotorSport*; online outlets such as motogp.com, Visor Down, Cycle News and Cycle World; and broadcasts such as Dorna's MotoGP™ podcast and Eurosport's Full Throttle.[2] Textual and audio sources were subjected to thematic coding in order to 'draw out themes from source material and examine the narratives they contain[ed]' (Craggs 2016, p. 123), allowing us to identify key sites and processes of qualification.

Retail visits included a 2018 launch event for the Dainese London flagship store, and subsequent 'rider events' hosted to coincide with major motorcycle races, such as the British Superbike Championship and the British round of MotoGP. We viewed retailing and display of rider airbags at trade shows including the National Motorcycle Show, and the *Motorcycle News* London show. We also draw upon longitudinal analysis of MotoGP television commentaries during successive race seasons as airbags were introduced (see also Table 1). The broadcaster BT Sport acquired UK rights for MotoGP in May 2013; and since the start of the 2014 season both the breadth and depth of their dedicated coverage has increased, including detailed technical commentary during free practice sessions, qualifying sessions and races; and interviews with riders, team managers and technical directors. Broadcast segments featuring discussion and demonstration of airbag technologies (clips of which are often re-circulated on social media) were captured, re-viewed and interpreted alongside the thematic coding of textual material detailed above.

Technologies of the rider airbag

The rider airbag is the most recent advance in a long line of technological innovation in materials associated with the practice of riding a motorcycle, including enhancing the durability of leather;

Table 1. Key moments in the development of rider airbag technologies: Dainese and Alpinestars.

Date	Technological event	Site/spatial clustering
1963	Alpinestars established as off-road motorcycle boot maker	Asolo, Italy
1972	Dainese established to manufacture leathers for motocross riders	Molvena, Italy
1974	German rider Dieter Braun: first Grand Prix racer officially sponsored by Dainese	Europe
1995	Alpinestars technical apparel line designed & launched to supplement boot market	US and Europe
2000	Dainese reveals D-Air airbag prototype	Munich Motorcycle Show, Germany
2001	Alpinestars begins research into motorcycle airbags	Italy
2001	Dainese creates the mobile research structure, D-mobile	Grand Prix racetracks globally
2003	MotoGP rider John Hopkins: first Alpinestars rider to use an active data logging system	Sachsenring MotoGP, Germany
2007	125 MotoGP rider Simone Grotzkyj Giorgi first to deploy Dainese rider airbag	Valencia MotoGP, Spain
July 2009	MotoGP rider Kenny Roberts Jr. debuts Alpinestars' 'Advanced Safety Technology' (AST) II: second generation of data acquisition system	Sachsenring MotoGP, Germany
2011	Retail launch for Dainese D-Air Racing suit	Europe
2012	Alpinestars launch TechAir Racing and Street vests (requiring compatible jackets/suits)	US and Europe
2012	Dainese D-Air Street vest launched (requiring compatible jackets/suits & motorcycle sensor kit)	US and Europe
2015	Dainese files airbag patent infringement proceedings against Alpinestars at the Tribunale di Venezia and 3 claims in Germany	Italy, Germany
September 2015	D-Air Racing airbag suit available to US market	US
2017	Regional Court finds Alpinestars in violation of Dainese patents relating to D-Air technology. Dainese awarded damages and Alpinestars forced to withdraw TechAir vests from sale in Germany	Munich, Germany
March 2018	Airbags mandatory for all MotoGP riders	all MotoGP races, globally
Summer 2018	Dainese London opens, joining other flagship stores in Italy, Germany & US	London, UK
27 July 2018	Dainese Archivio (DAR) opens: 9500 feet^2 of interactive exhibits, more than 500 authentic suits, 20 themed sections	Vicenza, Veneto, Italy
February 2019	Higher Regional Court upholds patent ruling against Alpinestars, continuing to prohibit the sale of Tech-Air airbag vests in Germany	Munich, Germany
July 2019	Dainese Smart Jacket (airbag vest) on sale across global markets	UK, US, South Africa
January 2020	Alpinestars Tech-Air 5 Autonomous Airbag system launched at Consumer Electronics Show, Las Vegas. Available to consumers March 2020.	UK, US

Source: Compiled from Dainese and Alpinestars corporate websites together with relevant trade press reporting.

the production of abrasion-resistant and breathable fabrics; and the introduction of body armour, back protectors and knee and elbow sliders (Black *et al.* 2005, Varnsverry 2005, De Rome and Stanford 2006, Bougourd and McCann 2009). In many ways, however, the airbag marks a significant shift in this development pathway since it involves active rather than simply passive protection (see Table 1).[3]

Car airbag safety systems have become commonplace, consisting of energy-absorbing inflatable textile cushions built into the fabric of the vehicle to protect passengers during a crash from impacts with hard internal surfaces, such as steering wheels, instrument panels, seats and body pillars. Car airbags are activated by collision impact sensors (micro-electro-mechanical accelerometers) that send data to the airbag's electronic control unit (ECU), where crash algorithms determine if the crash event meets the criteria for inflation and triggering a pyrotechnic gas generating firing device. Whilst early experiments with motorcycle airbag systems also were built into the machine itself, the technological trajectory soon shifted to the motorcycle rider (Pruner 2017). Modern rider airbag systems now incorporate inflatable protection into or under the rider's protective clothing, with rapid inflation of a bladder to protect the back, shoulders, kidneys and chest. Microfiliments connect both sides of the airbag interior to allow even and rapid inflation by helium-argon gas cartridges embedded in a rigid back protector. Whilst some systems are triggered mechanically by a tether attached to the motorcycle, others incorporate into clothing the accompanying technological infrastructure necessary for airbag deployment, such as ECUs, sensors, gas cartridges, battery packs and 'intelligent LED' (light emitting diode) systems with status display panels.

> How they work is little short of genius. Microscopic accelerometers and gyroscopes on the suits measure acceleration and lean angle, which is fed back to the internal computerised 'brain' of the system, around 1,000 times per second. Dainese uses a GPS [global positioning system] unit to help the ECU work out how fast the bike is moving, while Alpinestars uses an advanced inertial algorithm instead. The ECU uses this data to detect a crash, determine its violence and decide whether to activate the airbag, all in a matter of milliseconds. (Thomson 2018)

This then is why the rider airbag can be considered 'active' protection. Technical mediators, or non-human actants in the form of GPS, ECUs, accelerometers, gyroscopes and embedded algorithms, make normative judgements about bodies and movements in order to decide what counts as a 'crash' and therefore when to inflate, in order to provide protection for the motorcyclist. It is perhaps no surprise that lead firms have sought to emphasise airbag development as a paradigmatic shift in protective motorcycle clothing:

> Well, as our CEO Federico Minoli says, the airbag is a 'discontinuous innovation.' Before the airbag, the basic type of protection we used could be found in the New York Metropolitan Museum. Half a million years ago, when they had to protect soldiers' bodies for battle, they developed armour suits. Although we used different materials, like Kevlar and carbon fibre, our solutions were all similar to those that were studied 500 or 1,000 years ago. The airbag, on the other hand, is much more sophisticated because it's the birth of an intelligent suit. It doesn't take up much space or have much weight, but it activates when you need it. The airbag is a technological leap, not a progression from the past. (Lino Dainese, quoted in Miles 2014).

In order to further understand how this new form of rider equipment has been brought into being, we now need to explore the techno-economic networks (Callon 1991) which span design, production, motorsport racing, consumption and global regulation. The following sections elaborate the operation of agents and agency at key sites of qualification.

Sites of qualification 1: lead firms and territorial settings

One site of qualification we do know a lot about is the rich territory of lead firms, via regional innovation literatures. Two firms have been at the forefront of the development of the rider airbag. Since the early 2000s, Dainese and Alpinestars have supplied professional motorcycle racers with nascent technology; have monitored its use on the racetrack; and have refined and developed the product.

The firms are in relatively close spatial proximity, just over 30 km apart in the dynamic industrial milieu of northeast Italy. Dainese headquarters are in Molvena (Province of Vicenza) and Alpinestars are in Asolo (Province of Treviso). In their regional setting, the two companies are seen as exemplars of innovative, design-oriented success stories within a footwear cluster or 'sports system district' (Bettiol and Micelli 2006, 2014, Bettiol *et al.* 2010). Local manufacturing processes and organisation have been characterised by strong cohesion and collaboration, stimulating 'reciprocal learning and product improvements' and drawing upon rooted local craft skills (Di Maria and Finotto 2008, p. 187). Aage and Belussi (2008) foreground the importance of networks of creativity in enhancing aesthetic value amongst firms in the 'sport system' district of Montebelluna, including Alpinestars. Such narratives yield important insight into the ways in which, for example, the regional location of Alpinestars, with its connectivity to other cognate small- and medium-sized skilled craft-based firms, assisted the small manufacturer of ski boots successfully to shift focus to motorcycling boots and protective equipment in the 1970s and grow 'to become a major player with a strong international presence' (Di Maria and Finotto 2008, p. 192).

Beyond the benefits of locally-embedded networks of SMEs as well as supportive local institutional contexts (Antoldi 2007), the two lead rider airbag firms are also connected with other 'discrete spots' of scientific research (Henke and Gieryn 2008, 355). In addition to its dedicated research and development (R&D) centre located at the Group headquarters in Molvena, Dainese worked closely with Massachusetts Institute of Technology (MIT) on the airbag development project (Bettiol and Micelli 2006); and collaborative research programmes continue with MIT on space suit technologies. Dainese also has worked in partnership with Technopolis in Bari, the Consiglio Nazionale delle Ricerche (CNR) in Milan; and with the University of Padova (the products of this latter research are visible as research papers by Bellati *et al.* 2006, Cossalter *et al.* 2008). Alpinestars has R&D facilities in Asolo, whilst an additional site in Torrance (a coastal city within Los Angeles County) engages in consumer-facing research for Alpinestars' wider apparel and accessories market, including interactions with 'lead users' at the forefront of style and aesthetic trends (Di Maria and Finotto 2008).

It is important to understand how innovation in local and regional clusters is coupled to the dynamics of global value chains, as a number of authors recently have argued (De Marchi *et al.* 2017a, Buciuni and Pisano 2018). A central contention is that lead firms can act as 'bridges, with external markets, knowledge and external technologies connecting local value chains with global value chains [GVCs]' (Belussi and Caloffi 2018, 186). Belussi *et al.* (2017), for example, present Montebelluna firms' (including Alpinestars') shift from small scale, embedded local production to ownership of multiple overseas firms and subsidiaries as an insertion into GVCs. Most recently, Buciuni and Pisano's assessment highlights local-global connectivity (2018, p. 6) in four different northeast Italian manufacturing clusters, including the 'Montebelluna Sports Shoe District.' Both Dainese and Alpinestars now have well-established production networks outside the region, although bespoke racing leathers, including those with integral airbags, are manufactured 'locally' (Dainese Consumer Care, personal communication, 19 July 2019).

Sites of qualification 2: MotoGP racetracks and the mobile laboratory

At the Le Mans MotoGP circuit in May 2017, Australian rider Jack Miller, racing with the Marc VDS Racing team, lost control of his Honda in a free practice session. The momentum of the crash spun the motorcycle several times in the air and smashed it to pieces, whilst Miller was thrown violently into the perimeter barrier at 160 miles per hour. Witnessed by a global audience of millions, Miller got up immediately after what journalists described as a 'terrifying' crash, largely unhurt, and was cleared to race the next day. Providing crucial protection to his upper body, Miller's Dainese airbag also acted as a source of test data for the firm, whilst the crash itself performed a public demonstration of the value of the rider airbag. As Akrich *et al.* (2002a, p. 199) have articulated, 'to innovate is to change the consumer.' The MotoGP racetrack thus acts as a field laboratory for scientific trial and simultaneously as a site of qualification demonstrating and marketing the effectiveness of the product to a viewing public.

As we have argued elsewhere, the MotoGP championship is itself a mobile assemblage as it travels around the world through the racing year (March to November) (Pinch and Reimer 2017). What is crucial for our argument here is the use of MotoGP circuits by Dainese and Alpinestars since the early 2000s to generate data and test algorithms for rider airbags, acting precisely as the 'tests or trials' invoked by Callon *et al.* (2002). Dainese developed a prototype leather racing suit with integrated airbag, a system known as D-Air, in 2000. They constructed a mobile laboratory (called the D-Mobile and specifically described by the firm as a 'lab') and took it to MotoGP racetracks from 2001 onwards: 'this mobile research structure is an extension of the R&D department that visits racetracks around the world to identify and test the latest technological innovations' (Mobile Research 2019). Central to airbag development is the use of electronic sensing and data acquisition technologies to collect real-time data from riders on track. In between sessions, or after a crash, rider telemetry data is downloaded: the D-Mobile unit thus acts as the travelling division of Dainese's Molvena-sited R&D department.

By 2009 Alpinestars had developed a 'second generation' of a competing TechAir product that

> constantly monitors the exact orientation of the rider's body in relation to the ground and records the overall force and magnitude of any acceleration/deceleration as well as any impacts received. The system also features an integrated GPS which, coupled with the Inertial Motion Unit [IMU] and advanced post processing software, makes it much easier to amass data and fully determine movement and forces being exerted by and on the rider and their exact position, as well as the relationship between data and track location. This means the system can analyse the position of the rider's torso and limbs before, during and after an accident and the points and direction of impact forces throughout the progress of a fall and exactly where and when it happened. (Motorcyclist 2009)

The new IMU was first tested by US rider Kenny Roberts Jr. in a race at Sachsenring, Germany via technology installed in the aerodynamic hump of his suit; and Alpinestars subsequently analysed data from Spanish riders Carlos Checa and Toni Elias.

Fascinatingly, initial research by both Dainese and Alpinestars included detailed recording of riders' heart rates and temperature; and monitored humidity and cooling around the rider's body (Motorcyclist 2009). This was related to early product development assumptions that it might be possible to associate an airbag inflation 'trigger' with physiological measurements of the rider. Founder Lino Dainese reflected:

> Twenty years ago, when I went to MIT with the vision for the airbag, I was told it was impossible. At the time, I wondered if the brain, in a state of fear, might produce some adrenaline or chemical that could activate the airbag – not gyroscopes and accelerometers as we use now. (Miles 2014).

As explained in McCann *et al.* (2009, p. 242), Dainese's D-Tec 'Procom' project in 1998 was based upon

> a system of measurement and control of parameters (like temperature, blood pressure, perspiration, adrenaline etc.) that determine the physical state and comfort of a rider (Briatore 2004, p. 32) and to gauge levels of stress fear, competitive drive and fatigue. (Briatore 2004, p. 112)

However, further research indicated that monitoring bodily movement was more effective in predicting a crash, leading to the use of gyroscopes, accelerometers and algorithms to make judgements about rider performance. Movement is codified as large data sets, generated across practice, qualifying and race sessions at every track.

MotoGP race circuits therefore act as test arenas; as 'field laboratories' at which the airbag is trialled, and data is gathered. It should be emphasised that the 'mobile laboratory' described here has contrasting dimensions to so-called 'temporary clusters' portrayed in accounts of trade fairs (Maskell *et al.* 2006), professional gatherings (Henn and Bathelt 2015); and fashion shows (Entwistle and Rocamora 2006). Riders, technicians and equipment manufacturers at the MotoGP racetrack (together with their tools, equipment, laptops and analysis software) are directly engaged in detailed and extensive programmes of research, not simply knowledge circulation and exchange (*cf* Bathelt and Henn 2014); and interactive learning is rarely shared among firms. In fact, as indicated below, firms are more likely to be in bitter competition for markets.

Site of qualification 3: MotoGP riders, performances and celebrity

MotoGP riders are not simply passive test 'dummies' for the non-human technological actants and material systems they wear and transport. Rider feedback regarding the feel and effects of airbag systems on racing performativity has also impacted technological trajectories. For example, the extra weight and restrictive feel of racing suits with integrated airbag systems initially was opposed by many riders. This resistance was gradually overcome as suits became more flexible; and as refinements to airbag bladder fabrics and other component parts reduced the 1.3 kg weight of early prototypes to 600 g. Advances in data analysis and improved algorithms led to material enhancements, more efficiently moving compressed air from a reservoir in the rider 'hump' into the inflated airbag. Riders also were persuaded as the sport's highest profile and most influential riders, such as Dainese-sponsored Valentino Rossi and Alpinestars-sponsored Marc Marquez, became enthusiastic early adopters (Miles 2014, Wheeler 2018). The demonstrable benefits of the technology in reducing career threatening injuries, notably broken collar bones from high-side crashes, has further locked in this innovative pathway.[4]

Thus, MotoGP and its riders are an important socio-technical market device and a mobile experiential site where the airbag object is made both visible and spectacular to a viewing public, be it trackside or through broadcast television and social media. Public motorsport such as MotoGP and its globally recognised and marketed celebrity riders provides an 'imagescape' (Stephens and Ruivenkamp 2016, cited Mouat and Prince 2018, p. 317) through which the qualities of airbag technologies are arranged and demonstrated to potential retail consumers. In their moments of greatest instability, crashing MotoGP riders, such as the aforementioned Jack Miller, act to stabilise and frame the qualities of airbag technologies. MotoGP riders can be thought of as performing the object (Shove 2005).

MotoGP riders also are a form of quasi-consumer performing 'qualculative' (Cochoy 2002) evaluation of product qualities for risk free and safe viewers. Television commentary upon such events is also important to this process. For example, during a segment broadcast to UK viewers from Le Mans in May 2018, former rider and BT Sport presenter James Toseland 'tested' to camera the speed and physicality of an inflating Alpinestars race suit triggered by manufacturer representatives, whilst Toseland stood connected to a laptop.[5]

Enacting rider airbags in MotoGP, therefore, provides a way of enrolling potential consumers into the virtues of airbag technologies, even though the actual algorithms systems of 'off the shelf' consumer airbag products are set up differently to those worn by professional riders. Consumer products, for example, anticipate collisions from the rear when stationary (i.e. by a car), whilst MotoGP suits 'ignore' low speed crashes and small-scale loss of control in order to enable the rider to continue racing (Thomson 2018).

Firms that have developed the rider airbag significantly benefit from demonstrating the safety and effectiveness of the product to the consumer without the consumer directly using and evaluating it – primarily at the racetracks of elite class motorcycling and through the practices (crashes!) of professional motorcycle racers. Potential consumers watching MotoGP, for example, are reassured about crashing and surviving. Such consumer reassurance is important with a product that is problematic to qualify or indeed 'co-produce' with consumers. It is unlikely that motorcyclists wish to be over-exposed to the implications and 'counterperformativity' (see Mouat and Prince 2018, p. 318) of actual life-threatening road accidents, certainly not through experience, nor indeed through graphic visual representations of them. The racetrack, therefore, acts as a space of disassociation (Ibert *et al.*

2016) from the very real risks and practices of quotidian motorcycle mobility (Pinch and Reimer 2012).

Sites of qualification 4: courts of law and centres of governance

An important site in the 'socio-technical complex' (Mitchell 2008, p. 1118) that has brought the airbag into being has been courts of law, specifically as spaces in which patents have been legally contested. Such is the current and future market potential and value of the rider airbag that Alpinestars and Dainese have been involved in protracted legal disputes over ownership of this technology. The companies have pursued actions against each other relating to infringement of patents, notably involving copyright of particular airbag components rather than dispute over the overall 'item.' The prolonged legal battle is illustrative of an intricate network complexity, not least in relation to legislative sites positioned at different spatial scales. At a mid-level 'Landgericht' court in Munich in 2017, Dainese accused Alpinestars of three patent infringements, but in February 2019, only one was upheld. Alpinestars subsequently sought action in a higher German court, claiming that 'the German decisions have no impact on its Tech-Air kit in the UK or France – and that it's already moving to nullify Dainese's patent claims in Britain' (Thomson 2019). At the time of writing, disputes continue in Italy, France and the UK. Beyond the narrower issue of the significance of patent registrations (to the extent that patent data frequently is analysed as a marker of 'innovation'), our broader point is that the framing of legal systems plays an important role in qualculation (Cochoy 2002) across national and international spaces.

The laws and governance regime of MotoGP itself work further to stabilise airbag product qualities and to shape how 'objectified properties' are singularised and 'adjusted to the buyer's world' (Callon and Muniesa 2005, p. 1234). Key network actors include Dorna, the Spanish-based television and marketing rights holder for MotoGP and the Fédération Internationale de Motocyclisme (FIM), the Swiss-headquartered international governing body of motorcycle racing. Significantly, Dorna and FIM together in November 2016 announced that the wearing of rider airbags would be compulsory for all riders in this top echelon of motorcycle sport from the start of the 2018 season (Mann 2016). This official endorsement, we would argue, acts to change landscapes and cultures of motorcycle safety, since it forms part of the 'ontological boundary work' which 'objectifies [something] as inevitable' (Mouat and Prince 2018, 322, see Franklin 2019, Newland 2019). National government legislation performs and defines these boundaries even more conclusively, solidifying and framing markets as for example, in the case of compulsory motorcycle helmet laws or legislation requiring the testing and certification of personal protective equipment (PPE).[6]

Sites of qualification 5: showrooms and archives

Product qualification is further enacted at sites that face the consumer directly, such as retail stores owned and controlled by the major manufacturers. Both Dainese and Alpinestars operate a global network of showrooms engaged in the sale of motorcycle clothing, footwear and helmets. Increasingly these sites offer more than traditional product display. Dainese, for example, have launched a series of flagship stores that provide consumer interactivity both with the materiality of its products and with the professional riders who wear them. Dainese flagships have a dedicated space for ordering bespoke leather race suits in which a mock-up of disassembled pieces of Valentino Rossi's suit is displayed. As the most globally recognised MotoGP rider, Rossi has worn Dainese leathers since his career began at the age of 17, qualifying the product not simply through reputational celebrity endorsement but also through a history of embodied practice in riding and crashing. Dainese flagship openings include the London store on Commercial Street in Spitalfields (September 2018), which has hosted MotoGP and British Superbike rider 'meet and greet' events and motorcycle ride-outs. These stores also play a key role in servicing new airbag technologies.

In 2017 Alpinestars opened a week-long pop up shop at Union Garage, Brooklyn, New York, showcasing

> a huge selection of the company's heritage product line – including some new U.S. exclusives – plus they have on-hand, in-stock and for sale the absolute latest in motorcycle safety innovation with the Alpinestars Tech-Air airbag system. Previously available only for MotoGP athletes, the technology is now offered in a select number of street-ready textile jackets – and we'll have the first product available in the U.S. in-store for sales + demo. ('Alpinestars NYC pop up shop' 2017)

As well as being a site of object display, this site sought to invoke 'origin' narratives of craft production. Accompanying Alpinestars products were historic rider photographs and a textual wall display:

> In 1963, a leather craftsman by the name of Sante Mazzarolo brought forth a future icon. Based in the small Northern Italy town of Asolo and with the perennial Alpine Star flower as its namesake, Mr. Mazzarolo began producing the first products bearing the Alpinestars moniker, providing protection for a new sport called motocross.

The geographical imaginary, linking the firm back to its Italian roots, melds craft, performance and memory, with a further textual narrative emphasising 'Alpinestars' legacy of motorcycle racing.'

A new project, DaineseArchivio, has taken consumer 'experience' to another level, utilising contents formerly stored in the Molvena R&D lab and displaying them directly to the public:

> From the very first day, every test, every product, every design has been kept in the company's historical archive in Molvena. An inaccessible vault, which has fostered research and experimentation over time, as a function of innovation that is increasingly at the service of man (sic). Now, a part of that incredible collection is open to the public and available to everyone. https://www.dainesearchivio.com/archivio/

The artefacts are not simply sample products as in the high fashion archives of Dior and Saint Laurent (Sherman 2013), but are actual racing leathers worn by riders, bearing the marks of crashes that have been used for analysis. DaineseArchivio opened on 27 July 2018 in a purpose-built structure next to an existing retail space in Vicenza, providing a site of qualification firmly located in its region of origin. The displays make visible not only a material product lineage for the locally-made craft product (hand stitched leather race suits), but also foreground future project development such as airbag refinements and ongoing work on space suit technologies. Dedicated areas include an 'Intelligent clothing' section detailing the history of rider airbag technological development; and a sector highlighting the relationship between Dainese and MotoGP's treatment unit *Clinica Mobile:* 'Dainese's alliance with the Mobile Clinic enabled its engineers to understand which areas of the human body are most subject to injury, and to learn the physical and biomechanical laws of the rider's body.' (Sections 2019). Whilst the collection of historic leathers formerly had been available on appointment, for example to journalists (Dainese's secret stash of Rossi suits revealed 2015), in the space of the new 'archive' building, consumers are directly enrolled by displaying the artefacts of the lab.

Conclusion

Our paper has developed and utilised the notion of 'sites of qualification' in order to provide a more expansive understanding of how innovative products are designed, produced and brought to market. In so doing, we argue that researchers should pay greater attention to place and territory as they assess the diversity of agents and agency across heterogeneous networks. A sites of qualification approach expands conceptualisations of innovation as they have emerged within existing literature on industrial districts, whilst for prevailing work on the qualification of products, our concept offers the possibility of scrutinising important moments at which practices may be stabilised or routinised in space. Our perspective requires attention both to individual site specificity as well as to the potentially wide range and diversity of sites of qualification.

Through the example of the motorcycle rider airbag we have worked through sites of qualification as the object has transitioned from an 'industry-in-potential' (Mouat *et al.* 2018, p. 136), to its incorporation within specialist racing leathers, through to a product that is now more widely available to consumers. This has involved following the airbag's trajectory across a range of different sites, including lead firms and their territorial settings; MotoGP racetracks, mobile laboratories and professional riders; courts of law; and showroom and archive locations. Our presentation of these sites captures the social, material and technological roles performed by a heterogeneous collection of human and non-human agents, such as designers and technicians; motorcycle riders, airbags, algorithms, GPS systems, gyroscopes and electronic control units.

Sites of qualification are also central to the ways in which consumers are being enrolled into new kinds of understanding of the rider-body; in which protection is more highly valorised through new technological objects. As manufacturers launch ever more adaptable and lower cost vest systems, so rider airbags are starting to become as quotidian as other safety objects, such as car seatbelts and motorcycle crash helmets. In this regard it is interesting to note that Dainese's new lightweight Smart Jacket (launched July 2019), which fits under existing motorcycle clothing, seeks to normalise cultural conventions of its wearing through its marketing strap line 'Never without it'/ 'Mai più senza.' We see important future work in developing this approach to innovation for other consumer objects, precisely because as we have shown, sites of qualification are integral to the ways in which technical products are made social.

Notes

1. Many thanks to one of our referees for drawing our attention to Strathern's (1996) paper in relation to our arguments here.
2. Whilst direct face-to-face interviews potentially would be important for future work assessing the valorisation of rider safety (e.g. a research programme seeking to evaluate commentary from rider airbag consumers), we feel that the wealth of available archival/documentary material is appropriate for our purposes in the present paper.
3. Although an extended examination is beyond the scope of this paper, we also would argue that social wearing and cultural practices of display are central to the materiality of motorcycle clothing (ranging from the iconic black leather jacket to full-suit racing leathers, to durable textiles for motorcycle touring); and that embodied practices of moto-mobility are neither static nor uniform across space and time.
4. 'Dainese claim that none of the 306 crashes by riders wearing the D-Air Racing System between 2007 and 2013 resulted in fractures to the collarbone and shoulder joint areas, which is remarkable when you consider the forces generated in such high speed spills' (In Gear 2015).
5. Toseland articulated the 'first time' nature of his experience, almost as an 'ordinary consumer': having retired from racing in 2011 through injury, he had never worn a rider airbag himself.
6. In the UK, the 'Motor Cycles (Wearing of Helmets) Regulations 1973' was passed on 7 February and enforced from 1 June 1973. On the racetrack, the Auto Cycle Union (ACU) made helmets compulsory for the 1914 Isle of Man TT. Other protective clothing for motorcyclists is governed by consumer legislation in the sense that products for sale must meet British Standards stipulations. Whilst the 1989 European directive 89/686/EEC compelled PPE testing and certification by an independent body, manufacturers historically sold textile and leather motorcycle clothing as 'non-protective.' However, in April 2018 the new European regulation 2016/425 formally classified all motorcycle clothing as PPE (Milbank 2018).

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No potential conflict of interest was reported by the author(s).

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The precarious Chinese financial ecology of expertise: discontent in the mix

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ABSTRACT
By describing features of Chinese financialisation through *en masse* stock market trading, the article concerns the development of a Chinese financial ecology of expertise. This indicates a new precarious knowledge regime in which the relationship between the state and the financial subjects it fosters is increasingly defined through financial terms. It argues that the Chinese financialisation should be investigated alongside the state's project directed at financialising human capital and encouraging stock trading as a reaction to an increasingly contractualised labour market and vanishing welfare state. By observing investing strategies of both formally trained expert investors and untrained investors, it emerges how the preeminence of investing activities in the market risks exceeding that of waged labour. The Chinese stock market becomes a site to observe not only the reworking of the relationship between money and wages in China, but also the formation of a financialised redistributive regime in which the state's legitimacy becomes increasingly dependent on its capacity to *jiushi*—rescue the market in times of crisis.

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Introduction

When the Chinese financial crisis struck in June 2015, global media showed images of a Chinese stock market that differed from those captured during the 2008 Wall Street and Frankfurt crashes. The pictures from China were remarkable because they revealed the mundane face of Chinese finance, which until then had been little known around the world. Here, investors were not frenzied brokers in suits reacting with panic and despair. Instead, they were angry, ordinary people—retirees, housewives, and young workers without job security—who, for the most part, had been investing their private savings as a way to add some extra money to their family budgets.

This mass of Chinese lay investors, which amounts to approximately 160 million people and accounts for 99.6% of Chinese capital market investors, represented the most numerous class of investors in the world. Soon after the crisis, these ill-fated investors became the culprits of the crisis. In popular media accounts, they were blamed for triggering market volatility due to their lack of financial expertise and market misinformation. Yet, this narrative lacks an analytic lens that looks beyond the mainstream neoliberal rhetoric of the market/state dualism, as rehashed in the Western-centric view of capitalism. In China, despite the financial crisis, the state remains firmly in control of the subjectivities the market gave rise to.

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I suggest that an approach to Chinese financialisation, which takes as a premise the subjectivities generated by it, provides a critical method for the study of the specificity of financialisation in China. The *sanhu,* (in Chinese the 'scattered players') are typically lay people who invest in the market to make extra money to protect against the increasing lack of economic and social security (Dal Maso 2015). Based on research conducted in Shanghai and Shenzhen in 2013 and 2015, I observed how the *sanhu* embody the social and economic changes brought about by financialisation.

Drawing on interview data from this research, I examine the role of the *sanhu* and *haigui*. The *haigui* are Chinese students who have studied abroad to acquire financial expertise and, at the encouragement of the Chinese state, have returned to Shanghai to advance their career in the Chinese financial market.[1] From my research, it emerges that even if formally trained to work as professional investors, by entering the Chinese 'stock market arena' (Hertz 1998), the *haigui* join the low-end, non-expert actors of the *sanhu*. Their investment strategies suggest informal expertise and contingent practices associated with the *sanhu*. Despite the differences in their levels of expertise, both the *sanhu* and the *haigui* actively embraced a key modality of financialised capitalism in which 'the practices of investment come to be represented as integral to a secure and autonomous life' (Langley 2007, p. 74; see also French and Kneale 2012). Their 'convergence' takes place in what I define as the precarious ecology of Chinese expertise. This not only points to the emergence of a technocratic financial governance that is increasingly changing the Chinese economy—reducing the state's administrative and fiscal functions and increasing state assets according to a new shareholder logic (Wang 2015)—but also shapes a new precarious knowledge regime in which the relationship between the state and the financial subjects it fosters is increasingly defined through financial terms.

In this article I firstly describe the evolution of this ecology from the time the Chinese state established the two market exchanges (Shanghai and Shenzhen) and the China Securities Regulatory Commission (CSRC) in 1992, after decades of economic reforms. I will argue that the Chinese process of financialisation has been a state project directed at financialising human capital (via stock market trading and higher education including study abroad) and encouraging financial acquisition as a reaction to an increasingly contractualised labour market and vanishing welfare state. This unprecedented socio-economic market transformation involved a complex process of knowledge-making that deeply modified the traditional boundaries between the state and the population and also blurred the boundaries between professional and non-professional players.

Secondly, by observing both the strategies and attitudes of the *sanhu* and the *haigui* in the stock market, I examine how these investors develop investment practices that the state encourages but also seeks to tame. From my investigation, it is clear that the notion of financial expertise fades when the multitude of investors adjusts their practices in a heterogeneous and often irrational way. Their activities of *chaogu* (buying and selling stocks) seems like an arm-wrestling against the state for control of the market (Gamble 1997, Hertz 1998, Keith *et al.* 2014).

Finally, I highlight how the Chinese stock market points to the creation of a new contractual and redistributive model where the very notion of financial labour is at stake. I illustrate how in the Chinese ecology of financial expertise, the preeminence of investing activities in the market risks exceeding that of labour, rewriting the terms of state legitimacy. Whereas in the past labourers' access to money was bound by their subordinate relationship with the state, in which the state is the main distributor of wages and pensions in exchange for people's labour power, the introduction of stock market logic leads to a new relationship of dependence based in the growing relevance of investor and investee relations (Feher 2019). This paper will argue that this contract not only reworks the relationship between money and wages in China, but it also alters the relationship between the state and the financialised and speculative subjects it fosters.

The Chinese financial ecology of expertise

When considering China's current integration to capitalism, one should stress that 'China's 'open door' at the beginning of the twenty-first century was so utterly different from that of a century earlier because this time global capital entered by invitation' (Panitch and Gindin 2012, p. 149). Through the *gaige kaifang* (reform and opening-up), China sought to acquire investments, technology, and the market mechanisms necessary to its integration in the world order. It promoted special economic zones to encourage foreign investments, boost exports, and undertook market-oriented reforms to its state-owned enterprises (SOEs) (Naughton 2007). These measures radically reshuffled employment relations from the old life-long employment and fixed wages model based on the work units *danwei*[2] to one attuned to precarious and temporary contracts (Dal Maso 2015; Lee 2002).

Given the deep internal regional and local heterogeneity, which contributes to the overlapping of multiple labour and production regimes (Rocca 2007), the Chinese state employs financial capital as a form of command (Negri 2010, 266) over not only different sectors of the economy but also over the social realm. In this sense, China participated in the historical turn that marked the global rise of financialisation. Despite multiple institutional, historical, and political variations (Dixon 2011, Karwoski and Stockhamer 2017) neoliberal reforms advanced financialisation (Dumenil and Levy, 2001, Epstein 2005) through policies aimed at dismantling and privatising labour and social welfare (Crouch 2009, Dasgupta 2013, Bryan *et al.* 2008), and increasing the primacy of financial market-based operations (Krippner 2011, Hardie 2012, Aglietta 2000) over other economic and social spheres (Pike and Pollard 2010, Martin 2002, Marazzi 2010, Lazzarato 2012). In this transition, the role of the state should not be considered as exogenous but (and more so in developing countries) as a facilitator of financialisation (Dixon 2011, Bortz and Kaltenbrunner 2018, Rethel 2018, Akkemik and Özen 2014). China represents an extreme case in which the state not only exerts 'control within financialisation by monitoring, regulating and intervening into capital markets,' but also 'exerting control through financialisation' (Petry 2019, n.p.). By encouraging financialisation, the Chinese state not only sought to preserve domestic socio-political stability 'by harnessing capital in pursuit of economic growth' (Gruin 2016, 2019), it also acts as both an arbiter and promoter of (financial) market knowledge (Rethel 2018, p. 188; Lai 2010), governing the population to a new financialisation process.

By welcoming the logic of financial capital, the state relies on financial asset operations to sustain itself, which in turn redefines its contractual obligations with the population, and a new Chinese ecology of financial expertise is created.

As suggested by Ong (2013), an ecology of expertise refers to a 'knowledge milieu in which the strategic deployment of financial assets territorialise and code crisscrossing relations of convergence and competition to shape a financial state' (55). In the Chinese context, I use the concept of a financial ecology of expertise to address the specific shape of the Chinese financial state which has fostered the rise of formal and informal investors (Dal Maso 2019). I maintain that the 'particular sets of relations' to which the lens of ecology speaks, also allows for a 'consideration of power in relational thinking' (Lai 2017, p. 30) and the emergence of the *sanhu* and *haigui*.

The Chinese ecology of financial expertise took shape the moment the state created capital markets to 'refashion itself' via a new shareholding function (Wang 2015, p. 603) and to seek a new form of political legitimacy. The state used capital markets to restructure its State-Owned Enterprises (SOEs) through shareholding value, increasing financial activities to gradually convert its financing from fiscal to financial means (Wang 2015).[3] The process led to a deep labour crisis in which many workers in SOEs were laid off or left with insufficient one-off compensation payments or a basic living subsidy (Rocca 2003).[4] This unprecedented crisis of labour and welfare induced by the reforms was tackled through the means of financialisation. Workers were thus 'invited' to invest their own (insufficient) saving and pension funds in SOEs listed in the secondary market (Dal Maso 2015). To this end, since its inception, the stock market was organised into two different share classes (A and B shares); the former denominated in the local currency (the *renminbi*) and at the disposal of local investors (among them, the *sanhu*) and the latter denominated in foreign currency (US dollars in Shanghai and Hong Kong dollars in Shenzhen). This division enabled the government to be in a strategic position of creating a Chinese protected zone where foreign investors can participate, and exchange information within the Chinese stock market, while at the same time the government could preserve an exclusive Chinese space for Chinese investors only, who could leverage their money with the promise of 'secure' returns in SOEs. The Chinese state used the market as a political and governmental tool to create consensus by leading the population in a rush for money (Dal Maso 2015). This gave rise to a new, financially capable citizen, the *sanhu,* who participated as an investor in the country's financial wealth. These are millions of 'mom-and-pop investors' who, thanks to household income growth between 1998–2012, benefitted from a budget surplus available for investment (Carpenter and Withelaw 2017).[5]

The *sanhu* mostly come from the middle class, the *zhongchan jieji* (Goodman 1998, Tomba 2009). In the first years of market transition, most of the *sanhu* consisted of 50–60-year olds who were seeking to make extra money to increase their insufficient retirement savings (Hertz 1998). In recent years, the *sanhu* group has expanded to include young professionals, highly educated and mid-level income earners (like the *haigui*) whose wages remain nevertheless insufficient to cover the inflated prices of the Chinese urban housing market (Lin 2015). During the last few decades, the gap between wages and living costs has grown and since the beginning of the Chinese economic slowdown in 2010, the government has defined this as 'the new economic normal,' which has also given rise to a new 'mass' entrepreneurship culture in response to the lack of stable jobs.[6]

Despite this uncertainty however, the *sanhu* invest more than twelve percent of their annual incomes in trading activities (NBS 2018). To encourage trading of SOE shares on the capital market, the state fostered a new way of governing the social sphere through stock market trading and financial knowledge making. The market quickly became transformed into 'a site of knowable, calculable and manageable risks, rather than as a site of fundamental uncertainty' (Maman and Rosenhek 2019 p. 2). Thus, at its inception both the state and the *sanhu* resorted to stock market performance as a source of social and political stability, intrinsically linked with the new dream of socialism with Chinese characteristics (Petry 2019, Dal Maso 2015).

Leading up to the crisis: The *sanhu*

When the Shanghai Financial Crisis struck in 2015, those who had invested in state-backed companies were among the most indignant investors and felt the state had deceived them into believing they were making a safe investment. For instance, in Henan, the *Tengfei* Investment Wealth Management fund collapsed in 2014. Since then, protesters have regularly gathered outside the local government building demanding a refund.[7] Another case erupted in Guangzhou in May 2015 when *Fanya* Metal Exchange, a rare metals trading platform, was exposed as fraudulent after being caught up in a giant Ponzi scheme. Investors were particularly angry because of the government's direct support in launching and growing the company. The Guangzhou provincial administration approved the setup of *Fanya* and state banks aggressively sold its flagship products 'which promised 'zero risks' and high returns, to their clients' (Huang 2015, n.p). As in other cases, government recognition of a company blinded investors to the possibility that things could go wrong when the market collapsed in 2015. After equity markets collapsed, a wave of protests spread from Kunming to Xi'an to Beijing, and crowds started protesting outside the offices of the securities regulators in multiple Chinese cities. Protests in Guangdong, which included both laid off workers and investors, were convinced that 'government officials and the ruling CCP encouraged their investment of money and labour in ways that helped build modern China, and now they feel betrayed' (Yap 2016, n.p).

Mr Jin, an old *sanhu* I talked with in Shanghai a few months after the crisis, explained that in recent years the stock market changed from a relatively fertile field to sow one's savings, to a minefield of disappointments and losses, pushing a number of unlucky individuals to *tiaolou* (jump out of the window). He knew someone who committed suicide. He, too, was desperate, having lost almost everything he owned.

Mr Jin had more than 11 years' experience investing; he started when he was laid off from his job as a factory engineer in a SOE in Shenzhen. Mr. Jin described how he soon understood that 'the stock market emerged as a state's creature to collect funds from society to plug the holes of state-owned enterprises; [telling] everybody has to provide them with funds.[8] Initially, his investments had been secure, but now things have changed. Mr Jin said, ‘If in the past, the state was supportive towards investors like me, and SOEs meant safe returns, now the state seems indifferent, doesn’t care.’ His disappointment, however, was not enough to discourage him from investing; without a job or a pension that is sufficient to cover living costs, all he can do is hope the state will (continue) to rescue the market. He had nothing to lose.

In 2015, when the crisis erupted, and the Chinese Composite Index plunged by 30%, liquidating approximately 30% of China’s GDP ($10 trillion in 2014) in a span of a few days,[9] the Chinese government promptly intervened by halting all new stock listings and restricting short selling (the practice of betting against price falls) through the adoption of a ‘circuit breaker’ measure to mitigate the risk of further market turmoil. It restricted state-owned enterprises—and even the state pension funds—from selling shares. The government-controlled China Securities Commission called ‘the national team’ [10] set up a 120 billion yuan fund to buy shares in the largest state-owned companies and ordered the central bank to lend money to brokerage companies to buy shares totalling USD 365 billion.

As with Jin, most *sanhu* I interviewed applauded the state’s intervention and agreed that the government had acted with ‘good intentions.’ This perception may stem from the fact that since the market opened, the state has been able to guarantee a controlled and regulated exchange where retail investors could benefit from the state-protected environment to increase their saving through investment in domestic A-shares. In contrast to other stock exchanges, Chinese exchanges ‘do not sell real-time market data, which would give professional investors an advantage over retail investors.’ Chinese regulators publish market data published in bundles, which is ‘good for lay people, but bad for professional investors’ (Petry 2019).

Under these circumstances, the *sanhu* have to play the game not as passive receivers, but as fast and active investors, who hunt for information and rely on their self-made expertise. However their investment strategy appears to be one in which they follow market trends and exhibit herd behaviour with *chao* (literally ‘stir fry’), indicating playing and winning in a ‘bull phase,’ and *tao* (being stuck), which refers to the impossibility of reselling a stock after it falls (Rooker 2008, p. 13).

Mrs Lai, a young public school teacher seeking extra income through stock market investments, remained convinced that generally, ‘where the national team plays, state money cannot be lost.’ [11] Yet, despite her confidence, she was also aware that because of the dominant presence of the state, small investors like her are confined to pick up the crumbs. She was determined, however, to maintain discipline and convinced that investors must base their decisions on rigorous research and analysis. Mrs Lai explained,

> The stock market is a sea in which both fish and dragons hunt. You don’t study it, you just want to win, but that’s not an ATM, if you think it is enough to sail into this sea to learn how to manage, you will end as a vegetarian.

As Mrs Lai explained, it is not enough to ‘jump into’[12] the market expecting returns, but rather studying market knowledge is essential to compete with the big state players. She likened the stock market to a machine that is continuously operating and has the potential to recover losses and to keep nurturing hopes to get richer.

As I have explained elsewhere (Dal Maso 2015), the *sanhu*’s expertise lies between formal and informal, rational and irrational, tacit and codified knowledge, and their attitudes shift between trust and distrust towards the state and its manoeuvres. Consequently, in the *sanhu*’s eyes the chances to fulfil Deng Xiaoping’s call ‘to get rich is glorious’ remains a powerful force which keeps *gupiaore* (the stock fever) alive. As self-learners, and informal experts, the *sanhu* stand in sharp contrast to others in the array of the Chinese ecology of financial expertise, particularly the *haigui*.

The *haigui* are returnees from overseas study and thus formally trained experts. They are mostly young aspirant financial brokers and consultants trying to pave their way in the Chinese financial market thanks to their foreign-acquired expertise. The state’s efforts to include the population in its financialisation project involve policies of migration and education to spur the students to invest in their (human) capital by studying abroad, which is seen as a contribution to the country and their personal career (Nyíri 2010). At the same time, students' families also feel compelled to invest in them through private savings because of future returns and rewards from the returnees' financial career, expected higher wages and a *hukou* (a Chinese resident permit) for the Chinese first tier cities.

Asymmetries of financial expertise: *The haigui*

Cai, a *haigui* who graduated with an MBA from Australia and now works for a mutual fund company in China, spoke about his frustration with his role.[13] Such firms are a form of investment company that act as intermediaries between individual investors and the stock market and provide market research and analysis. However, in China these companies operate under supervision from the state and the restrictions the CSRC imposes. This means that the state establishes the market parameters that financial institutions must follow and stifles Cai's ability to apply his knowledge in the role. Adding to this frustration Cai also described how many of his clients (such as the *sanhu*) always want to make their own choices. He remarked angrily that the general behaviour of Chinese investors is illogical. As with many other *haigui,* Cai explained how the market in China is peculiar and unlike markets in other countries.

Cai downplayed widespread Chinese enthusiasm for the market to defend his professionalism and boost his role. He was supposed to provide clients with guidelines for investment and prevent them from making unnecessarily risky and irresponsible decisions. However, given the controlled nature of the market, where knowledge is restricted to insiders, it was hard to say precisely what kind of advice and service his company could provide to individual investors. After showing me his portfolio and the different options from which an investor could choose (from low risk 5% profit, to very volatile up to 20% profit), he told me that the best and safest investment a Chinese person could make, if they had the credentials, was on the Australian stock exchange or the US-based Dow Jones. This advice not only highlights the inapplicability of Cai's expertise, but also contradicts popular advice in which investors who want to avoid risk are advised to invest in state-owned banks or other state-owned companies, as there is a guarantee they will never go bankrupt. Yet even this was not straightforward; accessing reliable information, such as which are the 'right' state-owned companies and when is the 'right' time to invest, has often been reserved for knowledgeable insiders, such as institutional investors affiliated with the government, state backed securities companies, and state owned commercial banks.

Certainly, regular anti-corruption intervention from the CRSC helps maintain public confidence in the state as *super partes*, but it can also appear to act arbitrarily. On the one hand, the CSRC can denounce and threaten to prosecute local banks and provincial companies under its control, and on the other it can also bail out institutions involved in shadow banking[14] practices in a bid to guarantee more liquidity in the market.

Another interviewee, Xun, held a Ph.D. in applied finance and was working at a prominent Chinese hedge fund. He had returned to Shanghai through the 'Thousand Talents' programme, which encourages Ph.D. graduates from abroad to return with a series of advantages.[15] Xun's work was speculative and he was aware that the media had portrayed the hedge fund as the culprit of the Chinese financial market. From insider trading to Ponzi schemes and shadow banking practices, hedge funds are among the primary tools used for speculation. For example, *zhangting gansidui* (limit-up *kamikaze* squad)[16] is a widespread procedure practised by some *zhuangjia* (the so-called 'rat hoarder,' i.e. connected insiders), to push unaware retail investors to buy insecure stocks up to the daily limit, as imposed by the rules of the Chinese stock markets, and then sell the stocks right before they collapse, speculating over the momentary value increase they themselves provoked by pushing the purchases.

When I brought up *zhangting gansidui* in conversation, Xun told me that: ‘strategies like these are just part of the agenda; they are pervasive, and it’s just the way it works.’ In general, he was aware that insider trading, which was common practice, was making the job of analysts like him equivocal in the eyes of foreign investors who ask him for advice. But as everyone was blinded by a desperate desire for a high return, the practice of shadow banking and high-risk investing had become a *de facto* payment, with everyone expecting to ‘make yields irrespective of drought and flood.’[17] However, what was striking about Xun was that he was extremely elusive about the environment in which he has been able to re-adapt.

Xun tailored his role to play within that ecology of financial expertise established by the state. However, when it came to talking about his expertise, he expressed a kind of faith in it as a form of ‘applied science,’ a scientific truth. He explained that the concrete knowledge with which he operates comprises both fundamental analyses—values measured by market performance, balance sheets, and technical analysis—predictions on market and stock price patterns for a range of companies, irrespective of their current state of financial health. Through this, he could affirm his distinctive position as technically superior within the ecology of expertise and applied this when negotiating with foreign clients. When talking in technical terms, he was performing the hermeneutic discourse of his discipline, without questioning the possibility of its inapplicability within the Chinese context. However, even if often ‘unapplied,’ the *haigui* expertise still has a role to play in many situations, for example when investment procedures require updating when new products are brought to the market. For instance, the 2005 State Council’s decision to introduce securitisation in the Chinese markets and to re-launch it in 2012 after the 2008 mortgage crisis allowed the *haigui* to demonstrate their knowledge related to these financial instruments.

The Chinese derivative market (under the Chinese name of *fuyan gongju* ‘expanded instruments’) blossomed in 2017 (it reached USD 230 billion, with a 65.86% increase compared to 2016), thanks to the success of a range of new investment opportunities. For instance, at the end of 2015, the National Development and Reform Commission (NDRC) and the China Securities Regulatory Commission encouraged investors to finance a new instrument through asset securitisation, such as public-private partnership projects (PPPs). As Zhuang and Lai,[18] two *haigui* working in a stock sales company told me, ‘investing in PPPs is alluring for our clients.’ Initially, they offered uncharted business opportunities, and the ministry of finance offered them as a way to revive investors’ enthusiasm. Since these products were linked to massive state investment plans, investors saw them as particularly secure. Yet, Lai added that as customers are in general unaware about global finance, they mostly ignore that PPPs are derivative products, the same kind of products that triggered the global financial crisis and remain confident and unafraid of the risks. The *haigui* implicitly agreed that even if formally performing as derivative, these products were still ‘protected’ by the Chinese financial market rules and regulations.

As for their attitudes about the derivatives and their role as brokers, the *haigui* were keen to abandon the knowledge they acquired abroad about market commitments and instead focused on cementing their role as a necessary intermediary in the specificities of the Chinese market, in which it has been the state that determines what is, or is not risky. Their flexible attitudes towards financial practices has been a response to the evolving risk profile of financial labour which, by engaging in contingent, nonstandard, and uninsured forms of labour (Cooper 2015), has offered a solution for the *haigui*’s uncertain professional profile and thus social affirmation.

However, many *haigui* I talked to said that ‘unfortunately,’ investing in the stock market is not an activity for financially skilled traders but is ‘for everyone,’; being an investor means ‘being part of the crowd.’ Zheng, was laughing sarcastically when telling me that *laobaixing* (common people) keep investing even if they do not understand anything.[19] He was confident, however, that the state, sooner or later, would solve the problem and restrict such people. Despite the effects of their disturbance, however, other *haigui* I interviewed said that, besides investing in the market as part of their professional activities, they enjoyed checking market trends and planning their investment strategies in their free time. They described it as 'good fun' and that they could experiment with their investment strategies.

Most *haigui* I interviewed for this research, like Lai and Zheng, were playing the market as a parallel activity, in addition to their professional roles of market brokers and institutional intermediators. They were in fact, themselves part of the *sanhu* crowd. This situation however caused them anxiety and unease. As Fei explained,[20] many professionals like her, because of 'the masses' competing with them, considered 'making money through investing' a sort of a taboo, and she preferred not to talk about it. In general, the way the *haigui* talked about their professional activities as brokers or financial intermediaries, conflicted with stock investing. Their hesitation was due firstly to the fact they knew that investment traders, bankers, financial analysts, and other financial-related positions to which they were aspiring, were formally barred from playing in the market according to regulations against insider trading. Secondly, as financial experts, 'playing the market' put them at risk of 'losing face' (*diu mianzi*); debasing themselves to play like 'the others' to gain money and success that should have otherwise been guaranteed by their career achievements.

In the Shanghai financial market, it is often assumed that the *haigui* bring accounting or financial analysis expertise to tasks such as auditing, data disclosure, or tax returns for private and foreign corporations, to make both Chinese and foreign companies 'accountable' to be listed in the domestic or international market. However, upon investigating the nature of *haigui* expertise, it appears that the technical skills that make someone qualified are insufficient. Besides econometrics, statistics and accounting, a financial worker should also be familiar with local relational rules. To achieve this, one must simultaneously deploy two different skill sets: a formal one covering knowledge of the market regulations; and a more nuanced one, bridging the gap between multiple 'financial cultures,' and responding to the brazen improprieties of their employers, up to and including the covering up of illicit practices.[21] However, the *haigui*, even if not formally educated to perform this second task, seem at ease: 'their proficiency … is understood as both a proxy for smartness and a sign of money-making capacity' (Ortiz and Muniesa 2018). In the transition from financial consultants to financial speculators, *haigui* exceed and at the same time deny their expertise. Managing different methodologies of labour (Lazzarato 2004) was for them the best way to fuel their own self-valorisation.

Because of its tendency to follow a mimetic rationality (Marazzi 2008), financial labour is particularly adept at reconfiguring to the historical and local environments that constitute the heterogeneous space of finance capitalism. Returning to China after having studied abroad, the *haigui* are contingently remoulding their skills and behaviours according to the context in which they are acting. The *haigui* embodied the modalities through which 'circulating finance reveals itself, as both empowered and limited by its cultural specificity' (Tsing 2011, p. 57). Indeed, the potential of living labour is that it can deploy itself not just as the container of financial expertise and financial practices—where these are embodied in immaterial practices that also concern subjects' consciousness, resistance, coordination, and communication—but also as the container of different cultures of finance.

Conclusion

A striking demarcation is evident when confronting the two actors', *haigui* and *sanhu*, attitudes towards the state. While the latter, as informal and improvised investors, lean on the state's paternalistic measures over the market, the *haigui*, as (wannabe) formal experts and confident in their formal expertise, consider the state a hindrance to the free exercise of their abilities, but they still call for state intervention to reform the market. If the *sanhu* are aware of their weakness and recognise their need for a defender, a dispenser of public money at the rescue of a market they are freely attending to raise their private fortunes, the *haigui*, eager to valorise their technical skills, are in need of a neutral arbiter, and believe they might be employed and valorised within a system of mature and developed market rules. They insist that the market should be reformed and re-engineered into a device more sensitive to the logics of the globalised finance, less crowded by untrained and unconscious players and more in need of the suggestions of experienced experts.

However, despite these different viewpoints, the 2015 financial crisis has shown that the *haigui* and *sanhu* agree on the need for the state to intervene and safeguard their actions in the marketplace. This desire for the state to *jiushi* (save the market) is a decisive characteristic of the way China has been constructing financial capitalism (Lin 2015). Furthermore, despite the fact the Chinese ecology of financial expertise proves to be a 'high tension zone'—with conflicts among formal and informal financial experts, state institutions, local banks, and individual investors, these financialised subjects similarly nurse a grudge towards the state, which they hold responsible for the financial turmoil that manifested in the 2015 financial crisis.

What the investors want is a state that will guarantee 'stock fever' continues, a role that jeopardises a crisis, despite the fact the state succeeded in defusing them or, at least, repaired the damages they provoke. In turn, the unease and disquiet this disappointment nurtures discredits any social and labour rights bestowed by the state. Instead, the mass of investors rules out the state as responsible for their welfare and as a mediator of the relations of production—upon which the state's political legitimation has rested since its foundation.

From its foundation in 1949 to the Opening and Reform Policies of 1979, the Chinese state represented itself to the people as dispenser of work, wages, and consumer goods. This was a system where individual rights and obligations between employers and employees was marginal to the division of tasks between the state and the people. There was an expectation on the state to provide the people with the means to live, and the people had to provide the state with their labour. In the shift towards financialisation, the *guojia zhuren* (masters of the state),[22]—the peasants and workers—have lost their defender.

Through investing their own savings and free time as well as applying their own knowledge and aspirations to financial shares—including those of state-owned enterprises—both the *sanhu* and the *haigui* remove themselves from a relation of production previously organised along the lines of a 'productive outcome' (either material or immaterial) to one based mainly on profit. This routing is largely through the stock market, which acts as a financial redistributor and, 'although in a strongly unequal and precarious way' (Marazzi 2011, p. 37), transforms the investor's savings, or part of the still precariously earned wages earned through their labour, into profits accrued through investment practices.

The problematic realisation of profits (that is, selling the surplus-value product) is 'forcibly entrusted to consumption using non-wage incomes' (2011, p. 37). Under financialisation, making money by financial means also presumes 'disconnection between the wages paid and the labour performed' (Adkins 2015, p. 331). In this context 'earning more money' does not follow 'working more' and disrupts the 'structural complicity' that binds the worker to capital via waged labour (Gorz 2008, p. 133). Faced with such a dynamic, the increasing marginalisation of waged labour in China's financialised society means that the state might potentially realise that 'employment is no cure for other kinds of social ills' (Adkins 2012, p. 638).

The wealth produced from financial transactions requires particular attention because it represents a novel site for the extraction of surplus from society as a whole, with no determined structure based on waged labour and the hierarchy of skills specialisation it encompasses (such as dividing *haigui* and *sanhu*). Instead, while risking, investing, borrowing, winning, or losing their money on the stock market the *sanhu* (among which includes the *haigui)* engage in a race for money, which reformulated the terms of a pact with the state in speculative terms.

Through the lens of what Feher has recently identified an as emerging 'speculative politics' (2019), one could see the legacy of the socialist Chinese social contract turning into a financial relationship between the state, as recipient of investments (the investees as state bonds, SOEs, PPPs) and the multitude of retail investors (the *sanhu*), who lean on the state's charisma of main planner and provider of financial opportunities.

Under this new financialised contract, it is increasingly money, upgraded to the rank of an absolute value, that is left to filter the relationship between the state and the population. But money stripped of the garb of patriotism and reduced to a volatile and whimsical factor, could spread sentiments of disorientation and disaffection among the population of mass investors, inducing them to rush for financial returns beyond the state's pre-arranged offerings, and thus exceed the terms of any contractual agreement. To turn the savings of the population into state-oriented shares, the state elevates the mass of investors to credit suppliers, giving them 'an ability to select the projects that deserve to be financed' (Feher 2019). In this move, the state allows the mass of investors into its decision-making process, but these are bearers of their own hopes, with propensities that may diverge from the state's financial agenda. Thus, even if the Chinese state has attempted to divert struggles between capital and labour 'beyond the factory gate' through the reconfiguration of credit supply via capital markets, the financialised subjects emerging from this transition represent a new form of antagonism that might disrupt the state's efforts to embrace financial capitalism as a governmental conduct.

Notes

1. I interviewed 23 *haigui* for this research and 11 of them were actively investing or had done so at least once.
2. *Danwei* were, for many decades, the key reference for Chinese people in nearly all life events, acting as both a resource and a constraint. In the gradual process of dismantling the *danwei,* all these traditional social safeties were eroded. Thus, the population was mobilised to *huan naozi* 'change the brain,' that is, change the way of thinking (Gamble 1997).
3. Given the process of Chinese fiscal decentralisation and the numerous fiscal cuts the state has advanced to boost internal consumption, in recent years state fiscal profits have been in decline. (Pan et al. 2017)
4. Although statistics from the time are inconsistent 'total of approximately 25 million SOE workers were laid off between 1993 and 1999, and that probably almost 40 million workers were laid off in urban China' (Naughton 2003, 16).
5. The household's income growth has been a staggering phenomenon inextricably linked to urbanisation. While in 1999 urban population only was 2% (29 million), it grew to 39% (531 million) fourteen years later. Currently, the annual income of this new-born urban population has grown to USD 7,250/6,500 up to USD 30,000 (CEIC 2019).
6. To manage 'popular expectation about a prolonged economic slowdown, and to create a culture of [mass] entrepreneurship rather than a culture of employment, Xi Jinping announced that 'innovative entrepreneurship' is the 'new economic normal' for Chinese citizens' (Lee 2019, 148). This led to the mushrooming of new precarious contracts and the creation of almost 4 million new startups between 2014 and 2015.
7. In fact, this is one of the few semi-tolerated forms of street demonstrations in China (called *shangfang* 'petition to the authorities').
8. Interview with Jin, February 2016, Shanghai.
9. Shares had been overvalued, fueled by practices of margin trading (when investors use borrowed money to buy stocks) that the government had initially encouraged, but which quickly turned into a bubble that burst.
10. 'Chinese national team' (*Zhongguodui*), a sport term commonly used in Chinese stock market jargon to refer to the 500 biggest Chinese banks and SOEs, plus a few private mega-companies, the major economic players.
11. Interview with Mrs. Lai, February 2016, Shanghai.
12. In Chinese *xiahai* refers to Deng's encouragement to risk individually by 'jumping into the sea [of commerce]'.
13. Interview with Cai, 12 May 2013, Shanghai.
14. Chinese shadow banking is, as elsewhere, the sector outside the formal banking sector. In China it operates in the context dominated by large state-controlled banks, submitted to many state constraints. Yet, too prevent speculation, after the 2015 crisis, supervisory bodies intervened poring public money into shadow banking channels.
15. The Thousand Talent Plan aimed to attract about 1,000 high-level foreign-educated skilled Chinese. The recruits are expected to work at national research centres or laboratories, central government and state-owned financial enterprises, and to lead innovative projects to boost China's development. (Hao & Welch 2012, p. 246).
16. *zhangting*, an abbreviation for *zhangdie tingban* (limit-growth and drop lists), plus *gansidui* (dare-to-die bunch) ('go-for-max kamikaze squad' in the FT translation and 'rise to ceiling.')
17. The term is used to cover all financial intermediaries that perform bank-like activity but are not regulated as one. These include mobile payment systems, pawnshops, peer-to-peer lending websites, and mostly hedge funds, the industry Xun was working for.
18. Interview with Zhuang and Lai, February 2017, Shanghai
19. Interview with Zheng, 3 September 2013, Shanghai.
20. Interview with Fei, 7 June 2013, Shanghai.

21. These practices are indeed not to be referred to as just 'Chinese.' Investigations on financial experts acting in Western markets have shown how embracing a cynical attitude towards, and distance from formal financial training is a crucial part of the development of the financial system and financial policy making (Holst & Moodie 2015, p. 44).
22. *Guojia zhuren* (master of the state) is a much-used expression in Chinese political lexicon, referring to the role of the 'mass of the people' as 'the creators of history' and holders of ultimate authority (He 2001).

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Risk management and the logic of elimination

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ABSTRACT

This intervention is premised on the observation that differentiated and relational exposure and protection are fundamental to the political economy of settler colonialism in Canada. These orderings map directly onto a value logic that privileges the life of capital above all else, and orchestrates the voluntary and involuntary sacrifice of value to the national economy. Herein, the value of Indigenous life is continually metered out (and in various ways) in relation to the valued life of capital. I argue that 'risk management' – by which I mean the variety of techniques and practices that order and organize exposure to (and protection from) harm – is vital to the political economy of settler colonialism in Canada because of how it normalizes colonial violence. To support my argument I make three observations about 'risk management' anchored in three 'exposure scenarios' drawn from my research in the mining sector: (1) risk management is an intervention analogous to securitization; (2) risk management is powerful because it makes social relations fungible; and (3) risk management is a value logic consistent with settler governmentality and the logic of elimination.

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> What species of sophistry does it take to separate a quarter "part" of the life of a group from the history of their elimination (Wolfe 2006, p. 399)?
>
> Our lives are seven years shorter than the lives of non-Indigenous Canadians. Our unemployment rates are four times higher. The resources to educate our children are only a third of what is spent on non-Indigenous Canadian children. Our youth commit suicide at a rate of more than 5 times higher. We are living the effects of this dispossession every day of our lives and we have been living this misery in Canada for almost 150 years. (Manuel 2016, p. 8)

Introduction

This intervention is premised on the observation that differentiated and relational exposure and protection are fundamental to the political economy of settler colonialism in Canada. More specifically: that particular orderings of exposure to harm and protection from threat are constitutive of (rather than residual to) this economy. These orderings map directly onto a value logic that privileges the life of capital above all else, and orchestrates the voluntary and involuntary sacrifice of value to the national economy. Herein, the value of Indigenous life is continually metered out (and in various ways) in relation to the valued life of capital.

Canada's is an 'economy of dispossession' in the sense that elimination of autonomous Indigeneity–a process which often requires Indigenous death and dying – is both a material fulcrum and organizational logic (see Byrd et al. 2018) where-in uneven visceral geographies of not-voluntary Indigenous sacrifice (Brown 2012, Pasternak 2016, Nunn 2018) are deeply intertwined with the creation of settler and corporate wealth and privilege. These geographies are particularly evident in (but

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by no means relegated to) the Canadian mining sector where the value of exploration initiatives and their ability to attract and quicken exploration capital is in large part dependent on the power to at once offset threats posed to the value of mining capital by Indigenous jurisdiction and refusal *and*, maintain the dispossessive, marginalizing colonial arrangements and imaginaries that consistently undermine Indigeneity and produce Indigenous life and land as surplus and as 'wastable'. Mining and mineral exploration initiatives leverage value from the lives, lands, and livelihoods of Indigenous peoples and their non-human relations (in the form of unacknowledged proprietary interest, unpaid (land) debt, and toxic storage) leaving behind a trail of wastage, death (and its prognosis), and reduced life expectancy.

I am of course by no means alone in observing the systematicity and relationality of exposure and protection, nor its salience to the colonial project. Most recently, Neil Nunn has written about colonial geographies of life and living in which he suggests 'patterns of disproportionate exposure to toxic precarity' mark the colonial project, a project in which he argues, Indigenous 'life is systematically destroyed or compromised' (2018, p. 1331). Similarly, Shiri Pasternak (2016) has described the 'fatal game of fiscal relations' that 'kill Indigenous bodies or create the brutal conditions to make her live' (p. 319) and that 'distribute the value of Indigenous life across a domain of utility' beholden to capital (p.328). Writing of the architecture of relations and connections that render Indigenous life killable, Nunn asks the question: 'how does one uphold strategies of governance that produce racially defined exposure to toxic geographies while absolving culpability (2018, p. 1333)? In considering this question he enjoins us to consider not only the racialist-colonialist structures that overexpose Indigenous life to toxic harm, but also the processes that obscure and compartmentalize them (Nunn 2018, p. 1333). Likewise, in her consideration of the problematics animating contemporary colonial rule (including questions such as: 'how can people be rendered surplus to the national economy, even as their territories, resources, and jurisdiction remain central to its course? [and] How can we blame people for the poverty our dispossession caused, even while we deepen its source?') Pasternak highlights powerful economic rationalities that work to 'sanitize' the visceral colonial violence of the Canadian state (2016, p. 318).

In this essay I argue that 'risk management' – by which I mean the variety of techniques and practices that order and organize exposure to (and protection from) harm – is vital to the political economy of settler colonialism in Canada because of how it normalizes colonial violence. Responding to Nunn's important intervention, this essay attempts to clarify some of the processes and logics through which the disproportionate exposure of Indigenous life (and related non-human relations) is systematically and deliberately occluded by placing the sets of interventions and strategies that constitute risk management into direct conversation with the 'violent extent of eliminatory strategies' (Nunn 2018, p. 1333). My aim is to denaturalize the disproportionate exposure of Indigenous life to harm on the one hand, and the ability of extractive capital and the settler subject to protect against exposure to harm on the other.

Settler colonialism is a territorial project, acquisitive in perpetuity, that is centred on dispossession and control of Indigenous lands (Coulthard 2014, Nunn 2018, p. 1339). It is also eliminatory (Wolf 2006) in the sense that as an imperative setter colonialism strives toward elimination (by any means) of autonomous Indigeneity and engages settlers and the state in a constant struggle to undermine and erase Indigenous sovereignty and jurisdiction (Simpson 2011, Mackey 2016, Simpson 2017). In making this argument I am situating my analysis of risk in a conceptual framework that explicitly engages settler colonialism, governmentality, and racial capitalism and the powerful ways in which these forms (and their critiques) overlap. I take as entry point the insight that capitalism (including neoliberal capitalism) is constitutively racial – *and* colonial – capitalism (see especially Barker 2018, Byrd 2018, p. 127–129, Byrd et al., 2018) and as such entails a kind of biopolitical arbitrage. Capitalism, as Byrd et al., remind us 'hierarchically organiz[es] and dispos[se] social life … as a counterformation to Indigenous peoples and the recalcitrance of racialized lives that refuse and exceed its totalizing aspirations' (2018, p. 3). To support my argument I make three observations about 'risk management' anchored in three 'exposure scenarios' drawn from my research in the mining sector:

risk management is an intervention analogous to securitization; risk management is powerful because it makes social relations fungible; and risk management is a value logic consistent with settler governmentality and the logic of elimination. I begin with a discussion of the specific way in which I am using 'risk' and 'risk management.'

'Risk' is not a noun

By 'risk management' I mean the diverse sets of financial and heuristic transactions through which capital and the state engage configurations of value and exposure. And here I mean to explicitly include exposure to threats posed by Indigenous life and living (such as by Indigenous jurisdiction and refusal) and *to* Indigenous life (such as through exposure to toxic harm and life depleting conditions). This formulation rests on what I want to insist is a crucial distinction between notions of *risk* and notions of *threat* and *harm* that are almost always conflated yet conceptually are quite different. 'Risk' is a category of understanding (*a la* Kant): a situated, political and highly contingent way of *framing and engaging* geographical relations and experiences and of *producing knowledge* about them, distinct from the relationships and processes that constitute social relations, produce harm and put (some) people in harm's way (Ewald 1991, Dean 1999, Stanley 2013).

The danger in not recognizing these distinctions is to miss the doubling up of risk as both explanatory framework and referent object; in other words, as both modality for managing and intervening in social relations *and* social relations themselves (Stanley 2013). It is to conflate 'risk' with the events and relationships it is used to describe and bring into knowledge; a profoundly depoliticizing move that blinds us to the role that risk, as a knowledge practice that traces its genealogy in the constant drive to reconcile a need for order with settler colonial-capital's imperative of accumulation on, and acquisition of, Indigenous lands, plays in the production, management, and instrumentalization of the colonially differentiated lives and uneven geographies that are the hallmark of resource extraction and political economy in Canada. It also blinds us to the role risk management plays in the securitization of accumulative processes on Indigenous lands.

Here I want to be very clear: 'risk management' is a strategic intervention aimed at organizing exposure to a threat or explaining the existence of harm. In the same way that there is no such thing in the ontological sense as 'race,' or 'nature,' (despite that we naturalize and racialize with extreme and important consequences) there is 'no such thing', as Francois Ewald has famously noted, 'as a risk, but anything, can be *risk managed*' (1991). Expressions of Indigeneity (including Indigenous disruptions) are *not* 'risks' in and of themselves, however challenging or threatening they may be to capital and the state (see Dafanos and Pasternak 2018) but they can be, and are, risk managed. Nor do Indigenous peoples experience risk, in the technical sense of being 'at risk', but they are frequently exposed to harm; systematically and as a result of myriad processes and practices that have little to do with random chance, probability, or lack of resilience. Risk is distinct from the processes, relations and actors that threaten to disrupt established flows of capital and power in the precise sense that it is a way of making them knowable and interventionable; likewise for patterns of disproportionate exposure. Indigenous disruption, Indigenous inherent rights, Indigenous jurisdiction and governing authority are produced and managed *as risks* because of the ways in which the 'question of land' and hence land debt structures the political economy of Canada (see Dafanos and Pasternak 2018, p. 7). Risk does not map onto Indigenous jurisdiction but rather onto ways of managing (usually financially) the exposure of colonial capital and the settler state to the economic implications of what Indigeneity and enactments of Indigenous jurisdiction mean for the value and circulation of corporate and settler wealth in this economy. Likewise, risk does not map on to Indigenous exposures but rather onto methods for containing and explaining the existence of harm.

In what follows I outline three exposure scenarios in which to anchor my observations. The first two scenarios[1] outline measures taken by the state to protect the value of private and institutional investment in natural resources infrastructure (NRI) and mineral exploration in a context of imperfect sovereignty where the question of jurisdiction is far from settled, and in which the settler state and investors continually confront the 'deepening problem of Indigenous jurisdiction' (Pasternak 2013). These measures are not costless, but are sacrifices willingly made by the settler state in order to functionally offset threats associated with assertions of Indigenous jurisdiction on their territories. Shiri Pasternak has described a 'dynamic of governance' wherein 'state jurisdiction over Indigenous lands is an object of constant struggle to exercise effective sovereign control' (2017, p. 4). Jurisdiction, she reminds us, does not emanate from the presumption of state sovereignty (2017, p. 3), rather 'it is the apparatus through which sovereignty is rendered meaningful, because it is through jurisdiction that settler sovereignty organizes and manages authority' (Pasternak 2017, p. 3). An important 'gap' exists 'between the state's assertion of sovereignty over Indigenous peoples and its legal authority to exercise territorial jurisdiction over Indigenous peoples and their lands' (Pasternak 2017, p. 3). The measures described in scenarios 1 & 2 can therefore be read as part of an (unfinished) project of perfecting settler sovereignty, of – in Pasternak's words: 'the fusing of sovereignty claims with the effective exercise of territorial jurisdiction over Indigenous lands' (2017, p. 14–15). In these scenarios I suggest risk management is tied to state-led interventions directed at asserting settler jurisdiction over Indigenous peoples and their lands, and securing extraction of corporate and settler wealth given the significant operational confines of *imperfect* settler sovereignty (Stanley 2016, Dafanos and Pasternak 2018).

The third exposure scenario (which I outline in considerably more depth) involves measures taken by the state to manage Indigenous exposure to the downstream effects of oil sands development in the province of Alberta.[2] In response to widespread concern over the high incidence of cancer and other illnesses experienced by several Indigenous communities downstream of extensive tar sands developments, the government of Alberta conducted two successive studies (2009 and 2014, the first of which will be examined here[3]) to determine whether or not 'an increased risk of cancer' existed in the community of Fort Chipewayan.[4] As a politics of measure, risk calculation plays an important role in adjudicating between the claims of Indigenous peoples, governments and industry about the toxic effects of extraction (Stanley 2015). Its imaginative practices (De Goed 2008, p. 156) constitute an important epistemic moment in the evaluation and contextualization of the vital geographies of Indigenous peoples[5] (Stanley 2015).

At issue in this scenario are the epistemic techniques through which Indigenous life and death (including cancer incidence) are brought into knowledge and made visible and legible against the multi-billion dollar backdrop of oil sands production. In the epistemic terms of risk calculation an individual cancer case is not meaningful in and of itself. Risk measurement works in principle through the collectivization of phenomena (a discrete death, case of disease, occurrence of a suicide and so forth). It is, to quote Foucault (2007, p. 60): a technique for 'integrating individual phenomena within a collective field.' The 'collective level' or 'population' (to use Foucauldian terms) into which individual cases are integrated therefore must be understood as a kind of epistemic field (of mathematical continuity) within which individual events become meaningful as objects of knowledge, and in which constants and regularities (undetectable at the individual level), are revealed (Foucault 2007, p. 74). 'Population' here denotes a functional relation between an individual and a collective; in Foucault's words 'the totality of the social body and its elementary fragments' (p. 74). It refers neither to the collective, nor the individual specifically but to an assumed relationship or continuity between them (Stanley 2015, p. 803). Assumed continuities (such as between an individual and a collective) are fundamental to the metaphysics of risk calculation.

'Populations' can therefore be understood to exhibit regularities or normal tendencies (understood as a register or sampling of the specific 'reality' of the population at a given moment) made legible through arithmetic techniques (such as the mean, average, ratio, probability) that both assume and produce continuities between individuals, groups and collectivities. The statistical conception of the normal distribution and its probabilistic interpretation as a likelihood contained in an individual – a risk – is thus an epistemic claim to continuity (between distinct objects of knowledge), performed through practices of measure that are grounded in and reproduce these continuities (See Mader 2007, Stanley 2015, p. 805).

In this exposure scenario I suggest that risk calculation assumes continuities between objects of knowledge (such as between individual cancer cases and population rates) that are not in fact continuous, relies on dubious comparisons between objects that are distinct (e.g. between an actual cancer in a Cree trapper living in Fort Chipewyan (FC) and a ratio expressing the number of individuals who reported cancer in Alberta), and produces a knowledge about them and their relationships to each other that occludes these distinctions. The 'imaginative practices' of risk calculation, as utilized by Alberta Health (2009), helped generate a knowledge of exposure in which Indigenous cancers were rendered illegible and denied measure. Similar to other instances of exposure to the effects of extractive developments in Indigenous communities (Stanley 2015) 'risk management' (as a politics of measure) worked to obfuscate Indigenous death and dying by obscuring (and in fact legitimizing) their vital geographies.

Exposure scenario 1: flow-through financing and Indigenous refusal

In June 2016 the federal government altered the tax code to allow mining and exploration firms (including in oil and gas) to finance exploration and early stage development programmes by 'flowing' tax credits associated with the cost of addressing Indigenous rights and jurisdiction 'through' to investors in exchange for cash.[6] Canadian Exploration Expenses (CEEs) are a category of mining cost that can be banked indefinitely and subtracted directly from a mining firm's taxable income (at a rate of 100%) thus reducing the amount of income on which corporate taxes and mining royalties are owed. Alternatively, firms may choose to 'flow' these expenses 'through' to investors, in the form of tax credits attached to the sale of equity, receiving in exchange cash to fund exploration programmes. 'Flow-through' financing (as this process is called) is unique to the Canadian mining sector and has since the 1970s provided an important way for mining companies operating in Canada and paying tax in Canada to raise venture capital. It is particularly significant for the junior mining sector (prospectors and explorers) who typically don't have income against which to subtract exploration expenses, and was initially introduced to address the fundamental difficulties that mineral exploration firms face raising "high risk" exploration capital.

The June 2016 amendment to the CEE category is significant in that it enables mining firms to raise exploration capital on the basis of so called 'community consultation costs'; a change for which the mining and exploration industry had long campaigned as antidote to threats posed by assertions of Indigenous sovereignty and acts of refusal (especially in the Idle No More era) and the effect they claim this has on a firm's ability to raise exploration capital (Stanley 2016). While the precise contours of what constitutes such costs are unclear, examination of regulatory filings associated with subsequent flow through financings suggest that transactions have been structured to include costs incurred in relation to such things as: preparation of Indigenous 'Traditional Knowledge' and 'Land Use' studies; Indigenous community outreach and skills development programmes; hosting information meetings and open houses with Indigenous communities; consultation with Indigenous communities on the terms of reference for environmental assessments; negotiation of Impact and Benefit Agreements; fulfilling delegated crown consultation requirements with Indigenous communities in relation to completion of environmental assessments; Indigenous community engagement activities; and pre-development negotiations.[7]

Inclusion of 'community consultation costs' in the flow-through programme has the purpose of stimulating investment in the mining sector by socializing the cost to investment capital posed by exposure to Indigenous assertions of jurisdictional authority and the state's inability to assert its sovereignty over Indigenous people and their lands (Stanley In Press). Given the above modifications Flow through financing has become a modality for framing and engaging exposure to the threat of Indigenous sovereignty *as a financial risk*. It is a mechanism by which the state can convert its liability into a valuable asset (paid for in revenues foregone) and through which firms, who can offset the costs associated with Indigeneity, and investors, who can purchase the state's liability in order to offset their taxes, can manage and limit their exposure to the threat of Indigenous sovereignty. All the while, critical levels of investment in the exploration sector are maintained, and governments continue to produce effects of crown sovereignty.

Exposure scenario 2: Indigenous jurisdiction and the privatization of 'natural resource infrastructure'

In 2017 the same government announced the creation of the Canada Infrastructure Bank (CIB) designed to deliver on national infrastructure objectives by attracting private and institutional capital into development of new, large scale, 'productivity enhancing,' 'economic development' infrastructures (AECG 2016b). In order to deliver on these objectives the Bank was specifically mandated to curate and broker attractive, privatized investment opportunities in Canadian infrastructure, and use billions of dollars of startup treasury money to harness private capital to federal infrastructure objectives (ACEG 2016b, pp. 59–62, ACEG 2017, p. 8, Infrastructure Canada 2018, p. 50).

As a settler state, heavily dependent on extraction and export of natural resources, resource development is a national economic priority that cannot be realized without greater access to 'remote' (defined by industry as 50 km from existing transportation infrastructure) lands over which Indigenous nations assert inherent rights and jurisdiction. Backdrop to the Bank's inception is considerable agreement between industry and government on the need for large scale infrastructure development to support the expansion and competitiveness of the resource economy (Stanley 2019). Currently, 2/3's of the Bank's initial 35 billion dollar capitalization is tethered to infrastructure streams that support so called natural resource infrastructure (NRI), defined by industry as 'infrastructure that decreases the costs of resource extraction and development' and that 'contributes to opportunities for greater wealth discovery and production' (PDAC 2015, p. 1, CMIF 2017, p. 13). The Prospectors and Developers Association of Canada (PDAC 2016b) for instance, identifies road (including transportation corridors, highways and all-weather roads); energy (including power plants, electrification and grid access); broadband connectivity; rail; port; and airport infrastructure as essential to cost effective resource development and extraction, and argue (along with their industry colleagues) that investment in NRI will 'unlock' remote and northern Canada, 'enhance investment competitiveness' of the Canadian economy, and generate national wealth (PDAC 2015, 2016a, CMIF 2017, p. 13).

Large scale private and institutional investors (including Canadian pension funds in whose capital the federal government was particularly interested) are however, typically resistant to investment in new, ('greenfield') infrastructure projects[8], preferring instead infrastructure that is already fully operational with sustainable, proven revenue streams. Greenfield investments according to analysts face considerable 'front end' liabilities associated with permitting, regulatory issues, initial cost outlays, and eventual 'bankability' that pension funds typically wish to avoid (Beckers and Stegemann 2013, Marsh and Mclennan 2015, Webster 2017). In order to reconcile the growth and investment objectives of institutional investors (value generation and interest income) with the nation building, extractive objectives of the settler state (including securing and extending jurisdictional authority) the Bank has been specifically configured to absorb and contain private capital's exposure to liabilities associated with investment in new, nation building infrastructure projects (Stanley 2019).

The Bank, in the words of the senior civil servant overseeing its legislative implementation is 'a risk bridge' (Campbell 2017, p. 59)– designed, 'to take the risk and to manage the risk' (Campbell 2017, p. 54–57). Internal documents (obtained through access to information legislation, see Stanley 2019) reveal for instance, that Bank transactions have been deliberately structured to address 'early-stage risks' associated with large infrastructure projects through adoption of a wide range of financing techniques that 'share risk' and 'distribute risk' and offer investors highly tailored, bespoke management of project liabilities in order to lock-in private investment (ACEG 2016a, p. 80, 85). These include techniques such as: upfront equity investment; adoption of first loss and subordinated equity and loan positions; acceptance of below market returns to enable institutional investors to clear the market; revenue floors beneath which revenue would accrue to private investors; loan guarantees; and a host of other credit-enhancement mechanisms intended to reduce the cost of private sector borrowing. These financial innovations were justified to parliament (and Canadians) as essential to leveraging financing for urgently needed projects private investors otherwise 'just can't invest in' and taxpayers can't afford (Campbell 2017, p. 59); a message quickly reinforced by pension fund investors who insisted that in order for the Bank to attract their capital, it 'must … earn a lower rate of return than investors' (Claerhout 2017, p. 88).

The CIB has been explicitly configured to risk manage threats to the value of private capital so as to activate it for investment in infrastructure–an arrangement that involves a complicated re-organization of exposure to devaluation of capital invested and to the possibility of below-market returns between the settler state and finance capital – nationalizing exposure to capital's financial liabilities. As one senior pension executive noted: this arrangement makes perfect sense because unlike the financial sector 'government is not in the business of investing … they are in the business of providing critical infrastructure to their citizens and making sure that the society they create supports growth' (Claerhout 2017, p. 92). Beyond generation of interest income, privatized NRI for its part, materializes a jurisdictional entitlement to Indigenous lands and epitomizes the production of settler colonial space (Cowen 2018, Stanley 2019). Its expansion (which the CIB has been explicitly crafted to encourage) supports the extractive economy that underpins corporate and settler wealth and bears energetically on the state's ability to make good on its sovereign territorial claims. The financial innovations of the CIB are an attempt by the liberal government to secure the extractive economic future of the settler state through legislated, institutional commitment to in their terms 'de-risk' infrastructure investment.

Exposure scenario 3: settling the colonial terrain of extraction

In 2009 the Alberta government released the first of two reports on cancer rates in Fort Chipewyan (FC) a primarily Dene, Cree and Metis community on Lake Athabasca, downstream approximately 280kms of the Alberta Tar Sands. The study was a long overdue response to widespread public concerns raised in FC and other downstream communities (including the Athabaskan Chipewayan First Nation, The Mikisew Cree First Nation, and Fort Mackay First Nation) about the ecological and health impacts (including cancer rates) of heavy metal, mercury, and Polycyclic Aromatic Hydrocarbon (PAH) contamination in the Athabasca and Peace rivers (McCarthy 2015/17).[9] Alberta Health officials remained unresponsive to these concerns until they were incentivised, by the 2006 appearance of FC's physician on the CBC news, to investigate. The 2009 study considered cancer incidence in the community between 1995 and 2006, including incidence of rare bile duct cancers, blood and lymphatic cancers, and soft tissue cancers (AH9 2009). The studies (as noted above) focused only on cancer incidence, and only in FC.

The purpose of the study was to determine whether or not an 'increased risk' of cancer existed in FC. Following the initial identification of cancer cases, the study proceeded in three stages. First, rates of cancer in FC were compared to cancer rates in four other (non-exposed) Indigenous 'comparison communities' and to rates in Alberta for years 1995–2006. This was done by establishing cancer Incidence Ratios (IRs) for each population subdivided by age group, sex, type of cancer and total cancer and subsequently 'standardizing' the IRs to the Canadian population in 1991 to enable comparison. Age standardization yields Age Standardized Incidence Ratios (ASIRs) which are calculated by applying the age specific IRs in each population to the proportion of people in the matching age groups in the 1991 Canadian population, and summing across the age groups. Second, 'observed' cancer incidence in FC and each of the 4 comparison communities was compared to an 'expected' cancer incidence derived for each the four communities and computed from Alberta IRs (adjusted by age, sex, cancer type and 'First Nation status') mathematically expressed in the demographic structure of each community. Dividing the observed number of cancers by the computed expected rate for each community generated a set of Indirect Standard Incidence Ratios (ISIR) for each type of cancer for each demographic sub-category and represents a measure of the number of excess cancer (above what would 'normally' be expected) in the population. Third, the statistical significance of the resulting excess cancers (as measured in the ISIRs) for FC was tested. Statistical significance is a measure of the extent to which random variation in an event or measurement of an event can explain a result. The statistical significance of the excess cancers was tested first by calculating 95% Confidence intervals for the resulting ISIRs in fort chip, and second by stochastic simulation of expected possible cancer expression for FC in order to show the extent of random variation in cancer incidence in the community (Alberta health 2009, p. 19).

The study reached 2 overarching conclusions. First, that rates of all cancers, and of some specific cancers were higher than expected in FC, but that these were most likely attributable to chance (random variation in cancer *expression* is especially pronounced when there are a small number of cases) (AH 2009, p. 44) and increased detection. This conclusion was explained through reference to the 'Texas sharpshooter fallacy' (AH 2009, p. 33):

> our analysis would have an increased probability of finding a higher than expected number of cancer cases in the community as a result of a phenomenon termed the "Texas-sharp shooter fallacy". This is named for the anecdotal Texan who fired his gun randomly at the side of a barn, then drew a target around the spot where most of the bullet holes clustered and claimed to be a sharpshooter. This has two implications for cancer cluster studies in a population. The first implication is that an unusually high number of cancer cases found in a community can be a random aggregation of cases that depends on how the geographic boundaries and study time periods are defined. In the previous analogy, the bullet holes occurred randomly and the Texan drew a circle around a cluster of holes. The second implication is that a cancer cluster found in a community may not be the result of a specific cause. Following the same analogy, the appearance of a cluster of bullet holes was not the result of sharp shooting by the Texan.'

Second, despite attempts to make these cancer patterns legible, Alberta Health concluded that it was *not possible* to determine whether or not people living in Fort Chipewyan 'have an increased risk of developing cancer' (AH 2009, p. 44). As the study explained (drawing again on the logic of the Fallacy, above): 'any search for a cancer cluster is likely to find some aggregation of cases in a geographic location or over a period of time, even if there is no causal explanation' (AH 2009, p. 32). 'Increased risk' (if indeed it existed)[10] could not be distinguished from a 'random aggregation of cancers' (AH 2009, p. 32) and suggested follow-up monitoring.[11]

As calculative practices, incidence ratios (IRs), confidence intervals (CIs) and stochastic simulations were crucial to the narrative of exposure scripted in Alberta Health's risk assessment. For the remainder of this section, I focus on the ways in which each of these in turn shaped the of measure of Indigenous exposure and legibility of their vital geographies.

Recombinant epistemic space I: things come to stand for other things

Cancer incidence calculations (IRs) are the calculative foundation of Alberta Health's study and inflect (as the basis for ASIRs and ISIRs for example) every stage of the assessment. An IR in very general terms is a ratio of the number of people in a designated group known to have a specific type of cancer to the total number of individuals in the group. It is a ratio that represents the 'mean' distribution of cancer in this group and is calculated by moving arithmetically from an individual cancer, to a ratio of groups, and back to the individual. For example: from (a) an individual cancer; to (b) the total (or sum) of all individual cancers in a specified group; to (c) a ratio of the sum of all individual cancers (b) to the total number in the specified group comprising those that did and those that did not get cancer (the 'aggregate'); and finally to (d) a *probabilistic* interpretation of the relative frequency of cancer where the ratio (from c) is distributed back in the form of an individual likelihood to each and every individual in the aggregate of those who did and did not get cancer, to give each an identical likelihood, or, 'risk' of cancer occurrence.

An incidence ratio is a mathematical relationship between numbers representing properties of three distinct groups: the number representing the measure of the group who get cancer; the number representing the measure of the group who do not; and the number representing the measure of the group that is the aggregate of the two. Assuming a group of 100, in (a), as above, an individual cancer is measured and represented numerically as '1'. In (b) measures for all individual cancers in the group are summed ('1' + '1' + '1' …) and represented numerically as (say) '10'. In both cases, '1' and '10' are quantities expressing an integral property of an individual or group: '1' represents the measure of one individual cancer and '10' represents a measure of the quantity of cancers in a group of individuals. In (c) relationships between quantities representing properties of three different groups are *assumed* on the basis of mathematical continuities: the IR is a (rational) numerical expression representing the ratio of all cancers (10) to the aggregate of the group comprising those who have cancer (10) and those who do not (100-10 = 90) giving the ratio 10: (10 + 90), which simplifies to a ratio of 1:10. The individuals and groups represented as '1', '10', '10', '90' and '90 + 10' are brought into relation, in various different combinations on the basis only of mathematical continuities (for instance the continuity of the number line and the fact that quantities are divisible by other quantities). The IR (along with its probabilistic interpretation (d) as a relative frequency (1/10 or 0.1) and identical individual likelihood, or 'risk' of cancer) is a figure that applies to a mathematical relationship between numbers representing properties associated with groups and as such construes a slide in referent object – from individuals to relationships between groups, and from representations of integral properties of individuals and groups to rational numerical expressions of representations of these properties. This slide, from the individual (who actually has a measured cancer) to relationships between the groups who do, do not, and potentially might have cancer, produces a continuity of individuals and collectives assumed on mathematical rather than actual grounds (Stanley 2015, p. 807).

Here, mathematical continuities come to stand for social ones so that distinct objects of knowledge become continuous, and social relations are occluded on the basis of mathematical continuities. Marie Ann Mader refers to this effect as an 'ontological slide' (2007), where ontologically distinct objects (individuals, groups, rates) become continuous, comparable and infinitely divisible. The crucial point is that extant social relations are occluded by mathematical ones, and knowledge objects (Cree cancer occurrence) purged of socio-political qualities. The qualities of referent objects (racialized exposure histories say) are thus brought into knowledge as objective quantities, and social relations jettisoned by mathematical continuities. In terms of the measure and meaning of cancer in FC for instance, Indigenous cancers are homogenized: made continuous with, and comparable to, non-cancers, non-Indigenous cancers, rates of cancer expressed mathematically in other populations and so forth, such that (for instance) a bowel cancer occurrence in a 65 year old trapper who spends significant amounts time on the land and regularly prepares and consumes wild game species becomes indistinguishable from and in fact equivalent to (in both evidentiary *and* predictive terms) a bowel cancer occurrence in a man of similar age who was a school teacher and rarely consumed wild game.

This slippage is the basis for assumed continuities between cancers in different people *and* in different places and populations of people (as for instance with the age standardization of IRs from 6 different communities in part 1 of Alberta Health's assessment), such that a unit of cancer becomes comparable (and in fact equivalent!) to any other unit of cancer of the same type in the same sex/age group, *anywhere*. The only significance is in the relative *quantity* of cancer. The effect is to make a cancer occurring in FC *qualitatively* no different than a cancer occurring in Alberta or fort vermillion or any of the other comparison communities–except in their collective number. Dene, Cree and Metis cancers are homogenized with settler cancers and non-cancers, and cancer becomes legible only as a relational quantity. Likewise, in ISIR calculations, distinct and discreet objects of knowledge, such as an individual cancer in FC, an individual cancer in Alberta, and a rate of cancer refracted in an individual in Alberta (who may or may not have cancer) are made continuous and comparable. Here individual cancers in Albertans (via the measure of the rate (as in c and d) (whatever their specific geographies)) can be used to explain (and indeed cancel out) Indigenous cancers in FC. That individual cancers in Alberta (and indeed the IRs into which they are refracted) have any explanatory power is thanks to the arithmetic continuities that come to stand for social relations.

Recombinant epistemic space II: variation in measurement and variation in the thing being measured

More cancer was 'observed' in FC than was expected based on the computed incidence derived from adjusted Alberta IRs. For example, FC had 51 observed cancers, only 38.9 were expected. For most cancer types the ISIR (which recall is a measure of excess cancer; or the ratio of observed/expected cancers) was above zero. FC also had more excess cancers than any of the comparison communities (most of which in fact had fewer 'observed' than 'expected' cancers, likely reflecting the much lower prevalence of cancer generally in Indigenous populations in the absence of disproportionate exposure). Statistical significance is a measure of the probability that a result (an ISIR for instance, or number of excess cancers in FC) is explained by random variation (in measurement (sampling error), and/ or occurrence (chance) of cancer) rather than say, exposure. Alberta Health used 95% confidence interval calculations and stochastic simulations to measure the likelihood that observed cancer incidence as expressed in the ISIR, and the observed count respectively, could be due to random variation inherent in cancer expression (chance alone). Both techniques assume that cancer *expression* is subject to considerable random variation and that different results (different numbers of cancers) are possible for a given rate, under the same circumstances, all things being equal.

Confidence intervals address variation around the measure of a rate or value and are typically used to qualify the uncertainty introduced by variation in measurement (for instance the epistemic distance between a population and a sample) This technique calculates the range of values within which the 'true' value would fall 95% of the time, given an infinite number of samples or measurements, and yields an upper and lower confidence bound. At the 95% confidence interval for instance, the study is confident (that with an infinite number of samples) 95% of the time the 'true' value would fall between the calculated upper and lower confidence levels. The width of the range, or the distance between the upper and lower levels helps to indicate statistical significance of a measured value. Wide confidence intervals suggest there is a wide range within which it is likely for the 'true' number to fall, indicating a higher degree of uncertainty around the measure of the rate, a narrow range suggests the opposite.

Measures of statistical significance (such as CI's) evaluate the probability of a value using a distribution to associate the value with its probability. The correlate assumption being that a value *has* an underlying distribution and is thus a component of a larger sample or series of measurements. With respect to confidence interval calculations, however both the observed and expected values used to compute the ISIR come from what are considered 'complete counts'. They are not derived from a sample of a broader population but are derived from cancer registries which ostensibly represent *all* the known cancers in the population, and are considered completely representative samples. There is no epistemic distance between the sample and the population it represents, and thus no 'sampling error' to speak of. Nor does the ISIR result from a series of repeat measurements or observations of cancer expressions: this is in fact impossible since there is only one lived actuality in which cancer expressed itself in the FC and Alberta populations for the given time period. Alternate realities in which alternate possible expressions of cancer given the same rate (and all things being equal) may be measured do not actually exist or at least not in a space–time we are able to observe empirically. To measure random variation in cancer *expression* (and here it is important to note the distinction between variation in the *measurement (or sampling)* of an event and variation in the *event* being measured) the ISIR (a single, computed value that represents measures based on a complete count) was treated as though it was a sample of a larger population and interpreted mathematically as the *mean* of a series of measurements – representing a series of alternative possible cancer counts that could have arisen under the same circumstances given the assumption of random variation in cancer expression.

A similar script is embedded in Stochastic simulations of cancer expression used by Alberta health to further evaluate the significance of the observed rates in FC. In this test random variation in cancer expression was modelled by sampling randomly from a probability distribution assumed to represent the distribution of the value of the 'expected' IR (based on the Alberta IR for each type of cancer, adjusted for age and sex and expressed in the relevant sub age/sex demographic of FC). As above, the value of each IR is a singular, computed value, based on a complete count that is not actually part of a series of measurements or sample of a larger population, and as above, the value of each IR was treated as through it was a sample of a larger population and interpreted mathematically as a mean (this time of a normal distribution). By randomly sampling from this distribution (1 million times for each cancer type/ age/sex/year subgrouping) Alberta Health generated a frequency distribution of all possible cancer counts representing the random variation in cancer expression, against which they compared the observed IRs in FC.

In both measures of statistical significance, variation in the measurement of an event and variation in the event itself (ontological variation inherent in the character of the thing/event) come to stand for each other so that techniques for assessing confidence in the validity of the measurement of an event become techniques for measuring (and supposedly replicating) the effects of random variation in the event itself (chance). This is another ontological slide, this time between epistemic and ontological probability (for lack of better terms) wherein variations in the measurement of an event come to stand for variations inherent in the event itself so that the arithmetic effect of increasing the population size (by interpreting a value as a mean with an underlying distribution thereby synthetically increasing the number of samples) becomes a proxy for the operation of chance. Information generated by increasing the number of measurements of cancer incidence (obtained in the case of the simulations by randomly sampling from a synthetic distribution that represents a much larger, though hypothetical, population and in the case of Confidence intervals by assuming the ISIR is a sample of a broader population represented by a distribution) becomes information about the random variation inherent in the expression of cancer incidence.

This is a slide that occludes the collapse of the *actual* (observed incidence computed as described above into a measure of excess cancer); *hypothetical* (other *possible* cancer counts that could have been but were not– given the dimensional nature of the extant material world – expressed); and *synthetic* (the range of values associated with the statistical artefact of a specified (theoretical) probability distribution from which an infinite sample of values with associated likelihoods for cancer incidence can be sampled) into knowable, measurable objects that represent valid information about the extant material world and the people in it. Treating the ISIR (for instance) as a mean (not just as a ratio of observed and expected and by extension a relationship between numbers and quantities representing various different groups, as above) constitutes it as a quantity that is a property of relationships between numbers and quantities representing properties of additional groups, including the (synthetic) groups that represents the numbers of individuals (presumably all existing in an infinite number of alternate time-spaces) that do and do not have cancer and the composite of these groups.

The crucial point, is that once again, mathematical relationships between values and quantities representing properties associated with individuals and groups come to stand for social ones and conclusions are drawn –on the basis of mathematical continuities between distinct objects of knowledge (Indigenous and settler cancers; individuals and groups; actual and hypothetical individuals and groups; real and synthetic points in a probability distribution; actual and alternate space-times …) that are not in fact continuous– but which have been made comparable and in some cases interchangeable. Herein, extant social relations are jettisoned by mathematical continuities too dizzying to catalogue.

Discussion

Using the scenarios above as entry points, I return here to the 3 observations about risk introduced earlier in the paper. My overall argument is that as a modality of rule that traces its genealogy in the constant drive to reconcile a need for order with liberal capitalism's imperative of accumulation – an imperative which relies first and foremost on acquisition and theft of Indigenous lands and elimination of autonomous Indigeneity (Wolfe 2006)–risk management is intimately related to the production and maintenance of settler colonial-capitalism.

My first observation is that risk management is an intervention analogous to securitization in the Foucauldian sense of a speculative governmental rationality (fundamental to the arrangements of power and legitimacy that mark settler colonial-capitalism) for managing things that are harmful or problematic, yet structural and necessary (for instance the sacrifice of Indigenous life and land). It is a series of interventions aimed at securing, in a context of profound jurisdictional crisis, the material configurations from which colonial-capitalist values are extracted. Settler colonial-capitalism (especially its neoliberal configurations) both produces and is configured by deeply racialized, colonial forms of insecurity and deprivation (Toews 2018; see also: Blackburn 2005, Mackey 2016). Forms (including ongoing Indigenous dispossession, and destruction and replacement of collectives, nations, laws and economies) that are constitutive of value: enabling, formative and indeed necessary. These are settler colonial-capitalisms' conditions of possibility and are thus *objectives* of political rule. By the same token, Indigenous jurisdiction, sovereignty, refusal, acts of land defence (the very existence of Indigenous society) fundamentally disrupt the authority of the settler sate. Indigenous sovereignty is a crisis for settler sovereignty: 'robust Indigeneities and Indigenous sovereignties … are nightmarish for the settler state as they call upon both the impermanence of state boundaries and the precarious claims of sovereignty enjoyed by liberal democracies' (Simpson 2011, p. 211). As a logic, settler colonialism is forever responding to this endemic crisis, with attempts to manage, circumscribe and extinguish Indigenous sovereignty.

Risk management is an intervention aimed at securing colonial-capital's conditions of possibility. Scenarios 1 &2 detail strategic engagements with colonial-capital's exposure to threats of Indigenous sovereignty, jurisdiction and land defence the goal of which is to enter into productive relationships with these threats; and reorganize exposure to them in a way that ensures continued ability to circulate value through Indigenous lands. Flow-through financing of 'community consultation costs' reorients the relationship between capital, the state and Indigenous struggles for self-determination and in so doing disarms threats to the value of investment posed by Indigenous sovereignty. This 'produces' effects of crown sovereignty (Blackburn 2005). Through this mechanism the state is able to ensure at least a critical flow of capital despite Indigenous refusal of state jurisdiction and resistance to mining and exploration on their lands. By nationalizing exposure to threats to the value of capital invested in privatized NRI and to the ability to raise interest income from it, the financial 'innovations' of the CIB directly engage the state's relationship to Indigenous sovereignty and jurisdiction by mobilizing and materializing state jurisdictional entitlements to Indigenous lands through development of privatized RDI and expansion of the extractive economy that secures its value as an investment.

Scenario three details one of the ways in which the setter state and capital sanitize the constitutive colonial violence of extraction (as death, ecological destruction and reduced life expectancy) in the context of tar sands exploitation. The objective of this modality of 'risk management' is to circumscribe non-voluntary Indigenous sacrifice (to in Nunn's terms 'mask the ways in which Indigenous life is systematically destroyed and compromised') in the pursuit of value, so as to facilitate its continuation. As a politics of measure, risk management both obscured and normalized the toxic effects of extraction in Cree, Dene and Metis lands, bodies and non-human relations by reducing colonial patterns of toxic exposure to chance expressions of cancer and by homogenizing Indigenous and non-Indigenous exposures. The result was to discredit Indigenous resistance, delegitimize acts of land defence (and other assertions of Indigenous jurisdiction against the tar sands) and maintain state and corporate access to Indigenous lands.

My second observation is that risk management is convincing (and powerful) because of the ways in which it makes social relations fungible. Risk management is a process of translation whereby a liability or a threat to capital becomes something else: a cost, an asset, a value, a fungible entity, an outcome with odds, a set of exposures, or a commodity (see Dillon 2008)–through a series of heuristic and financial transactions that obscure or come to stand for social relations. (For instance, in the continuity of the number line and infinite divisibility of quantities in scenario 3, or as a set of financial exposures that can be strategically oriented and engaged with in scenarios 1 &2.) It is a process whereby where things come to stand for other things such that the liabilities they are associated with are displaced. Produced as a set of financial exposures to be strategically engaged (in the context of FT financing) – specific aspects of Indigenous sovereignty – the threat its expressions pose capital and the state – are produced as a set of financial exposures with which industry, investors and the state can engage. Indigenous struggles for self-determination take on a different form as a financial asset through conversion first into a cost borne by a firm, and then into a tax credit (or amount of equivalent tax relief) sold to someone else (an investor) in exchange for cash. A structural threat to the political economy of settler colonialism becomes a cost whose financial burden is transferred to the state and away from firms and investors. The state's liability is converted into a valuable asset (paid for in revenues foregone) and investors, who can purchase the state's liability in order to offset their taxes, can manage and limit their exposure to the threat of Indigenous sovereignty. It is likewise for the financial configuration of the CIB. Nationalizing exposure of private capital to threats posed by investment in RDI has the effect of transforming threats (regulatory delays (including Indigenous refusal), cost overruns, labour disruptions and so forth) into costs (born by the state in the form of equity losses from loan guarantees or first loss equity positions for eg., and ultimately born by tax payers as services lost) in order to materialize state jurisdictional entitlements to Indigenous lands and quicken extraction in the resource economy.

Alberta Health's 2009 cancer study instantiates a modality of risk management in which mathematical relationships take the place of social ones such that conclusions about Indigenous death and exposure are made on the basis of assumed mathematical continuities. Calculation of Incidence Ratios, standardization practices and tests of statistical significance (practices through which mathematical continuities between distinct (and distinctly discontinuous) objects of knowledge are enabled) thusly configured authoritative knowledge of Indigenous exposure, life and death that was sanitized of the setter-colonial formations that systematically overexpose (and strategically sacrifice) Indigenous life and land. The result is to perpetuate the not-voluntary sacrifice of Indigenous land and life, since according to Alberta health, there is no such thing, and to profoundly discredit and disarm Indigenous attempts to exercise territorial jurisdiction and protect themselves and their lands against exposure to the colonial violence of tar sands extraction and to resist state and corporate control of Indigenous lands.

My final observation is that risk management is an intervention consistent with settler governmentality and the logic of elimination. Crosby and Monahan, drawing on Partick Wolf, have observed that settler colonialism operates according to a logic of elimination that positions its security in opposition to perceptions of Indigeneity as insecurity (2012, p. 422). This gives rise to a series of governing rationalities (settler governmentality, see also Blackburn 2005) whose objective is the elimination of Indigenous life worlds (Crosby and Monaghan 2012, p. 423 See also Byrd et al. 2018). It is clear that risk management is a value logic, one that turns on questions of differentiated and relational exposure and protection and consists of a strategic organization of the relationships that different and colonially differentiated lives have to harm. This is a logic that profoundly undermines the value of Indigenous life and secures colonial capital's conditions of possibility.

As a series of financial exposures with which capital and the state can engage in varying (and profitable configurations) to limit exposure and maximize returns (as in relation to FTS and the CIB) risk management works to profoundly undermine Indigenous sovereignty and jurisdiction by perpetuating critical levels of investment in the resource economy, opening up access to remote lands and extending and deepening state jurisdictional control of Indigenous lands. As a politics of measure, risk management obscures (and in so doing perpetuates) Indigenous death and dying from exposure to toxic effects of tar sands extraction, and in the end regularizes Indigenous exposure. This particular modality of risk management creates the social-scientific consensus needed to secure the deeply colonial and racialized configurations of value upon which the political economy of setter colonialism rests, and which normalizes devaluation of Indigenous life (to the literal point of death). It also profoundly undermines Indigenous jurisdiction – discrediting Indigenous resistance to the tar sands; delegitimizing attempts to prevent exposure to its extractive violence and block its expansion in their lands; and reducing Indigenous peoples' ability to govern, care for and survive in their territories and communities.

Notes

1. I have written more extensively about each of these scenarios elsewhere in (Stanley 2016, 2019).
2. I wish to make clear that this deconstruction was not undertaken in collaboration with or on behalf of any Indigenous community in the Tar Sands. The purpose of my analysis is not to represent or qualify Indigenous exposure to the effects of Tar Sands extraction, but to interrogate attempts by the state (Alberta) to circumscribe exposure of Cree, Dene, and Metis peoples to the toxic effect of the tar Sands extraction.
3. This is by far the more substantive consideration of cancer risk in the community. The 2014 study was technically a follow up study that reproduced some of the methods and conclusions of the 2009 study (though with considerably less analytical rigour, for instance it did not adjust for Fist Nation status) over a subsequent time period. This study is not discussed here due to space constraints.
4. The Study was initially supposed to include several Indigenous communities downstream of the tar sands, but due to disagreements with Alberta Health authorities most of the other communities refused to participate or eventually withdrew.
5. This is of course also true in respect of other racialized, working class populations, deemed surplus in Canada and elsewhere. Here however, in keeping with the focus of the essay I confine myself to examination of the ways in which risk management as a politics of measure normalizes the systemic and structured overexposure of Indigenous life to the toxic effects of settler colonial-capitalism in Canada in order to highlight the ways in which risk this particular modality of risk management is vital to the political economy of setter colonialism in Canada.
6. This amendment was first announced in the 2015 federal Conservative budget prior to losing the federal election to the Liberals. Evidence suggests, however, that Canada Revenue Agency has permitted mining firms to claim community consultation costs as CEE and to structure FTS arrangements on the basis of costs associated with addressing Indigenous rights in the mineral exploration and development process beginning in 2013, for the 2012 tax year.
7. For instance, according to its financial documents and regulatory filings Noront Resources Limited, a tier 2 exploration firm and primary land holder in Ontario's fraught "Ring of Fire" mining area (home to at least nine Mattawa First Nations), raised 9.3 million dollars of flow-through financing (in 2016) 1 million of which was earmarked for 'fulfilling consultation requirements with first nations' in relation to completing the company's environmental assessment. It raised another 3.7 million in September 2017 via flow through for the 2018 exploration programme. Analysis of first and second quarter financial materials and regulatory filings suggest that between January and June 2018, 233 thousand dollars of this budget had already been spent on 'first nations community engagement,' including 'pre-development negotiations' and other 'community engagement activities.'
8. Indeed despite their ongoing involvement in the development of the Bank, leading Canadian Pension funds consistently expressed significant concern with the 'risk and return characteristics' of greenfield infrastructure investment (Stanley 2019).
9. Cree Dene and Metis communities in the Peace-Athabasca Delta, including in the Mikisew Cree First Nation (MCFN) and Athabasca Chipewyan First Nation (ACFN) most closely associated with Fort Chip engage in land based practices of governance and care, including the harvest and consumption of wild foods. Many are (or have been) employed in the tar sands. A remarkable 2014 study conducted jointly by the ACFN, MCFH, and University of Manitoba (CBC 2014) detected elevated levels of carcinogenic polycyclic hydrocarbons and heavy metals (such as arsenic, cadmium, methyl mercury and selenium) in the muscle, kidney and liver tissues of wild foods (plants, animals and fish) including at levels that were of concern for child and adult safety (CBC 2014). The study (which was not a risk assessment) also identified high rates of cancer including rare soft tissue and biliary duct cancers, and determined that cancer occurrence amongst Indigenous study participants increased significantly (in the statistical sense) with participant employment in the tar ands and with increased consumption of wild foods (including animals and plants) and locally caught fish (CBC 2014). This is to my knowledge the only study that measures contaminate levels in wild foods, and that directly investigated the linkage between environmental exposure and Indigenous health (including cancer). Immediately following the release of these finding Alberta Health's 2009 and 2014 studies were used by government and industry to dismiss the study. I am not aware of any subsequent research undertaken to address linkages between health effects and tar sands contaminants (indeed this type of research appears to be actively avoided by industry and government) or to follow up on cancer rates in FC. The current Alberta government is however, actively surveilling, criminalizing and discrediting environmental opposition to the tar sands.

10. The study speculated that any increased risk (if it did exist) was most likely to result from, in descending order: 'lifestyle factors' (obesity rates, diabetes, smoking); socio-economic factors; family history; possible genetic predisposition; and *lastly* to possible occupational or environmental exposure (AH 2009, p. 44).
11. The 2014 study compared cancer incidence in FC (2007 and 2011) to the age, sex adjusted rates for the province of Alberta standardized to the FC population. It did not adjust IRs to reflect First Nation status (despite much lower cancer Incidence in unexposed Indigenous communities relative to their settler counterparts). The study determined that overall rates of cancer were no different than in the Alberta population, with the exceptions of lung, cervical, and biliary cancers. These were attributed not to exposure but to (a) viral infection ('the majority of cervical cancers are related to human papilloma virus exposure'); (b) smoking ('the majority of lung cancers are due to smoking'); (c) chance, lifestyle factors (obesity and smoking), family history, and aging (AH 2014, p. 1). No evidence from clinical histories (e.g., smoking habits) was examined to support these attributions.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Incommensurate abstractions and the (re)quantification of monetary amounts: how Western Kenyans measure and are measured in a behavioral economic experiment

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Incommensurate abstractions and the (re)quantification of monetary amounts: how Western Kenyans measure and are measured in a behavioral economic experiment

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a.r.t.e.s. Graduate School for the Humanities and CRC “Future Rural Africa”

ABSTRACT

Revolving around a behavioral economic experiment on temporal discounting conducted in collaboration with a behavioral economist in a Western Kenyan village, this paper excavates a specific type of (re)quantification. The participants of our experiment translated monetary amounts into units of what locally constitutes a satisfying meal. This ‘incommensurate abstraction’ is interpreted as being grounded in a disentangling of money’s numerical character from its potential of abstraction which results in a methodological impasse. Facing the loss of the stabilizing power of an incremental numerical system that allegedly enables and facilitates the commensuration and comparability of monetary amounts, we could no longer control the experiment and had to resort to innovative practices of ‘cooking data’ which, ultimately, were doomed to fail.

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As part of a project on the interdisciplinary potential between behavioral economics and anthropology, I recently participated in and observed the implementation of a behavioral economic experiment in the small market center Kaleko.[1] The experiment had been designed by a behavioral economist who accompanied me to Western Kenya where we implemented it with the help of two research assistants (Gilbert Odhiambo and Jack Misiga). As expected by both of us from the start of our cooperation, we had different goals. While she looked forward to conducting her first experiment in the Global South, I was interested in getting a more nuanced idea of how behavioral economists set up their experiments, how they put them into practice in the field and how they analyze them. I wanted to open up the ‘black box’ of an experiment in order to make visible what tends to be rendered opaque in later publications (Latour 1999, p. 304). Doing so, I believed, would allow me to scrutinize the ways in which participants and scientists alike wrestle with and make sense of monetary amounts and how their understandings of monetary amounts are situated in their respective cultural frameworks.

The experiment revolved around the issue of present bias, i.e. economic actors’ tendency to value payoffs that are closer to the present higher compared to trade-offs between two future moments (cf. O’Donoghue and Rabin 1998). Let us assume an actor is faced with the following two choices:

Choice 1: Would you like to receive (A) 100 € today or (B) 110 € in 1 month?
Choice 2: Would you like to receive (A) 100 € in 1 year or (B) 110 € in 13 months?

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A fully rational, i.e. time-consistent actor should choose (A) or (B) in both choices. In contrast to this expectation, the majority of experiments has shown that people choose (A) in choice (1) and (B) in choice (2) (cf. Loewenstein and Prelec 1992). This 'predictably irrational' (Ariely 2010) behavior is one example of present bias, i.e. time preferences which are 'distorted' through the allure of immediate gratification. In order to calculate present bias experimentally, behavioral economists systematically increase the amount of money participants are going to receive if they are willing to wait for their remuneration instead of receiving the money immediately. This method allows the behavioral economists to determine the 'cutoff choice', i.e. the exact amount that incentivizes the participant to forego immediate gratification. While some participants, e.g. might demand to receive 100 Kenyan Shillings (KSh) after 1 week of waiting in order to forego 50 KSh today (interest rate of 100%), others might be willing to wait if they are offered 75 KSh after 1 week (interest rate of 50%).

In a surrounding where mobile money loan apps flourish and allow especially young, urban, and mobile literate Kenyans to get loans in less than a minute, finding an answer to the question of how present bias affects actors' economic decisions is considered crucial by Kenyan politicians, NGOs, and actors from the private sector alike (for a critique Bateman *et al.* 2019). Understanding Kenyans' attitudes towards the allure of immediate gratification lays the foundation for 'improving' the repayment of loans and helps reducing the uptake of doubtful loans aimed at, e.g. 'unproductive' consumption. Due to their promise to shed light on the relation between local understandings of time and use of money (e.g. Balakrishnan *et al.* 2017), 'time discounting studies' (for an overview see Frederick *et al.* 2002) are thus unsurprisingly regarded to be of central importance to understand and subsequently 'correct' the behavior and attitudes of Kenyans vis-à-vis loans and savings.

Western Kenya is of no exception when it comes to the new craze for digital finance products and has proven to be extremely attractive for actors interested in financializing the 'rural'. Despite having been exposed to money from the early twentieth century onwards – colonial policies forced *jo*-Kaleko ('people of Kaleko') to work as migrant laborers or to sell their agricultural produce in order to pay taxes – Kaleko can still be considered 'poor'. Few *jo*-Kaleko have a regular income and the majority relies on produce from their fields which have become smaller and smaller over the years due to increasing population density. Mounting pressure to acquire cash for school fees, to pay outstanding debts, or to treat sick relative forces many to try to make ends meet on a daily basis by offering their labor power to, e.g. dig latrines, take care of cattle, or harvest maize for richer neighbors. The omnipresent lack of and craving for money (Schmidt 2017a) coupled with a patriarchic culture and a high percentage of HIV and Aids resulting in the presence of many orphans allows NGOs as well as governmental actors to picture Western Kenyan as the archetypical poor Africa – a portrayal that helps channeling donors' charitable interests and their money to Western Kenya – making it one of Global South's most experimented on areas.

Looking back on a long history of involvement with money and the technologies accompanying it like coins, banknotes, loan schemes and, in the last ten years, Kenya's mobile money service Mpesa, rural Western Kenya is thus, despite being poor, highly monetized. This puzzle of being monetized while remaining poor is, time and again, explained by Western Kenyans' inability to plan ahead through saving and their reluctance to shackle off family ties (cf. Jakiela and Ozier 2016). *Jo*-Kaleko are indeed embedded in dense networks of different informal as well as formal credit relations (Shipton 2010), which have, to the surprise of many observers, flourished and intensified since the introduction of mobile money (Kusimba *et al.* 2016). Testing, designing, and subsequently launching new loans and credit schemes is therefore seen as a way to understand the 'native mind', to develop the rural area as well as to unearth the economic potential of a far from fully explored market.[2]

Our experiment revolved around the tension between, on one hand, money's allegedly individualizing potential reinforced by the allure of immediate gratification and, on the other hand, the power of social relations to minimize money's individualizing and thereby to curtail its – depending on one's perception of money – emancipatory or coercive potential (cf. Schmidt 2017b). My colleague was particularly keen on testing the hypothesis that present bias occurs more prominently when participants make economic decisions that only affect themselves. Present bias would – so the hypothesis – be less prominent whenever participants make economic decisions that affect others. She, in other words, aimed at 'replicating' (Guala 2005, p. 14) a typical experiment on the phenomenon of 'present bias' by introducing a new twist, namely that respondents had to decide for a family member as well.

If the above-mentioned hypothesis were to prove correct, mobile loan apps could, e.g. remind lenders in text messages that they are responsible for the well-being of family members in order to decrease the influence of present bias and, as a consequence, improve repayment rates. Building on my previous research among *jo*-Kaleko practices surrounding the use of money, I, on the other hand, was primarily interested in how monetary amounts are put to use by the behavioral economist in order to measure the temporal preferences of *jo*-Kaleko and how the latter perceive these monetary amounts. The magnitude of our disagreement about how to understand the ways in which people use money and what money actually is to begin with became obvious weeks before we implemented the experiment.

Are monetary amounts commensurable? On the practical nature of numerical abstraction

If somebody had seen us sitting on the terrace of a Nairobian hotel, laptops open, eyes focused on the screen and typing, they might have concluded that we were doing similar things. Nothing could be further from the truth. While I pondered about the diverse ways in which Western Kenyans enumerate and make sense of numbers and monetary amounts, my colleague was grappling with a different problem. Following up on my comment that I found it improbable that participants would be incentivized by a monetary amount such as 83 KSh, which deviates from everyday prices and Kenyan denominations, she was trying to alter the underlying interest rates in order to offer our participants only options of numbers that are multiples of 5 KSh. After asking her why she would not just use 85 KSh instead of 83 KSh without altering the interest rates, she told me that the amount of 2 KSh might appear small and insignificant. It would, however, have tremendous effects in the future due to the compound interest the additional 2 KSh would accrue over time. Having Jane Guyer's claim in mind that 'one continuous, incremental, uniform, relentlessly incremental scale is […] difficult to calculate and retain in one's head' (2004, p. 58), I responded that I did not believe our participants would calculate the effect of compound interest on the spot.

While we had teamed up to understand how Western Kenyans deal with monetary amounts, we quickly had to realize that we differ on what makes monetary amounts monetary amounts to begin with, i.e. if they are primarily distinguished from each other through the ways in which they are used and put to practice in everyday life or by their inherent and calculable potential to grow in the future as if interest rates were not only a law of nature but also something actors calculate before making economic decisions. While I believed that a difference of 2 KSh meant nothing, the behavioral economist thought it could risk the validity of the experiment. She, in other words, had to embed the experimental design into the repertoire and demands of her own science. Deviations in the experimental design which – from the anthropological perspective – appear as approximations towards the cultural context had to be kept to a minimum and tightly controlled in order to allow her to compare the results with the already published literature. She had to keep the experiment in a sufficiently abstract relation to the cultural context.

One of the prime ways of how behavioral economists keep experiments in a sufficient distance from the different cultural contexts is by the use of money. Monetary amounts and what people – scientists like us as much as the experiment's participants – think about and do with them is indeed of enormous importance to understand what happens during economic experiments. As shown by the fear that 2 KSh can turn into more than 1000 KSh in the future, the experiment's scientific validity is built upon a notion of monetary amounts as abstract and therefore commensurable indexes of value. Any specific amount of money can be related to other monetary amounts by being tied to the same abstract numerical register. Monetary amounts can be added, subtracted, multiplied, and divided like rational numbers. It is the process of abstraction through numeration that allows actors to interpret 10 KSh as a fraction of 100 KSh or to assume that a difference between 2 KSh can grow to several 1000 KSh. As a consequence of this numerical commensurability, participants of an experiment are expected to treat different monetary amounts with reference to the same abstract register of numerically symbolized indexes of economic value, i.e. prices of different goods and services.

Reflecting upon the decisions participants made during our experiment, I will argue that monetary amounts are not, as assumed by both behavioral economists as well as the majority of anthropologists, necessarily abstractions that stand in for a multiplicity of goods and services. Different from monetary amounts encountered in daily life which are known and made through practices that are supposed to be open to public scrutiny (cf. Verran 2001), participants perceived the monetary amounts we offered them as 'monetary black boxes' awaiting to be abstracted to stand for some other entity. We will see that, as much as for an economist 150 KSh are an abstraction of the value of one candy bar, three 50 KSh notes or a few handfuls of *omena* (locally sold sardines), participants abstracted, and thereby (re)quantified, different concrete amounts (e.g. 50, 60 and 70 KSh) to stand for a satisfying meal. Carefully interpreting the participants' choices as well as their reflection on the experiment will allow me to excavate an alternative abstraction operative in *jo*-Kaleko's choices, one that is binary instead of arithmetic and sensitive to local differences instead of universally valid. Centering on units of satisfactory meals rather than monetary amounts, it demonstrates the rationality of prioritizing the maximization of an incommensurable quantity of food over the maximization of a commensurable quantity of economic value. The presence of a different form of abstraction poses a challenge to the behavioral economic assumption that the abstract nature of money allows them to compare choices made within and between experiments. This assumption relies upon the idea that monetary incentives 'override' culturally different contexts because, to quote a Dholuo proverb, *paro ogik pesa* ('Thoughts end in money'). Behavioral economists, in other words, presume that monetary incentives enable them to measure and compare different preferences, some of which are not necessarily enacted through or signaled by monetary amounts in daily life, e.g. levels of social affection (cf. Guala 2005, chapter 11).

My argument follows up on James Carrier's call to study 'social aspects of abstraction' (2001) instead of haphazardly denouncing any form of abstraction as violent as well as recent trends in anthropology to zoom in on money's quantitative and numerical nature without equating it with abstraction (cf. Holbraad 2005, Maurer 2008, Ross *et al.* 2017, Strathern 1992). Such an equation has not only been made by the majority of economic anthropologists (cf. Bohannan 1959) who, especially in the 1980s, exhibited the tendency to focus on localized forms of resisting money's potential of coercive abstraction (cf. Shipton 1989 for Western Kenya), but also by Weber, Marx, and Simmel alike who posited that 'capitalist moneys render everything quantifiable according to one scale of value and permit previously unthinkable comparisons among objects, persons, and activities' (Maurer 2006, p. 20).

Any attempt to understand numbers and monetary amounts as qualitative (cf. Lévi-Strauss 1954, p. 585, Maurer 2008, p. 72) entails the danger of reinvigorating colonial and paternalistic perspectives on non-Western societies as numerically and, as a consequence, financially illiterate and childlike (Piaget 1965) – perspectives related to framings of non-Western approaches to numbers and money as 'magical' (cf. Levy-Bruhl 1966 [1910], p. 182, Mauss 1969 [1914]). Far from claiming that my Western Kenyan interlocutors are unable to perform numerical practices in an arithmetically and mathematically correct way, I will conclude that it is their refusal to do so in the economic sphere, i.e. their bracketing of their arithmetic abilities during the experiment, which reveals that the Western coupling of rational calculation and economic progress is built upon the unfounded and irrational assumption that money's numerical character and its potential of abstraction are intrinsically related.

This paper's intention is not to critically discuss the political repercussions and discursive changes that go hand in hand with the 'rise of the randomistas' (Donovan 2018) which culminated in the decision to give the 2019 Nobel Memorial Prize in Economic Sciences to Michael Kremer, Abhijit

Banerjee and Esther Duflo.[3] The problems entailed in, e.g. shifting the focus from 'fixing the economy' (Mitchell 1999) to 'fixing the economic actor' – a shift achieved by (re)locating the cause of economic decisions from the structure of the economy as a totality to the neurologically hardwired preferences of individuals – have already been discussed elsewhere (Boeckler and Berndt 2017, Dow Schüll and Zaloom 2011). My main goal is to prove that the methodological repertoire of behavioral economics fails in capturing the numerically 'untamed' economic practices of *jo*-Kaleko by showing how money's allegedly inherent and universal potential to commensurate is better understood as a result of specific practices and ideological assumptions. Disentangling money's numerosity from its potential of abstraction thus opens up new trajectories of criticizing one of the main assumptions of behavioral economics bolstering their claim of scientific comparability: the commensurability of monetary amounts.

On the challenges of designing an experiment in a Western Kenyan village

Conducting a behavioral economic experiment in the field requires an awful lot of preparation and paper work. We printed over 3000 pages of decision sheets, questionnaires, and consent forms, conducted two pretests, one in Nairobi and one in Kaleko, in order to secure that participants would understand the instructions, looked for suitable avenues to conduct the experiment, and went to local markets to randomly select 111 adult participants. After finishing the preparation, we conducted seven sessions of the experiment with roughly 15–20 participants each in two different primary schools around Kaleko. This temporal and spatial containment and concentration of the experiment was a carefully calibrated achievement and a result of adhering to specific scientific practices and ideals like anonymity, randomization, and replicability. These ideals, however, are always threatened to be destabilized or compromised if the abstract experimental setting is breached by, for instance, an experimental subject transgressing the rules of the experiment. A logistic nightmare for behavioral economists used to a university laboratory primarily frequented by students of behavioral economics, but a dream for any STS-scholar interested in understanding 'how to do things with experimental economics' (Guala 2007), an activity which, especially after behavioral economists discovered the Global South, is entangled in the dilemma of abstracting from and, at the same time, accepting cultural differences. Our experimental instructions which had been, a very common practice among behavioral economists, modeled after similar experiments and then translated into the local language Dholuo (see the English instructions in supplementary data) are especially interesting for anybody interested in the political as well as epistemological baggage of concepts and terms central for economics. Is the scientifically required and positively associated 'anonymity' aptly translated as *pando* which carries a lot of negative associations related to secrecy and hiding? Is *yiero kaka uhero* the best translation for 'preferences' as the latter carries the connotation of being hardwired? It thus appears to be a silently agreed upon but not yet scientifically established fact in behavioral economics that these concepts are akin to what Latour has called 'immutable mobiles' (Latour 1987, p. 226–227).

The first challenge of our experiment, however, was to design it. After going through several options, my colleague committed herself to a relatively new method called 'convex-time-budgeting task' (Andreoni and Sprenger 2012). It allows the calculation of participants' degree of present bias.[4] In a convex-time-budgeting task participants have to make multiple choices about how they want to split their earnings between an earlier and a later payment date while being incentivized by increasing interest rates. In our experiment (cf. Figure 1) we asked people to make five different choices in the time frame of 'today' (*kawuono*) versus 'after 1 week' (*bang' juma achiel*). While the amount they will gain if they choose to receive all money today remains the same throughout the five choices (column A), we increased the incentive to wait by enlarging the interest rate from row one to row five. A participant, e.g. might choose option A in choice 1, i.e. to receive 300 KSh today and nothing after 1 week. In choice 2, the same participant might choose option C which would indicate that the increased interest rate functioned as an incentive for the participant to accept receiving only

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AN

IN IWUON ibiroyudo pesa momedi ewi mibirochuli.

Yie iyier ni pesa adi ma idwaro ni mondo ochuli KAWUONO to kendo adi ma idwaro mondo ochuli bang' JUMA ACHIEL

	AN	A	B	C	D	E
1	KAWUONO	Siling 300	Siling 225	Siling 150	Siling 75	Siling 0
	Bang' JUMA ACHIEL	Siling 0	Siling 75	Siling 150	Siling 225	Siling 300

	AN	A	B	C	D	E
2	KAWUONO	Siling 300	Siling 225	Siling 150	Siling 75	Siling 0
	Bang' JUMA ACHIEL	Siling 0	Siling 85	Siling 170	Siling 255	Siling 340

	AN	A	B	C	D	E
3	KAWUONO	Siling 300	Siling 225	Siling 150	Siling 75	Siling 0
	Bang' JUMA ACHIEL	Siling 0	Siling 100	Siling 200	Siling 300	Siling 400

	AN	A	B	C	D	E
4	KAWUONO	Siling 300	Siling 225	Siling 150	Siling 75	Siling 0
	Bang' JUMA ACHIEL	Siling 0	Siling 110	Siling 220	Siling 330	Siling 440

	AN	A	B	C	D	E
5	KAWUONO	Siling 300	Siling 225	Siling 150	Siling 75	Siling 0
	Bang' JUMA ACHIEL	Siling 0	Siling 125	Siling 250	Siling 375	Siling 500

Figure 1. Decision sheet number (1).

150 KSh today and wait 1 week to receive 170 KSh (thereby increasing his total earnings by 20 KSh). Participants who want to receive money 'today' instead of 'after 1 week' are thus asked to pay a price for being unwilling to wait (if seen from the opposite perspective one could also say that they are remunerated in case they are willing to wait).

The decision sheet (1) therefore allows the calculation of an individual's willingness to pay for receiving money 1 week earlier. The second decision sheet (2) includes an increased time span ('today' versus 'after 2 weeks', *bang' juma ariyo*) and the third (3) detaches the decisions from the present by asking participants to choose how they want to divide their remuneration between 'after 1 week' and 'after 2 weeks.'

Comparing (1) and (2) makes it possible to measure how a participant's willingness to pay for receiving money immediately changes if he is asked to wait 1 week longer (the assumption here is that the longer you have to wait, the more willing you are to pay for immediate gratification). The comparison between (1) and (3) measures the individual's present bias. If participants decide to receive more money 'today' on sheet (1) than compared to 'after 1 week' on sheet (3), they exhibit present bias. Sheet number 4–6 repeat the choices for a family member (*ng'atno ma watna*) the participants had to choose before and the comparison between sheets 1–3, which we printed on blue paper, and sheets 4–6, which we printed on yellow paper, allowed my colleague to compare the level of present bias in the case participants chose for themselves (*an*) versus when they chose for the family member (*ng'atno ma watna*) of their choice (see supplementary data for the decision sheets 1–6). Participants thus had to make a total of 30 different choices and at the end of the experiment one of the 30 choices was randomly chosen by the enumerators through drawing a lot. The participants were then paid according to their choices through Mpesa immediately after the experiment.[5]

Cognitive overloads, law of demand violations, and the methodological potential of 'readymade experiments'

After presenting our design to a staff member of a Kenyan research and advisory firm specializing in the application of behavioral economic methods, he predicted that we would encounter many 'weird results' if we go to the field in order to conduct our 'pen and paper' experiment. In line with many psychologists and other experimentally minded scientists, he expected participants to be cognitively overburdened by the complex tasks involved due to lack of arithmetic abilities and numerical literacy. They would, he was convinced, be overwhelmed by what a friend of mine later called a 'bewildering' amount of numbers and options on our decision sheets (cf. Tilley 2011 on the history of such assumptions in sub-Saharan Africa). The fear that our experimental design would trigger too many weird results tells us a lot about the epistemological assumptions behind behavioral economists' increasing vigor to replicate experiments in the Global South.

Realizing that their subject pool had been awfully limited to W.E.I.R.D. (western, educated, industrialized, rich and democratic) people predominantly recruited from their own classrooms (cf. Henrich *et al.* 2010), psychologists and behavioral economists alike have started to conduct experiments in countries of the Global South, the classic turf of cultural anthropologists who, ironically and during the same period, more and more withdrew from studying remote villages in Africa, South America, or Asia. The main assumption of this reorientation was and is that the homogeneity of the subject pool of the experiments can lead to false generalization of the findings which, in fact, might not be applicable to all the different societies of the world. While this critique attacks the move to abstract from a concrete sample of respondents to a general claim about human nature as such, it does not question the assumption that the experiments themselves retain their potential to replicate the same phenomena in different contexts (cf. Baumard and Sperber 2010). In our case, we had, according to the assumptions of behavioral economics, good reason to believe that our experimental design has the ability to elicit context-dependent levels of present bias. This belief had been stabilized by the assumption that respondents will make decisions according to stable and coherent preferences that can be measured with reference to monetary incentives and, as a consequence of money's numerical character, numbers.

I thus want to argue that, in behavioral economic experiments, money functions as the magic concoction that helps circumvent a more general paradox of the social sciences which Muniesa has recently described as follows:

> The more the analyzed situation gets closer to a process of ordinary life as experienced by oneself (e.g. shopping in the bazaar), the more it will appear as scientifically messy and meaningless (e.g. it cannot be modeled), and the more the scientist will feel alienated. Conversely, the more trivial and alienating for participants is the analysed situation (e.g. bidding in a blind auction), the more the scientist will find it meaningful and controllable (e.g. it can be modeled) (Muniesa 2018, p. 199).

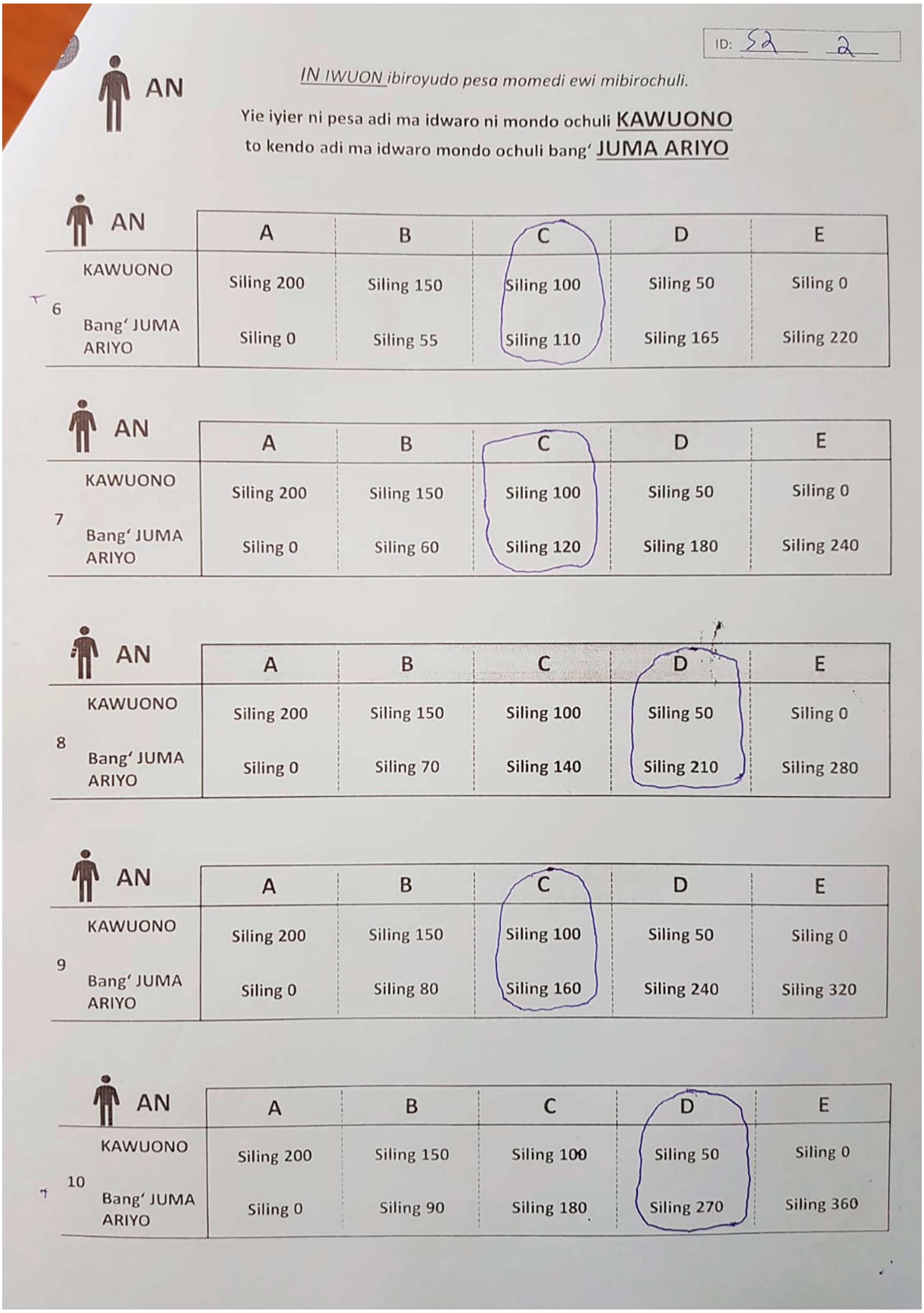
Money is able to circumvent or at least attenuate this problem by acting as a reversible figure in behavioral economic experiments. While money's numerical character allows the behavioral economists to link the results to economic theory at large as well as to compare respondents' choices within and across sessions as well as different experiments, money's embeddedness into daily life helps respondents to both performatively and imaginatively link their actions inside the experiment with what happens outside. Money used in behavioral experiments, in others words, abstracts and concretizes at the same time (cf. Schmidt 2017b on how *jo*-Kaleko conceptualize money as both abstract and concrete).

In order to be able to perform its function as a reversible figure, respondents, however, must, at least to a certain degree, use money in an economically rational, i.e. not 'weird', way. In our case, the behavioral economist's main concern was that our research design would lead to a lot of 'law of demand violations.' The 'law of demand' assumes that people's demand of a specific good or service changes inversely with its price, i.e. the lower the price of a good or service, the more people will demand it and vice versa. If the price of one candy bar is reduced from 200 to 100 KSh, the demand for it should increase. Transferred to the case at hand, participants' demand to receive money at a later payment date should not decrease if the offered interest rate increases. Comparable to an economic actor who should prefer a bank account offering 5% interest on savings over one offering 2.5%, participants in our experiment should not demand a larger share of their money today in one of the rows with a higher interest rate.

This, however, happened in the following example. The participant accepted to wait longer for a larger share of his potential profits in row 8 compared to row 9, i.e. he wanted more money today in row 9 compared to row 8 although we had offered him a higher interest rate (Figure 2).

Behavioral economists do not consider choices which manifest law of demand violations to be based upon stable personal preferences. They are cognitive errors violating 'common sense.' As a consequence, behavioral economists interpret these violations as resulting from a lack of understanding of the task or a cognitive inability to understand interest rates and solve the underlying arithmetic calculations. Law of demand violations are particularly troublesome as they cannot be explained in the framework of the theory of temporal inconsistencies and the convex-time-budgeting method. They are not systematic inconsistencies. As a consequence, behavioral economists generally delete choices manifesting law of demand violations out of the sample and restrict the statistical analysis to the ones that do not violate the law of demand.

In order not to spoil the whole experiment, behavioral economists also often retreat from interpreting singular law of demand violations as resulting from a general cognitive inability. Instead of inferring from a few law of demand violations that the participant did not understand the task or was cognitively impaired, they assume that the participant was shortly distracted or had not yet understood the task. Assuming that the participant is actually rational and was only temporarily distracted allows behavioral economists to keep the valid choices inside their sample (e.g. the choices made in rows 6, 7, 8, and 10 in the above example). Getting rid of outliers such as the choices which entail law of demand violations shows how comparability between monetary amounts and, as a consequence, between choices is creatively attained through scientific practices and not given as such. The



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AN

IN IWUON ibiroyudo pesa momedi ewi mibirochuli.

Yie iyier ni pesa adi ma idwaro ni mondo ochuli **KAWUONO** to kendo adi ma idwaro mondo ochuli bang' **JUMA ARIYO**

AN	A	B	C	D	E
KAWUONO	Siling 200	Siling 150	Siling 100	Siling 50	Siling 0
6 Bang' JUMA ARIYO	Siling 0	Siling 55	Siling 110	Siling 165	Siling 220

AN	A	B	C	D	E
KAWUONO	Siling 200	Siling 150	Siling 100	Siling 50	Siling 0
7 Bang' JUMA ARIYO	Siling 0	Siling 60	Siling 120	Siling 180	Siling 240

AN	A	B	C	D	E
KAWUONO	Siling 200	Siling 150	Siling 100	Siling 50	Siling 0
8 Bang' JUMA ARIYO	Siling 0	Siling 70	Siling 140	Siling 210	Siling 280

AN	A	B	C	D	E
KAWUONO	Siling 200	Siling 150	Siling 100	Siling 50	Siling 0
9 Bang' JUMA ARIYO	Siling 0	Siling 80	Siling 160	Siling 240	Siling 320

AN	A	B	C	D	E
KAWUONO	Siling 200	Siling 150	Siling 100	Siling 50	Siling 0
10 Bang' JUMA ARIYO	Siling 0	Siling 90	Siling 180	Siling 270	Siling 360

Figure 2. Example of a law of demand violation.

behavioral economist, in other words, 'cooks his data' (Biruk 2018) by making those choices invalid that exhibit law of demand violations – a process that begins during the transfer of choices from filled-out decision sheets to excel spreadsheets, which allow for a statistical analysis of the whole data set.

While such 'aberrant deviations', as Lévi-Strauss has called them (Vilaça 2018, p. 7), tremendously trouble the behavioral economist and risk the validity of the carefully planned, meticulously executed, and often quite expensive experiment, for the anthropologist the latter becomes a 'ready-made experiment' (Lévi-Strauss 2013, p. 245) awakening the ethnographer's interest in curiosities and triggering the urge to come up with solutions to solve such strange and irrational numerical practices (cf, e.g. Ferreira 1997). In contrast to the behavioral economist's dismissal of these inconsistencies as 'weird', the next section suggests an alternative reading. Building on Guyer's observation that 'number regimes do not necessarily have the same properties as each other nor work according to established mathematical theory nor resonate similarly across meaning domains within the contexts of practice' (Guyer *et al.* 2010, p. 37), I show how the law of demand violations resolve themselves as soon as one replaces one 'number regime', the regime of numerical monetary amounts that follow upon one another arithmetically, with another 'number regime' that counts in units of satisfying meals.

From concrete numbers to abstract meals

At the start of our project, we conducted several pretests ('pilots') in order to make sure that the instructions were clear and understandable. The results of these pilots included an intolerable amount of law of demand violations. Unwilling to risk the success of the experiment, we concluded that we could not continue with the design we had used so far. Both of us agreed that the monetary amounts we offered were responsible for these 'irrational' responses. Looking at the decision sheets again and again we started to see a pattern. Many of the law of demand violations were detectable in the same area of the decision sheets (right side between rows 2 and 3 and rows 3 and 4).

In order to understand why the majority of law of demand violations was observable in those areas, we, after the next session, conducted a focus group discussion. Having identified the amounts people tended to choose despite of the irrationality of these choices, we, thereby (re)contextualized the respondents' choices and asked if they associated specific monetary amounts like, among others, 100 and 160 KSh with a specific good or service when they had made their choices. Almost immediately a heated discussion revolving around different types of food developed:

> Moderator: […] Many of you chose 100 and 160. Why do you love to divide the amount between 100 and 160? When you see the numbers 100 and 160, what comes to your mind?
>
> Respondent 6: It's not good to eat too much today and not to have anything to eat tomorrow. So you should balance. The range of the two figures balances.
>
> […]
>
> R2: *(pointing at the option where one chooses to get nothing now)* This one means that today you will starve (laughter).
>
> M: If you take zero it means you will starve?
>
> R2: Yes, it's better to take 100 today and with it buy *omena* [freshwater sardines].
>
> M: Is 100 shilling enough to buy *omena*?
>
> R6: Yes. You buy *omena* just to push you. It's enough to push you till you get more money.
>
> M: So, how much does *omena* cost?
>
> R6: *Omena* costs 50 shilling.

M: So, that is enough food (*chiemo maromo*).

R6: … A meal [uses as the English term].

M: You mean that the amount will be enough for a meal?

All: Yes.

[…]

M: What you're saying is that with 120 shilling you can buy food enough for a meal; that with it you can buy some *omena* and onions?

R5: Some *olo riyo* … [short for *olo riyo nono* which literally means 'better-than-going-without' and which is an expression which denotes the smallest unit of sugar, but is also used to denote an amount of food between nothing and a meal]. And oil and tomatoes.

[…]

M: Ok. Which other items can you buy with 160 shilling?

R6: With it you can buy rice; you can spend 100 shilling to buy bread …

M: You mean bread costs 100 shilling?

R6: You see a person who has a family will buy a big loaf of bread, the one for 100 shilling.

M: Oh, you will buy bread that costs 100 shilling.

R6: Yes, or two small loaves of bread.

[…]

M: […] we really wondered why your choices were mostly around the amounts of 160, 240 and 140 and yet you avoided 50; it's now apparent that the 50 shilling's loaf of bread is not enough for those with children.

R9: Oh, that (small bread) will be like nothing (*nono*).

Participants linked diverse monetary amounts with different types of food which were evaluated according to their potential to be transformed into a satisfying 'meal'. The smallest units discussed as sufficient for a meal were a handful of *omena*, with which a small family can cook dinner (provided that other ingredients are there), as well as a small loaf of bread which both are sold for 50 KSh. Probably depending on the economic background of the respondent, monetary amounts lower than the minimal amount required to prepare a satisfying meal were considered to be *nono*, 'nothing'.

Although the discussion finished on the remark that, at least for a larger family, 50 KSh is 'nothing', we decided to transform the decision sheets and replace the monetary amounts with portions of *omena* as shown in the picture below. Bundling all monetary amounts between 0 and 49 KSh to be 'nothing' and all amounts between 50 and 99 KSh to be one portion of *omena* (every amount between 100 and 149 KSh as two portions of *omena* etc.), we realized that the allegedly irrational choice patterns do not constitute law of demand violations (Figure 3).

Rather, these choices equalize the budget of respondents (the green arrows mark law of demand violations which could no longer be viewed as law of demand violations after we translated the monetary amounts into meal-portions). People, in other words, just preferred to have two meals in the week of the experiment and two meals the week after, i.e. they preferred to 'balance' as respondent number 6 had phrased it. The requantification of monetary amounts into 'units of meals' had explained the above-mentioned clustering of law of demand violations between lines 2 and 3 and 3 and 4.[6]

Following up on this insight, we increased the interest rates in order to enlarge the differences between the monetary amounts offered in the options A, B, C, D and E so that they approximated the critical value of 50 KSh. We decided to approximate 50 KSh because increasing the differences

AN		A	B	C	D	E
1	KAWUONO	4	3	2	1	0
	Bang' JUMA ACHIEL	0	1	2	3	4
2	KAWUONO	4	3	2	1	0
	Bang' JUMA ACHIEL	0	1	2	3	4
3	KAWUONO	4	3	2	1	0
	Bang' JUMA ACHIEL	0	1	2	4	5
4	KAWUONO	4	3	2	1	0
	Bang' JUMA ACHIEL	0	1	3	4	6
5	KAWUONO	4	3	2	1	0
	Bang' JUMA ACHIEL	0	1	3	5	7

AN		A	B	C	D	E
1	KAWUONO	Siling 200	Siling 150	Siling 100	Siling 50	Siling 0
	Bang' JUMA ACHIEL	Siling 0	Siling 55	Siling 110	Siling 165	Siling 220
2	KAWUONO	Siling 200	Siling 150	Siling 100	Siling 50	Siling 0
	Bang' JUMA ACHIEL	Siling 0	Siling 60	Siling 120	Siling 180	Siling 240
3	KAWUONO	Siling 200	Siling 150	Siling 100	Siling 50	Siling 0
	Bang' JUMA ACHIEL	Siling 0	Siling 70	Siling 140	Siling 210	Siling 280
4	KAWUONO	Siling 200	Siling 150	Siling 100	Siling 50	Siling 0
	Bang' JUMA ACHIEL	Siling 0	Siling 80	Siling 160	Siling 240	Siling 320
5	KAWUONO	Siling 200	Siling 150	Siling 100	Siling 50	Siling 0
	Bang' JUMA ACHIEL	Siling 0	Siling 90	Siling 180	Siling 270	Siling 360

Figure 3. Transformed decision sheet and valid 'law of demand violations'. Valid 'law of demand violations' from B, C, D or E back to A are not highlighted.

between the choices next to one another (i.e. between A and B, B and C, etc.) to more than 50 KSh would have raised the interest rate to such an extent that we feared two problematic side effects. On the one hand, we feared that participants would over proportionately decide to wait due to the high interest rate. On the other hand, such an increase would have had simply blown our budget. Having implemented this change, we observed less – although still many – law of demand violations in the following sessions.[7]

Immediately, the anthropological reflex to shy away from discussing abstraction set in and I resorted to a convenient explanation: *Jo*-Kaleko concretize the numerical meaning of abstract monetary values into socially and culturally situated values of subsistence. They, in other words, had 'resocialized' (Maurer 2008) or 'earmarked' (Zelizer 1997) monetary amounts. Having reflected upon it after returning from the field, I realized that a different interpretation makes more sense. Our participants abstracted from concrete monetary values into values of livelihood, namely 'one meal' which allowed them to speak about and have different opinions about what this 'one meal' entails. In the context of our experiment, it is not capitalist money's abstract potential which turns money into a 'radical leveler' that 'extinguishes all distinctions' (Marx 1990, p. 229) making, e.g. a meal, a bus drive, and the work of cleaning shoes comparable with one another because they are all worth 50 KSh. Rather, the abstractive potential of a meal allows for the equation of differently sized monetary amounts like 50, 60 and 70 KSh:

50 KSh = 60 KSh = 70 KSh → meal

bus drive = meal = cleaning shoes → 50 KSh

Participants of our experiment did not enact monetary amounts as abstract entities linked to an incremental and successive number line and standing for different goods, but as concrete amalgamations of different amounts that they, to use the words of Helen Verran, 'decomposed' (2018) to reveal parts that they measured against the same abstract entity: a satisfying meal. As a consequence of this abstraction, individual participants equated, e.g., 50 KSh with 70 KSh. Twisting the observation of Verran's analysis of enumeration practices in Nigerian primary schools that Yoruba numbers 'locate difference in an idealized or formalized sameness' (Verran 2001, p. 88), I believe that our participants located 'sameness within a formalized difference'. For the participants of the experiment, the concrete monetary amounts artificially made different by my colleague and myself entailed multiple parts, concealed from direct view, especially for scholars who assume numbers signify amounts abstractly. Making sense of the law of demand violations requires looking at what Vilaça has called the 'hidden life of numbers' (Vilaça 2018), which allowed us to understand that participants abstract both 60 and 70 KSh into 'one meal' (50 KSh) and 'nothing' (0 KSh) which ultimately allows their equation:

70 KSh = 50 KSh + 20 KSh = 50 KSh + 0 KSh = 50 KSh = 50 KSh + 0 KSh + 10 KSh = 60 KSh

Comparable to what Holbraad writes about monetary amounts as 'purely multiple' grounds against which purchases stand out as concrete figures (2005, p. 231), we can observe a reversal of the abstract and the concrete. Participants turned the relationship between abstraction and concretization on its head not in order 'to dramatize and mask' but to reverse 'the links across different scales of judgment that make up value repertoires' (Guyer 2004, p. 58), namely the links between monetary amounts and goods so that the latter are no longer viewed as concrete instantiations of the former, but as their abstract potential. This reversal led to a disentangling of the allegedly fixed links between the numerical and monetary register. The simultaneous and incremental succession of monetary amounts and their numerical indexes, in other words, no longer ran smoothly.

How the experiment's participants dealt with monetary amounts allows us to imagine an ethnographic alternative to the commonly made observation that 'money, an abstract scale for measuring value, spills over into other domains of enumeration as money itself brings ever more objects, entities or activities from those domains into its calculus' (Maurer 2008, p. 69). Taking for granted the existence of an inseparable and natural link between commensurable quantities and commensurable money, this truism neglects that 'relations of quantity are merged (or submerged) into ongoing activity' (Lave 1988, p. 120). Considering the link between the register of monetary and the register of numerical values as negotiable opens up the ethnographic possibility that behavioral economists and their subjects do not 'see' the same monetary amounts (Maurer 2008, p. 72).

The reversible figure of money which understands money's two sides as, on the one hand, an abstract numerical potential and, on the other hand, a socially embedded and concrete entity, as two sides of the same coin reveals itself as a myth. In the case of the behavioral economist, monetary parts are detachable from monetary wholes because the link between the register of numbers and the register of monetary value is inseparable. The values of monetary amounts can be counted, subtracted, divided, and multiplied like rational numbers. This allowed my colleague to view 2 KSh as a fraction of a larger amount that would be accrued through compound interest at a later stage and it allows us to pay 4 $ for a good that has a price of 3.99 $ after concluding that 0.01 $ 'can't buy anything.' In contrast, the participants of our experiment did not consider all monetary parts as detachable from their monetary whole because they did not identify the monetary with the register of rational numbers. As a consequence of the worthlessness of what could be called 'phantom amounts' such as 10 KSh or 30 KSh in the register of units of satisfying meals, a numerical register working with natural numbers (1, 2, 3, 4, …), they recursively nested larger numerical into equalized monetary values (Ross *et al.* 2017, p. 5). Increasing the numbers from 50 KSh to 60, 70 KSh or even 90 KSh did not imply a similar monetary increase: 60, 70 or 90 KSh just remained 50 KSh, i.e. 'one meal'. Food, an abstract scale for measuring value, spilled over into the domain of enumerated monetary value.

Incommensurable abstractions

The abstractness of the 'meal-pattern' suggests that behavioral economists could base their work around it in order to use the comparative potential assured by its abstractness. This suggestion demands further critical reflection. As much as we tend to equate numerosity with abstractness, we also often make the mistake of conflating abstractness with universal commensurability. This constitutes a hazardous confusion of abstraction with generalization respectively of abstraction with commensurability. What we generally tend to understand as abstraction is a process entailing three different, potentially independent acts: isolation, abstraction, and quantitative comparison. We (1) isolate something from something (e.g. a nose from a face), we then (2) abstract towards something (e.g. view the nose as an example of a 'nose') and then (3) use a standard to compare the different noses (e.g. a geometrical standard of beauty that allows us to rate noses from 1, exceptionally ugly, to 10, exceptionally beautiful). The classic economic link between concrete goods and abstract economic value, assumes that money allows us to abstract from the concrete qualities of goods (their usability) towards their economic value (their exchangeability) which is made comparable through money's numerical property and the price-building mechanisms of the respective economy. I suggest to call abstractions that do not entail step (3) 'incommensurable abstractions'.

The 'incommensurable abstraction' at play in our experiment is set in motion through a binary distinction between 'nothing' (*nono*) and 'enough' (*maromo*). Participants abstract from the concrete numerical qualities of monetary amounts towards their ability to constitute 'enough' for a 'meal'. What constitutes 'enough', however, is not universally made commensurate by being pegged to a holistic system of, e.g. numerical indices identifying the nutritional value of a meal, but highly sensitive to the multiplicity of ways in which households and families are constituted and what their living standards are.[8] I therefore shy away from suggesting that the problem is solved by replacing one universal form of abstraction (monetary amounts) with another universal form of abstraction (meal-portions), because no evidence exists that suggests meal-portions in Kaleko have achieved the same level of universal commensurability as monetary amounts have in the culture of behavioral economics: while 50 KSh + 50 KSh equals 100 KSh in the culture of behavioral economics, one meal + one meal might turn out to be less than enough for some families in Kaleko. It is precisely because 'one meal' and 'nothing' are not attached to a holistic system of prices or nutritional indices, but to a diversity of what behavioral economists call 'uncontrollable' and 'exogenous' factors (e.g. nutritional preferences, living standards, and household size) that we had to fail in taming all inconsistent results. The convex-time-budgeting task demands a rigidity of how monetary amounts are related to one another numerically that is not enacted by the participants of our experiment.

As shown by historians of science, anthropologists, and other scholars time and again, any 'number register' which facilitates a universal commensurability of its terms must be considered a historical accomplishment and a result of repetitive situated social practices and political indoctrination (Porter 1995). Naturalizing the equation of money's numerosity with its potential of abstraction carries the risk of making the scientist blind towards an understanding of monetary commensurability as a practical accomplishment rather than a given fact.[9] *Jo*-Kaleko who refuse to conflate the numerosity of money with its abstractness and who do not subscribe to an understanding of monetary amounts as fully commensurable are therefore less 'weird' than behavioral economists. Furthermore, they remind the latter that their decades long involvement with their own experimental systems risks obviating the fabricated character of some of their allegedly universally valid claims.

Notes

1. Place names have been anonymized. I conducted fieldwork in Kaleko in February–April and August–September 2009 together with my colleague Sebastian Schellhaas and returned alone in August–September 2012, February–April 2013, March–April 2014, February–April 2015, August–September 2016, March 2017 (with my colleague Martin Zillinger), November–December 2018 for the experiment, June–July (with my colleague Anna Lisa Ramella) and October 2019.
2. A research analyst of one of the largest Kenyan loan app company told me that they currently analyze the feasibility to lend money to customers who only possess a phone capable of sending SMS-based text messages. This would increase the danger of default as the 'correct' calculation of potential customers' credit scores depends on

the data their smartphones collect. Nevertheless, it shows how much economic potential is yet to be explored in the rural areas of Kenya.

3. The anthropological literature on behavioral economics or the inclusion of (economic) experiments remains scarce. Exceptions include Baumard and Sperber (2010), Pickles (2020), Rottenburg (2009) and Stafford (2008).
4. As can be seen in the instructions (see supplementary data), the experiment also included a real-effort task and a variant of a dictator game.
5. As the experiment's results are not the main topic of this paper, let me just rush through my colleague's findings: (1) People are not as impatient as they themselves and others suspected during interviews before the experiment. Overall, participants were rather patient. (2) Participants are more patient when they choose for others. This effect, however, cannot be explained by any of our research parameters such as present bias. (3) The different time frames are less important than expected.
6. The green arrows between row 1 and row 2 are less important as most participants were not yet incentivized by the interest rates offered so that the majority did not choose option D or E.
7. In the end, 11.64% of the choices were considered inconsistent and removed from the statistically analyzed sample.
8. Further discussions in the field revealed different standards of 'enough' such as the term *olo riyo nono* ('better than going with nothing') which is used to refer to the smallest unit of sugar, but also denotes amounts of food that are, somewhat between 'nothing' and 'a meal'.
9. Leaving the equation of numerosity, abstraction, and commensurability unchallenged makes it impossible to understand monetary amounts and their cognitive interpretation as 'epistemic things' (Rheinberger 2010). They cannot be understood to exist prior to the experiment as such, i.e. as pre-existing preferences only to be 'drawn out' of the participants' minds.

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Alipay's 'Ant Credit Pay' meets China's factory workers: the depersonalisation and re-personalisation of online lending

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ABSTRACT

Scholarly accounts of the global rise of statistical credit scoring technologies have tended to portray these automated, digitised systems as supplanting human involvement in lending. This paper examines Chinese migrant factory workers' encounters with Ant Credit Pay, Alipay's novel consumer credit facility (which utilises the Zhima Credit scoring system). Drawing on ethnographic data, we document how workers come to understand Ant Credit Pay through the depersonalising and re-personalising processes they associate with it. Workers prefer its depersonalised mode of lending over borrowing from banks, friends, or family. However, they nonetheless also attempt to re-personalise Ant Credit Pay through propagating the belief that human-style logics underlie its scoring mechanisms. This becomes evidenced through workers' integration of the platform into their personal spending practices, alongside their portrayal of charismatic Alipay founder Jack Ma as the orchestrator of the platform's novel approach to lending. We argue that acknowledging Ant Credit Pay's consolidation of depersonalising and re-personalising qualities necessitates the productive analysis of digital credit as a human-machine assemblage. Furthermore, this financial object – and workers' engagement with it – is generative of a distinctive personhood that concretizes China's ongoing social transformation, while also carrying implications for understanding current global trends towards the digitisation of credit.

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'My Zhima Credit[1] (*zhima xinyong*) rating hasn't changed for three months,' says Huang Jiwei[2], in a tone carrying both bewilderment and frustration. Jiwei is 22 years old and works on a production line manufacturing magnetic fasteners for bags and clothing in Dapeng Factory, a small, low-tech factory on the periphery of the city of Shenzhen in southeast China. He gazes at the screen of his smartphone, with the Alipay app open, flicking between one page that displays his credit score and another, which shows a record of transactions made through the platform – mostly purchases of goods, or money transfers to friends or family. He runs through rough calculations of the points he ought to have earned in the last few months, trying to comprehend why Alipay no longer awards significant credit score increases on the basis of multiple online purchases made through the platform, as had been his experience previously.

Jiwei's efforts to understand and improve his Zhima Credit score are tied to the fact that a higher score will mean that the amount of money he is able to borrow on Ant Credit Pay (*mayi huabei*) – a feature on Alipay which enables him to buy certain goods now and pay for them later – will grow accordingly. Jiwei's motivation for increasing his capacity for borrowing should not be explained

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away as a materialistic desire to bolster his personal consumptive abilities, evidencing the oft-assumed function of credit as 'the handmaiden of consumer demand' (Carruthers and Ariovich 2010, p. 86). Instead, Jiwei claims that his chief reason for cultivating a higher score is in case his friends should ask to borrow money from him, given that such a request would put further strain on his already tight finances. Ant Credit Pay allows him to quickly free up cash from his wages – which would normally be 'earmarked' (Zelizer 2017) for his own living expenses – and instead use this money for lending to friends.

Jiwei is not the only person exploring Alipay's novel Zhima Credit offerings. He is one of the 100 million individuals across China who, as of November 2017, have accessed this new form of credit through the novel Ant Credit Pay feature on their Alipay accounts since its launch two years prior (Gao 2017). Researchers and media commentators are turning their gaze towards this new form of consumer credit, which promises to promote financial inclusion in China by offering 'ant sized' loans to swathes of citizens, including those normally refused access to credit by banks (Kapron and Meertens 2017). However, suggestions that this new avenue of 'formal' credit helps low-income persons avoid resorting to 'informal' lending seem undermined by Jiwei's attempts to draw on the former in support of the latter.[3]

Alipay's Zhima Credit services represent the company's attempt to redefine personal lending in China by capitalising on the vast amounts of customer data collected by Alipay (and its parent company Alibaba) pertaining to users' financial transactions, shopping histories, consumer preferences, personal information, and social relationships. This data supposedly gives Alipay a competitive edge over traditional financial institutions in identifying new sections of the population to lend to, while also streamlining loan application procedures. Numerous scholars have documented the central role that digitisation and algorithmic decision making technologies have played in the evolution of credit scoring in American and European contexts (Leyshon and Thrift 1999, Poon 2007, Fourcade and Healy 2013, Marron 2013, Fourcade and Healy 2017). However, Alipay pushes this to a new level both in terms of the scope of data collected and, as evidenced by Jiwei's struggle to make sense of his own credit score, the seeming opacity with which decisions are being made.

This situation prompts two questions, which this paper attempts to address. The first is an empirical puzzle, which asks what qualities of Zhima Credit make Dapeng Factory workers like Jiwei feel comfortable borrowing from Alipay, while they remain reluctant to do so from banks or other 'formal' financial institutions. This paper will suggest that Alipay's appeal partly stems from its radical reconfiguration of the way that lending is personalised, which accords neither with the existing precedent set by banks, nor that seen in informal lending. This gives rise to a second, more theoretically-oriented question, which asks whether the digitisation of credit – both as a decision-making process by lenders, but also as the '*site* where consumer credit is enacted' (Ossandón 2017) – necessarily entails inevitable rationalisation and depersonalisation? The evidence presented in this paper suggests otherwise, leading us to argue that studies need to acknowledge how, as consumer credit adapts to take on novel digital forms, both consumers and lenders are continually inscribing the various 'financial objects' (Yuran 2014) of credit with both personalising and depersonalising qualities. These are, in turn, giving rise to new forms of personhood that are responding to broader societal transformations and the social opportunities found within them.

This paper consists of several sections. First, the literature on the emergence of statistical credit scoring technologies is reviewed, which generally assumes a depersonalisation of the lending process. Second, the conditions of fieldwork in Dapeng Factory are described. Third, we locate Alipay within the broader context of the variegated forms of credit present in Chinese society, which helps illustrate how Alipay's appeal to workers stems from its strongly depersonalised nature. Fourth, we describe how through their use of Alipay, workers nonetheless attempt to re-personalise Zhima Credit by working out how its scoring technologies 'think' through embedding Ant Credit Pay within their own personal consumption. Charisma also plays a key role in the re-personalisation process, with workers asserting that Alipay founder Jack Ma actively steers the logics of the platform's lending.

A concluding section will discuss the novel personhood stemming from Ant Credit Pay's unusual consolidation of depersonalising and re-personalising qualities.

The rise of statistical credit scoring: machines replacing people?

In her account of the growth of 'doorstep finance' in Britain around the turn of the twentieth century, McFall (2015) describes how check credit and life assurance companies relied upon the charisma of their door-to-door agents to not only collect customer payments, but also to obtain and transmit useful information between the company and its clients. This charisma, 'bureaucratically organised' by companies who sought to style their agents as 'good, average men' was essential for gaining the trust of customers and building an accurate picture of their financial position on which lending decisions could be based (McFall 2015, pp. 63–64).

Charisma increasingly took a back seat during the second half of the twentieth century, which witnessed a fundamental reshaping of consumer credit through the emergence of sophisticated scoring technologies that allowed banks, retail stores and other institutions to make lending decisions, supposedly with ever-greater efficiency and precision. The rise of statistical credit scoring has increasingly seen consumers constituted in terms of 'risks' (Marron 2007). Leyshon and Thrift (1999) note how decision making has moved out of the hands of bank managers and their employees who – much like earlier doorstep finance agents – were supposed to possess 'embodied knowledge' about customers' credit-worthiness gleaned from personal interactions. In its place, credit-scoring software has been touted as an effective means of overcoming 'information asymmetries,' whereby customers possess greater knowledge of their own financial situation than lenders, making it difficult for the latter to distinguish between 'good' and 'bad' borrowers.

The United States played a leading role in the development of credit scoring technologies (Marron 2007, Poon 2007, Marron 2009) while also instilling a widely-shared belief that reducing the role humans played in evaluating consumer credit applications would lead to the reaching of more equitable, rational lending decisions. This position received state endorsement with the passing of the Equal Credit Opportunity Act 1974, which banned basing credit decisions on factors such as gender, race, or religion and 'gave legal recognition to scoring systems as being objective, scientific devices permitting a dispassionate, empirically derived account of credit worthiness' (Marron 2007, p. 110).

New actuarial techniques such as credit scoring have also encouraged the expansion of consumer credit amongst lower-income populations by making it easier for lenders to differentiate *within* the market, offering interest rates or loan conditions tailored to different segments of borrowers (Marron 2007). Poon describes this transformation as one which has

> shifted the way people were selected away from a simple yes or no, towards a linear gradation of classes constructed around empirically assessed odds-predictions which lenders could – sliding up and down the scale at will – parse out and treat differently. (Poon 2007, p. 295)

A dual dynamic can be seen here: just as the removal of human actors from credit scoring made the credit encounter more depersonalised, the same technologies allowed for the personalisation of loan products according to borrowers' individual circumstances.

Despite the dominant trend in consumer credit being one of increased reliance on automated credit scoring and decision-making technologies, some scholars are notable in pointing to the enduring presence of human actors within novel digital formations of credit. Ossandón's (2013) study of retail credit in Chilean department stores achieves this by treating consumer credit as a 'socio-technical mediator.' He examines how credit analysts (whose role had been to screen out unsuitable borrowers based on a reading of their customer records) have been replaced by risk managers (who are charged with using data to increase customer borrowing without corresponding increases in default rates). Ossandón notes that despite risk managers being heavily reliant on statistical methods and software for performing their duties, they nonetheless saw a continuity between their work and that of the credit analysts they had replaced. Both involved making lending decisions 'not only based on abstract knowledge, but also on carefully following the daily flow of transactions and acting on it accordingly' (Ossandón 2013, p. 441). In this case, introducing greater technology into the credit scoring process appears to have had the effect of *displacing* rather than *replacing* persons and their labour.

Shifting the focus from lenders to borrowers, Kear's (2016, 2017) research on the use of credit-building peer 'lending circles' by financially marginalised groups in the United States demonstrates that consumers attempt to find ways to assert their agency amidst the increased dominance of algorithmic scoring methods. Kear argues for 'an object-oriented account of financial subject formation,' describing how individuals holding poor credit ratings joined lending circles in an attempt to provide credit scoring algorithms with positive data about themselves in order to align the 'alien quantitative abstraction' of their credit score with the 'felt qualitative reality' of their own lives, in which they understood themselves to be creditworthy individuals (Kear 2017, p. 348).

Significantly, Kear describes lending circle members' attempts to remedy this perceived misalignment as a process of 'personifying economic objects that enable the performance of unfamiliar subject positions' (Kear 2017, pp. 348–349). This involves members 'acting out' behaviours normally alien to themselves (e.g. using one's credit card for store purchases despite being accustomed to paying with cash) with the aim that these actions are transposed on to the external 'object' of the credit scoring algorithm. By 'playing the game' of credit scoring, users are able to personify this abstract algorithm in the hope of making it more closely resemble their 'real' (creditworthy) self and in so doing, fulfil their 'longing for equality in the market' (Wherry et al. 2019, p. 5).

Ossandón and Kear's accounts both suggest that the growth of statistical credit scoring technologies represents more than a passive process of digitisation. Rather, the introduction of computing technologies constitutes a reworking of credit as an assemblage of contemporary finance, comprised of human actors (lenders, borrowers) intertwined with multiple computing technologies. This therefore necessitates distinguishing the person (and the personal) from the human. Whether credit is experienced as personal is clearly not solely determined by whether lending decisions are made by a machine or a human. Rather, the above studies point to how, in relation to credit, the sense of the personal and impersonal is multi-valent and socially contingent, pertaining not only to scoring itself, but also to broader interactions with and around credit. Also visible are the shifting boundaries between personalising and depersonalising that accompany the reworking of these human-machine assemblages. This is particularly evident in the adoption of Ant Credit Pay by Dapeng Factory workers, where it radically alters personal experiences of borrowing.

Doing fieldwork on factory work

The research presented in this paper stems from primarily ethnographic fieldwork conducted by the two authors at Dapeng Factory between November 2017 and October 2018 as part of a broader project on digital money transformations and migrant labour in China.[4] Although it was never our original intention to specifically study Ant Credit Pay, during our fieldwork we were surprised to discover that not only were many workers eligible to purchase goods on credit through the service, some – like Jiwei – were already enthusiastically doing so.

As opportunistic anthropologists eager to understand the social implications of this phenomena, we nevertheless faced challenges in finding participants who were willing and able to discuss their experiences of using Ant Credit Pay. Although the vast majority of the approximately one hundred labourers employed at Dapeng Factory regularly make use of Alipay (and its main competitor, WeChat Wallet) as a mode of payment for everyday spending and transfers, only around half a dozen employees – generally males in their twenties – have begun to access credit via the new features being rolled out on the platform. Taking into account the fact that not all workers wished to discuss their financial affairs with us[5], those who ultimately did share their experiences were somewhat self-selecting. As such, the individuals discussed in this paper do not represent all workers in Dapeng Factory, much less so all workers in China. Instead, these cases should be read as providing a valuable early glimpse into the varying social experiences and engagements generated through low-income Chinese persons' encounters with emerging forms of digitised credit.

Participant observation with workers took place on the production line, in dormitories, and elsewhere in the factory. This method allowed for casual conversations to occur between researchers and participants, while also witnessing the broader social contexts of the factory. This was complemented by more formal interviews conducted with participants, incorporating focused questions aimed at eliciting their views on, and uses of, these new digital credit services. Interviews were recorded with a digital voice recorder, before being subsequently transcribed. Analysis of interview transcripts and fieldnotes was a collaborative process between the authors, involving both researchers making multiple careful readings and highlighting potentially relevant themes. By repeating this process at regular intervals and comparing between each other's understandings of pertinent themes, several clear phenomena began to coalesce around the different kinds of depersonalisation and re-personalisation found in this novel form of credit. It is to these issues that we now turn our attention.

Alipay's depersonalised credit: mediated, trustworthy, and dispassionate

The success of Alipay's Ant Credit Pay service in attracting factory workers to borrow seemed remarkable given that, as well as being very frugal with money, many workers strongly believed that credit products offered by banks and rural credit co-operatives were simply not intended for 'blue collar' labourers like themselves.[6] For instance, Jiwei rationalised not having a credit card with the assertion that 'I don't want to put too much effort into nurturing (*yang*) a credit card because I am not a businessman. A credit card is of no use for me.' Jiwei's sentiment is shaped by the fact that, for many years, Chinese banks – which are frequently state owned enterprises – offered loans only to other state owned enterprises. Even when the roll-out of credit cards to Chinese citizens started to widen in the early 2000s, such products were initially targeted at various 'elite' groups with strong connections to the state (e.g. civil servants, enterprise employees), rather than ordinary workers (Rona-Tas and Guseva 2014).

Jiwei's perception that bank-issued credit cards and loans were simply not intended for people like himself was further affirmed by the 'documentation difficulties' that many rural migrants face when applying for consumer credit products. Banks often ask potential borrowers to produce evidence of collateral (i.e. real estate/car ownership records), proof of urban residency and long-term employment contracts – all of which Jiwei lacked. However, Jiwei confidently asserted that had he really wanted a credit card, he could circumvent many of the documentation requirements by enlisting the help of a licensed guarantor company (*danbao gongsi*) which, for a fee, would assist him in securing credit from a bank. Jiwei emphasised that it was in fact his prerogative not to pursue the lines of credit offered by traditional financial institutions.

By contrast, Ant Credit Pay provided access to credit against purchases without the need for lengthy application procedures or complex documentation requirements. Workers' experience of this service thus contrasts sharply to the discrimination – both explicit and implicit – that rural migrants often experienced in encounters with banks. For instance, female worker Wang Lihua made clear how *depersonalised* interactions facilitated by Alipay were often preferable to *dehumanising* ones with bank staff:

> Banks treat VIPs and us differently. VIPs have gold cards, diamond cards. When they go to use bank cashiers, the people meet each other, then there will be a separation between rich and poor, high and low status. But when you use Alipay, it's all operated on your phone, so it's not the same.

While Ant Credit Pay's mediated nature contributed to its appeal, workers were not facing a purely binary choice between Alipay and banks. Rather, their decisions were made against a lending landscape populated by a plethora of easily accessed 'informal' modes of credit. Casual, often interest-free lending between friends and family is extremely commonplace in China (Turvey and Kong 2010). Multiple forms of 'curbside-credit' or 'folk credit' (*minjian jiedai*) also exist, including rotating credit associations (*hui*), pawnshops (*diandang hang*), moneylenders, loan sharks, and peer-to-peer online loans. Rather than attempting a detailed comparison of the differences between these indigenous forms of Chinese credit (see Tsai 2004), we instead highlight two key characteristics found amongst them, which when taken together, help further explain why Alipay constitutes a preferable alternative.[7]

First, several forms of indigenous credit were regarded as being usurious or unstable. Loans offered by moneylenders and loan sharks often bore extortionate interest rates (*gaolidai*), rendering them illegal. Rotating credit societies – which during China's reform era had mushroomed from small lending circles of mutual friends into large networks composed of strangers hungry for readily available credit – had suffered several high-profile collapses, most notably in the city of Quanzhou in the early 1990s (Tsai 2000). Peer-to-peer (P2P) online financing platforms expanded rapidly since 2010, but became dogged by scandal following media reports of cases of university students forced to provide P2P lenders with naked photos of themselves as a security against their loans (Li 2016). By contrast, Alipay is widely regarded as being 'trustworthy and safe,' in part because of the colossal size of its parent company, Alibaba (Chong 2019, p. 300). Ant Credit Pay users in Dapeng Factory asserted that Alipay was 'too big to fail,' with its dominant position in providing escrow and savings services, meaning the company could be trusted not to act usuriously.

Second, many sources of indigenous credit rely heavily on borrowers' personal social networks, usually as a safeguard against the kinds of unscrupulous lending outlined above. For instance, one female factory worker mentioned the continued existence of small rotating credit societies amongst friends from their home village, with lending in such associations driven not by a desire for profit from interest payments, but rather by the creation of obligations for subsequent interactions amongst members.[8] However, the most commonly mentioned form of credit was casual borrowing from either friends or family. Jiwei identified clear differences in the moral obligations involved in borrowing from either Ant Credit Pay or friends:

> If you borrow from Alipay, you will become a slave to money; while borrowing from friends, you only owe them *renqing*.

Here, Jiwei describes personal borrowing from friends as being governed by logics of *renqing*, a Chinese concept literally meaning 'human emotion,' which alludes to the affective personal bonds held between individuals that are deepened or maintained through the ongoing exchange of favours (see Yang 1994, pp. 67–72, Yan 1996, Kipnis 1997, p. 58).

While drawing on *renqing* as means of accessing credit from friends or family seemed safer than potentially usurious impersonal borrowing, it could be troublesome nonetheless. This was because it was understood to entail not only the eventual repayment of the initial sum borrowed, but also of another yet-to-be-decided favour at some unspecified point in the future. Many of the younger workers at Dapeng Factory lived fairly transient lives, changing employers frequently. As such, they were hesitant to test the *renqing* of their colleagues by asking to borrow from them. Even if co-workers were willing to engage in casual lending, it was difficult to predict the nature of the possible favours that may be asked of borrowers in return, much less their ability to fulfil them.

Relying on friends or family from one's hometown carried its own moral problems, too. For instance, Jiwei described how, during his previous employment working as a chef on a night-time food stall, he felt reluctant to borrow money from his boss with whom he shared a hometown connection:

> We are from the same place and I fear that the boss would gossip with my fellow villagers back in the hometown about me borrowing money all the time, and this will 'injure my credit' (*sun wode xinyong*).

Comparing Alipay with both banks and indigenous forms of lending shows that much of the appeal of Ant Credit Pay to factory workers stems from their perception that it is a strongly depersonalised mode of credit. This distinct sense of depersonalisation can be attributed to the mediated (avoiding the embarrassment of requesting credit in person), trustworthy (institutionally embedded in a large, private technology firm), and dispassionate (free from *renqing* obligations associated with friends or family) qualities of the platform. While Ant Credit Pay appears to be strongly depersonalised, some personal qualities still remain visible. Indeed, just as 'money is always both personal and impersonal' (Hart 2007, p. 16), in credit, too, the boundaries between the two domains can, at times, be indistinct.

This indeterminacy becomes particularly clear in migrants' varying attitudes towards borrowing from versus lending to friends. Like Jiwei, many of our participants were *reluctant to borrow* from friends, family or co-workers. Instead, small loans provided by Ant Credit Pay were playing a vital role in helping them 'to deal with mismatches between family income and expenditures' (Carruthers and Ariovich 2010, p. 84) in a way that personal savings often could not. However, participants also expressed a strong *willingness to lend* to others who might be in need, even if this meant drawing on depersonalised loans through Ant Credit Pay in order to be able to do so. The accumulation of *renqing* therefore clearly remained desirable, despite the fact that calling upon it oneself was not always so. While this suggests an accordance with Peebles' (2010) observation that many societies maintain credit to be productive and debt to be destructive, it also demonstrates how the advantages and disadvantages of particular forms of credit hinge upon the specific social contexts that acts of borrowing are grounded in. As such, multiple sets of social connections are often implicated in borrowing acts, extending beyond simple dyadic relations between lender and borrower.

While Alipay may have been preferred by workers because its depersonalised nature allowed them to avoid having to rely on friends for loans, workers nonetheless felt that Ant Credit Pay was not without its own pitfalls. Jiwei's concern that 'you will become a slave to money' by borrowing from Alipay pointed not to worries that the platform may act usuriously, but rather that the assumption of debt would precipitate feelings of greed amongst borrowers, leading to a loss of self-control over money. These sentiments suggest an anxiety that when debt relations occur between people and impersonal institutions, the absence of the moral constraints normally fostered by *renqing* could have derisive effects on the borrower's own moral integrity. Worker Huang Zhongtian, aged 22 years, similarly explained that 'Once you start [borrowing money], you will create more and more desire till it is far beyond your control.' Of course, such concerns were not unique to Alipay alone. Workers expressed similar worries with regards to credit cards and loans offered by banks. However, Ant Credit Pay was seen to do a better job of ameliorating potential dangers because it was relatively conservative in the amount of credit it would extend to workers in the first place. Rather than expressing frustration at being unable to access large amounts of credit, workers instead interpreted this as a sign of Alipay's responsibility as a lender.

This section has demonstrated how workers perceive Ant Credit Pay to be a strongly depersonalised mode of credit. Workers do not particularly envisage it as helping them to either enter the formal economy or avoid informal lending (even if financial inclusion experts may claim this to be the case). Nor does it appear as though Ant Credit Pay owes its existence to a paucity in the availability of credit (legitimate or otherwise) in China. Instead, the particular constellation of relations, obligations, and personhood condensed within Ant Credit Pay is what affords it its strongly depersonalised nature. However, workers' attempts to use these loans in the service of more casual forms of lending also point to an opposing dynamic at play, whereby workers made successive attempts to re-personalise Ant Credit Pay with the aim of being able to relate to this form of credit and efficaciously appropriate it into their social lives.

Re-personalising credit: logics of scoring, shopping, and charisma

One of the key modes of re-personalisation came from workers' perceptions that Alipay assessed the creditworthiness of individuals in a way fundamentally different from that practiced by banks. Chinese banks chiefly rely on the country's central credit bureau, the People's Bank of China Credit Reference Centre (PBC CRC), for credit scoring. PBC CRC collect extensive data (i.e. loans, court records, tax positions, telephone, utility bills, etc.) covering almost the entire adult population (Rona-Tas and Guseva 2014). While the hegemony of credit scoring in many economies results in consumers having little option but to 'play the game' of cultivating one's own score (Kear 2017), low-income persons in China have long regarded their PBC CRC credit score to be largely inconsequential.[9] This was primarily because they (like Jiwei) believed bank loans were not intended for their use, or because urban bank staff discouraged them from submitting loan applications in the first place.

By contrast, Zhima Credit's rating system touted a personalised scoring technology that promised to rate *all* users – regardless of their social background – through a combination of five factors: 'credit history' (*xinyong lishi*), 'good behaviour' (*xingwei pianhao*), 'ability to practice economy' (*lvyue nengli*), 'distinguishing identity characteristics' (*shenfen tezhi*), and 'personal connections' (*renmai guanxi*) (Zhima Credit 2019).[10] Alipay also allowed users to easily view their Zhima Credit score – a single numerical value between 350 (lowest trustworthiness) and 950 (highest trustworthiness) – through their smartphone app.

While for factory workers this personalised score represented a novel way of 'seeing' credit, Alipay provided no further guidance on what criteria went into each of the five factors, their calculation methods, or the relative weighting between them. This opaqueness left many workers trying to understand the system's functioning by embedding it within their own, pre-existing personal economic practices. These heuristic efforts to comprehend how Zhima Credit 'thinks' sought to translate the seemingly arcane inner workings of Zhima Credit's algorithmic scoring system into a set of easily implemented guiding principles.

It also had the effect of opening a further avenue for re-personalising Zhima Credit through assuming that such logics were, somehow, perceptible. For instance, Jiwei asserted that improving one's Zhima Credit score was simple: 'If you use it, it grows' (*Ni yong ta, ta jiu sheng gao*). He claimed to have deduced that the only action that made any discernible impact on his score was making regular purchases on credit with Ant Credit Pay. Jiwei reported that the easiest way of achieving this was by spending regularly on Taobao, a vast Alibaba-owned online shopping marketplace which uses Alipay for payment processing. He confidently asserted that 'If you don't buy anything for a month, it won't grow.' Jiwei's re-personalisation of Ant Credit Pay through attributing commonsense, human-style logics to Zhima Credit's scoring system strengthened his affinity for the service, while also providing him with a sense of agency over his own credit score. He saw himself as being able to positively influence his score through increasing his consumption, which to him seemed a more accurate reflection of his economic ability than external indicators relied upon by banks, such as rural/urban status or educational attainment.

The agency that workers felt they possessed over Zhima Credit's personalised scoring sometimes even led to deliberate attempts to 'mislead' the system by inflating the amount of purchases made through the platform. Jiwei recalled one such instance, from when he worked as a chef, prior to joining Dapeng Factory. His former manager relied on Jiwei to use his personal Alipay account to purchase large volumes of ingredients and cooking equipment from Taobao. As a result, Jiwei received monthly increases (of around 100 RMB) to his Ant Credit Pay borrowing limits. In a desire to further bolster his Zhima Credit score, Jiwei began to offer to help other friends and colleagues make everyday purchases on the platform. However, Jiwei found it difficult to maintain the same purchasing volume after taking up employment in Dapeng Factory. Older factory employees generally had little need to buy items online, whereas his peers had their own Alipay accounts and did not wish incur *renqing* obligations by asking newcomer Jiwei for help making purchases. In contrast to Kear's (2017) description of low-income Americans who feel obliged to 'play the game' of credit scoring by providing algorithms with positive data in the hope they recognise their creditworthiness, Jiwei's attempts to 'fool' the human-style logics of Zhima Credit rather suggest a willingness to 'play with' this new form of credit and explore its potentials.

Workers' perception of there being an element of human reasoning governing Ant Credit Pay's functioning extended to the managerial structure that guided Alipay's operations. Here, workers' use of Ant Credit Pay sparked powerful social imaginaries regarding the individual believed to be central to this novel mode of borrowing: Alipay founder and (until recently) Alibaba CEO, Jack Ma.

Participants often spoke of Ma and Alipay as being inextricable from each other, despite the fact that he was not actually the CEO of Ant Financial, the subsidiary of Alibaba that manages their credit. This technicality did not prevent workers from asserting that Ma's unorthodox decision-making had been instrumental in Alipay's foray into the personal loan business. Zhang Xiaowu, a male worker in his thirties, commented:

> It's just that every person's brain thinks differently. Jack Ma's got guts. He dares to use his platform to lend money to you. He *gives* this money to you; he's not worried about not getting it back.

This near-comical image of Ma as a benevolent moneylender, doling out cash to borrowers with little concern over repayments arguably represents an anathema to the dominant model of institutional credit, with its insistence on profits deriving from interest-bearing loans. This playful vision was further fostered by numerous promotional campaigns laid on by Alipay, which encouraged the adoption of Ant Credit Pay (and other services) by rewarding users with 'virtual red envelopes' containing money or discounts. Jiwei explained that 'For Jack Ma, [distributing red envelopes] is a drop in the ocean, he's given out so many red envelopes.' Notably, workers appeared reluctant to abuse Ma's magnanimity. All of our participants – perhaps guided by fears of themselves becoming slaves to debt – reported conscientiously repaying purchases made on Ant Credit Pay within the interest-free period, thus avoiding incurring extra charges.

Workers' invocation of Ma as being central to Ant Credit Pay meant that such lending was viewed as unconventional but nevertheless imbued with strategic purpose. Wang Lihua, a female production line worker in her forties, described how Alipay's objectives stemmed from Ma's deep familiarity with grassroots society:

> In my heart, [Ma] is like a legend. He does business, invents software, his brain is very agile, he can know the public's feelings. Jack Ma just really understands the public feeling and digs into their problems. So, he is very smart.

This portrayal of Ma as uncannily able to discern the difficulties faced by 'normal people' positioned him as uniquely suited to address the inconveniences, shortcomings, and discrimination that workers felt were inherent to existing sources of credit, whether from banks or community-based lenders.

Alipay's own branding of its loan products also further fostered this sentiment, carrying strong connotations that, in contrast to banks which were understood to prioritise serving companies or wealthy urbanites, Ant Credit Pay primarily sought to assist hard-working individuals and small businesses. In naming their loan products after the eusocial ant, Alipay invoked powerful imagery of an army of tiny loans combining forces to foster economic development amongst a striving entrepreneurial working class:

> 'Ant' represents the natural world's tiny and tenacious force. Although small, when they are put together, they are an infinite power. 'Ant' represents our trust in, and dependence on, the 'tiny.' (Ant Financial 2017)

This sentiment was echoed by Jing Xiandong, CEO of Ant Financial, who claimed that 'Ant represents the little guys (*xiaohuoban*), the normal public and small companies' (Zhongguo Xinwen Wang 2016).

This final example of re-personalising Alipay through invoking the figure of Jack Ma was only possible thanks to Ma's charismatic nature, whereby factory workers considered him 'extraordinary' and possessing the kinds of 'exceptional powers or qualities' that allowed him to understand the problems they faced (Weber 1978, p. 241). Applying charisma to consumer credit may seem counter-intuitive, given Weber's assertion that charisma 'abhors the owning and making of money' and is, in its pure form, 'opposed to all systematic economic activities' (Weber 1978, p. 113). In fact, such a position aligns nicely with workers' depiction of Ma as a carefree distributor of credit. Although Weber went so far as to suggest that charisma was an inherently unstable force, destined to succumb to economic rationality and 'a slow death by suffocation under the weight of material interests' (Weber 1978, p. 1120) Ant Credit Pay's continued expansion seemed to further evidence Ma's charismatic status. In this case, economic activity actually appeared to sustain charisma.

Workers' injection of Alipay's loans with the charisma of Ma also demonstrates how the re-personalisation of institutional credit can make possible ostensibly formal financial products that nonetheless appear to resist bureaucratic organisation. In this sense, the strong emotional affinity workers feel they have with Ma somewhat resembles the cult-like charismatic leaders that Biggart (1989) describes as directing American direct sales organisations, where a kind of 'charismatic capitalism' operates through a logic that appears radically different from that of bureaucratic organisations. Just as the inclusive membership and aspirational ideals of direct sales organisations led by founders with magnetic personalities represented 'a challenge to the bureaucratic organisation of enterprise' (Biggart 1989, p. 7), Chinese factory workers attributed Alipay's willingness to extend them small amounts of credit as part of Ma's masterplan, whereby he sought to deliberately undermine the market dominance of banks that clung to bureaucratic lending procedures. Alipay was also complicit in 'bureaucratically organising' Ma's charismatic image (McFall 2015), by featuring Ma's face on virtual red envelope giveaway promotions and implying that the company was fighting in the corner of the 'little guys.'

The above examples have shown workers re-personalising Ant Credit Pay through attributing common-sense logics to its scoring system, ascertaining how the platform 'thinks' by embedding it within personal spending and ascribing its mode of operations to Jack Ma's charisma. These diverse modes of re-personalisation reveal that, despite Ant Credit Pay's appealing depersonalised nature, workers nonetheless still aspire to form a social relationship with the financial object of credit itself. Indeed, the achievement of Alipay is arguably that its personable nature has ended up becoming expressed in many of those domains of life where China's working class feel they possess at least a modicum of agency: their extensive familiarity with digital technologies, growing consumptive abilities, and participation in a larger social transition towards a more entrepreneurial society (as epitomised by Ma himself).

Conclusion: reinventing credit and redefining the person

Observing factory workers' encounters with and uses of Ant Credit Pay reveals a 'grassroots view' of emerging Chinese credit scoring technologies that differs markedly from established accounts of statistical credit scoring, which have traditionally portrayed computerised systems as superseding human-led lending decision making by delivering more equitable outcomes and new borrowing markets. Instead, Dapeng Factory workers come to understand these new digital credit products through their assumed depersonalising and re-personalising properties, which although appearing somewhat opposed, are in fact often simultaneously consolidated with each other in a multitude of variations.

This paper has demonstrated how workers find Ant Credit Pay's depersonalised mode of lending preferable to relying on familiar connections – such as friends or family – for loans. At the same time, workers have responded to the opacity of Zhima Credit's scoring mechanism by subjecting it to their existing personal spending practices, in an effort to glean insight into its operations. Alongside this, workers have also re-personalised Zhima Credit through a process of personification, invoking Jack Ma as the charismatic leader behind the platform, steering its operating logics, encouraging its perceived munificence and distinguishing it from credit offered by banks, which is seen to discriminate against low-income workers.

Appreciating the varying forms of depersonalisation and re-personalisation found in Zhima Credit allows us to answer the two questions posed at the beginning of this essay. First, it helps to empirically explain the appeal of Ant Credit Pay over not only banks, but also other indigenous forms of lending. By combining depersonalising and re-personalising processes, Zhima Credit is tailored by workers (and also the Alibaba company itself) into a financial object that fits closely with their shifting priorities as they reassess the nature of their social relationships with family, friends, colleagues and state-owned banks. This reflects workers' growing desire for financial autonomy, a changing relationship with the state, and a need for credit that can be flexibly deployed credit for a range of social purposes.

Second, it addresses the theoretical question of whether the digitisation of credit inevitably leads to its rationalisation and depersonalisation. Here, the unique amalgamation of depersonalising and re-personalising characteristics present in Ant Credit Pay challenges dominant accounts of the rise of statistical (and increasingly algorithmic) credit scoring as a process whereby machines are gradually replacing humans. Indeed, the consolidation of these aspects within Ant Credit Pay raises the question of whether this new form of credit may, in turn, be producing a new form of person?

Moor and Lury (2018) suggest that the development of dynamic 'personalised' pricing technologies makes it harder for consumers to identify themselves as part of a recognised group, giving rise to a 'transcontextual' personhood, combining individualisation with dividualisation. Ant Credit Pay's depersonalising and re-personalising qualities – and the role that workers play in constructing them – similarly indicate the emergence of a distinctive personhood, albeit one that speaks to Chinese tendencies to anchor the person within sets of hierarchical relations. Ant Credit Pay facilitates a personhood increasingly made manifest through individual consumptive activities, rather than one's position as a labourer under a (systematically inequitable) state-led market economy, or as an actor within emotionally burdensome networks of familiar friends and family. Importantly, it represents not an abandonment of these latter modes of personhood, but rather an articulation with them. Indeed, if, as Hart asserts, 'the moral economy of capitalist societies is based on an attempt to keep separate the impersonal and personal spheres of social life' (Hart 2006, p. 29), then the case of Ant Credit Pay serves as a reminder of how contemporary digitalised businesses work in both separating but also re-entangling the impersonal and personal.

This is especially important in the current moment, as the meaning of credit in China appears to be undergoing a monumental reworking. Private companies like Alipay are introducing new forms of credit, calculated in novel ways, using reams of big data generated through the platformatisation of everyday life in China (de Kloet et al. 2019). While this paper has focused on the new loan products being offered as a result of this process, Zhima Credit is increasingly being employed for an array of 'off-label uses' (Rona-Tas 2017, p. 53) across multiple domains of social life, determining users' eligibility for everything from bicycle rentals to expedited visa applications. Alongside this, the Chinese government are in the midst of creating a 'social credit' system designed to monitor and positively influence citizens' behaviour (Creemers 2017). These developments suggest that while the dominant understanding of credit in the world today is rooted in developments in the American financial services sector occurring over the twentieth century (Poon 2007, Marron 2013), the story of contemporary credit is by no means complete. Important questions remain about how the new financial technologies and cultures of credit that are currently being forged in China may shape the future of credit elsewhere in the world.

Indeed, Alipay may itself be grappling with such questions. On 10 September 2019, Jack Ma stepped down from his position as CEO of Alibaba in a carefully choreographed handover of power that had been first announced a year earlier. Different explanations surfaced for Ma's departure. One was that it represented an attempt to reduce the risks associated with ownership of the company being concentrated in the hands of Ma and other key individuals. Another was a desire to avoid a 'cult of the founder' business culture. In an open resignation letter penned by Ma himself, he simply wrote 'I still have lots of dreams to pursue,' while also professing that 'Alibaba was never about Jack Ma, but Jack Ma will forever belong to Alibaba' (Lahiri 2018). As Alipay continues to pursue its dream of reinventing credit in the absence of its charismatic leader, the issue of how and where it is depersonalised and re-personalised will remain of importance for the company, its users, and for scholars seeking to understand the nature of credit in contemporary society.

Notes

1. International media reports and scholarship often refer to these services as 'Sesame Credit,' the literal translation of *zhima xinyong*. However, Zhima Credit is the official English-language name of the product.
2. Pseudonyms have been used in order to preserve participant confidentiality.

3. The distinction between formal and informal economies is, of course, a problematic one. Hart (2008) notes that the concept draws heavily on Weber's (1981) notion of rationalisation and works to consign a broad array of economic activities (e.g. casual labour, unregulated lending) occurring outside formal bureaucratic institutions to the domain of the informal, or, even more pejoratively, the 'underground' or 'black' economy (Hart 2008, p. 1).
4. Available at https://sociology.hku.hk/digital-money-china [Accessed March 2 2020].
5. A rumour circulated that Li had been sent onto the production line by factory management in order to surreptitiously observe workers.
6. Rural credit co-operatives are financial institutions that primarily serve rural Chinese townships. Despite their name, these institutions are typically enterprises (many of which are state owned) and operate in a similar manner to banks.
7. We use the term 'indigenous' rather than 'alternative' credit, as the latter phrase often implies these forms of credit exist due to a lack of other 'legitimate' options.
8. This somewhat accords with Martin's (2014) description of rotating credit societies in rural 1970s Taiwan.
9. The recent introduction of certain punitive sanctions against Chinese citizens with poor credit records (e.g. bans on air or high-speed rail travel) suggests that credit scoring is becoming increasingly difficult to ignore.
10. Like banks, Alipay also consulted (and contributed to) PBC CRC credit score data. However, Zhima Credit's marketing materials instead emphasised the primacy of its own proprietary credit scoring system.

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Shaping epistemic distance: producing and withholding knowledge in market research

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ABSTRACT

This article explores the notion of 'epistemic distances,' which are operationalised by acts of showing as well as omitting. It is investigated through practices of market research where researchers aim to overcome a perceived lack or absence of market knowledge. However, such work relies on keeping clients and respondents away from many details of how the research is undertaken. Based on anthropological fieldwork, this article inquires into how the staff members of a market research firm limit what their clients and respondents know. Such study of the role of secrecy and non-knowledge in commissioned knowledge production takes its cue from the anthropology of secrecy and the agnotological study of ignorance. Further, the article draws on spatial imaginaries in constructivist market studies as well as the study of the role of distance and difference in understanding in science and technology studies. The text contributes to the understanding of knowledge making by showing how market research features epistemic as well as relational concerns. These are handled through the active managing of epistemic distances by shaping what involved actors know. The gap between current and desired knowledge is sometimes met only by maintaining distance.

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Introduction

This article deals with the role of distance metaphors in the making of knowledge. Motifs include efforts to 'close gaps' in market knowledge as well as to manage relationships between knowledge producers and recipients by means of omission. In order to discuss the role of relations in knowledge production, I suggest the notion of 'epistemic distance,' which I explore through examples from market research practice. Involved in commissioned knowledge production (Nilsson 2018b), market researchers make it their business to produce a particular kind of material – marketing knowledge – for recipients to use. This is typically framed as work to close or overcome gaps in knowledge about markets, or providing a link between the client and consumers (cf. Lien 2004). However, market researchers may keep both clients and the respondents they study ignorant regarding many details of the research work. Indeed, market researchers may consider this work to both overcome and to maintain ignorance as complementary. Such action is framed as useful not only for pursuing their own business interests but also to ensure that clients truly receive useful information.

Empirically, I draw on how a group of market researchers shape what their clients and study respondents know. This shaping is explored both in the sense of producing knowledge qua useful market representations (Ruiz and Holmlund 2017) and through different kinds of 'non-knowledge'

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– a phrase denoting both the limits and absence of knowledge (Proctor and Schiebinger 2008). This dual attention stems from the tensions and ambiguities within market research as an activity: it involves both making knowledge and managing ties with clients (Nilsson 2019; 2018b). As such, it features the overcoming of distances and the production of insight but also work to keep clients and respondents at arm's length. My discussion is based on ethnographic study with a Swedish branch of an international market research firm, which I call Norna. I have interviewed staff members, assessed work materials and undertaken participant observation (Davies, 2012) to find out how the distribution and making of information is handled though the market research process.

Following the tradition of constructivist market studies (e.g. Araujo *et al.* 2010), this article approaches the making of market knowledge as an activity that plays a part in shaping the phenomena it purportedly describes (Nilsson and Helgesson 2015). Marketing 'knowledge' is fruitfully approached as representations (see Ruiz and Holmlund 2017) that cannot be readily disentangled from the methods through which they have come about (Law 2004). Given interest in how market researchers seek to do business by filling particular needs for knowledge, I turn to studies of knowledge as unequally distributed and socially shaping (Barth 1990, Barth *et al.* 2002). As market researchers rely on keeping things unknown for the sake of informing their clients, I also draw on scholarship about non-knowledge as constitutive for understanding (e.g. Proctor 2008). I explore the ambiguous work to both overcome and (re)produce distances between the actors involved in market research and how this relates to the production of knowledge. This further develops perspectives on how market research seeks to pursue social relationships in the form of business interests and epistemics qua research concerns in tandem (Nilsson 2018b).

This article turns to the case of market researchers at Norna, pursuing the question: How are tensions between closing and maintaining distances vis-à-vis research participants and clients handled by means of shaping knowledge and non-knowledge? Drawing on interest in science and technology studies (STS) about how distance affects understanding of scientific results (MacKenzie 1990, Collins 1997, Latour 1999), I argue that distances between researchers, respondents (i.e. research participants) and recipients (i.e. clients) are shaped by market researchers in order to foster certain kinds of knowledge reception and relationships. The article contributes to scholarship about the making of marketing knowledge (Bjerrisgaard and Kjeldgaard 2013, Nilsson and Helgesson 2015, Ruiz and Holmlund 2017) by showing how such work involves the making of results and reports as well as affecting relationships.

Background to market research as knowledge production

Knowledge as a cultural phenomenon is best studied through its workings: how knowledge is made, distributed, kept and drawn on (Barth *et al.* 2002). This includes the role played by practices, models and ideas in producing research results (Helgesson *et al.* 2016) and knowledge about markets (Kjellberg and Helgesson 2007, Nilsson and Helgesson 2015). The area of research has focused on the role of economics (MacKenzie 2008, Steiner 2010) as well as marketing (Kjellberg and Helgesson 2007, Araujo *et al.* 2010) in enacting markets (Callon 1998). Such scholarship stresses that markets and market knowledge are mutually shaped and shape each other and that results cannot be readily separated from processes of making and describing. This includes studies of how markets are achieved (Callon 1998) and how objects of marketing knowledge are performed in the methods used to describe them (Heiskanen 2005, Muniesa and Trébuchet-Breitwiller 2010). Further, research into the making of market research reports stress that simplification (Diaz Ruiz 2013) and the shaping of recipients' interpretations (Ruiz and Holmlund 2017, Nilsson 2019) play a major role in the usefulness of such representations. Given this attention to models and ideas for the outcomes of knowledge production there is reason to think about how actions towards meeting knowledge needs are expressed – not just in marketing settings but in other fields of knowledge production. This article adds to the extant scholarship on the workings of market knowledge by acknowledging how metaphors of gaps, space and distance are utilised to produce desired outcomes.

The role of spatial metaphors in knowledge making

For the purpose of inquiry into how market research addresses knowledge gaps, it is worth considering how ideas about markets and the need to know them are expressed. Anthropologist Marianne Lien (2004), who has studied marketers in Norway, notes that marketing knowledge is produced to address gaps in knowledge as if research is about bridging distances. The marketers she portrays refer to the lack of connection to actual consumers as motivation for continuous marketing research. The undertaking of research offered the chance for closer interaction and direct experience with the otherwise distant targets of marketing work (Lien 2004). Spatialised notions of market and marketing knowledge are also inferred by project process models and other managerial tools that outline the process of going from data about the world to knowledge, and from research situation to client (Moisander and Valtonen 2006, Bjerrisgaard and Kjeldgaard 2013, Kotler et al. 2016, Ladner 2014).

A further analysis of the role of gaps and absences in knowledge making may be found in STS works that conceptualise distance in understanding. For example, Donald MacKenzie (1990) has observed that results in science and technology tend to be understood differently by those closely involved in making them than by those with less access to the practices of such knowledge production. Uncertainty over results is high among those directly involved in designing and testing technologies (where uncertainties and snags are well-known). This uncertainty then decreases in the case of actors with more passing knowledge (such as managers championing the results), only to increase again in those alienated entirely from knowledge production. Similarly, Harry Collins (1997) has noted that understanding of scientific results differs between groups of actors. Although involved researchers, other 'scientifically literate' experts, policy makers and 'the public' may hold similar opinions in a scientific controversy, their understanding of science and its imperfections may vary (Harry Collins 1997). Both MacKenzie (1990) and Collins assume a difference that is framed in terms of distance.

Importantly for this investigation, Collins as well as MacKenzie refer to spatialised notions of a separation of actors as a given condition, rather than something that is actively managed by the actors involved. Their observation of a sort of 'epistemic distance' (Nilsson 2018b) is useful to this inquiry, however. For one thing, it resonates with the implication that research bridges some kind of distance between decision makers and the world as expressed by Lien's (2004) marketers or the models used for global trend analysis discussed by Bjerrisgaard and Kjeldgaard (2013). Ideas about research spanning distances are also expressed in knowledge models where 'data' out in the world is turned into 'information' that can subsequently be turned into 'knowledge' and then 'wisdom' or 'insight' of the recipients (Rowley 2007). Often such models describe a one-way direction of the analysis process (Räsänen and Nyce 2013). The process connects the world to the recipients of knowledge, across a series of related steps and involved actors (e.g. research respondents; researchers and their tools of analysis; receiving clients) to produce increasingly abstract representations (see also Latour 1999, Ruiz and Holmlund 2017). Attention to spatiality in knowledge making is useful for this article's inquiry into how gaps in knowledge are addressed. With gaps overcome through processes that feature active omission and the maintenance of distance, there is reason to look further into how knowledge can be approached as distributed and shaping social relationships.

The (unequal) distribution of knowledge

Anthropological concerns over knowledge have come to include not merely that which is treated as knowledge but also that which is not. For instance, in his study of secret knowledge in Melanesia and south Asia, Anthropologist Fredrik Barth has stressed how knowledge in a society is unequally distributed, both through modes of communication and withholding (Barth 1990). Keeping knowledge from other people is approached as useful in enacting social distance: uneven distribution of knowledge may shape social relationships by designating who knows what. Here, Barth suggests how shaping the spread of what is known, or the right to know, distributes knowledge, power and influence in society in a manner that sets (groups of) people apart. Withholding information and maintaining secrecy constitute a useful tool for inclusion and exclusion. Market research entails much effort to produce social relationships between client and research as part of the work (see Nilsson and Helgesson 2015, Nilsson 2019). While the role of knowledge in shaping social relationships is important to this inquiry, the making and interpretation of knowledge are also central concerns. This spurs attention to the role of shaping understanding through what is kept unsaid and thus unknown in order to connect social and epistemic concerns in market research.

How what is not known shapes understanding

Adding to interest in how knowledge affects social formation there are also important strains of research that explore the limits of knowledge. Cases include deliberate omission, identified lacks of knowledge, or simply the unknown. Agnotology is the study of how such 'non-knowledge' plays a part in shaping our understanding of what we know: limitations make knowledge possible by framing interests and interpretations (Proctor and Schiebinger 2008). While the anthropological analysis of secrecy may assume knowledge or an underlying truth (e.g. Manderson *et al.* 2015), the anthropology of ignorance (High *et al.* 2012), agnotology studies (Proctor and Schiebinger 2008) and ignorance studies (Gross and McGoey 2015) instead treat states of knowing and not knowing in a more symmetrical fashion. For instance, Proctor and Schiebinger (2008) note the widespread assumption of knowledge as a teleological point of arrival, and ignorance or other forms of non-knowledge as gaps to be filled. Alternatively, they suggest that non-knowing and the non-known are to be studied as located and achieved phenomena (Proctor and Schiebinger 2008).

Acts of omission are possible to see in terms of distributing ignorance which both affects social relationships and makes certain knowledge and understanding possible. There are many times when someone does not want to, or ought not to, know of things (Gross and McGoey 2015). Leaving things out or maintaining secrets is not just obscuring truth, but may act to make statements of fact compelling, both in the sense of being convincing and being comprehensive. Rappert *et al.* (2011) describe how anti-cluster bomb activists struggle with government secrecy, but also how they use and make accounts more useful for their purposes through acts of omission. Their article further argues for the value of looking into state secrecy, not merely as a negative issue to be mitigated by the researchers' exposure, but rather as something that can be used as both an analytic resource and important social cueing in the analysis of secrecy: 'the overt partial disclosure given here could be interpreted as contributing both to the ignorance and understanding of readers' (Rappert *et al.* 2011). Ignorance about certain things may be fostered in order to strengthen recognition on the part of recipients, and audiences may well be privy to a form of 'meta-ignorance' in knowing the extent of what they do not know (Rappert *et al.* 2011). Simply put, Rappert *et al.* suggest treating omission as a way to shape understanding.

Tools for investigating market research as the shaping of non-knowledge

This article relates the study of market researchers to scholarship on the making of marketing knowledge, spatial metaphors of knowledge making, and study of how knowledge is intimately connected with non-knowledge through omission. Previous research suggests attention to how knowledge is shaped, partially through spatial notions and models. It also urges further research into how this spatiality relates to knowledge and the unknown. Market researchers may be aware of details that may best be omitted in order to decrease uncertainty on the part of clients and make sure that clients are down in the 'trough' of low uncertainty (MacKenzie 1990). Indeed, a feeling of certainty of information may foster better propensity for decision making (Ruiz and Holmlund 2017, Nilsson 2019). The spatial relation that is treated as a constant by Collins (1997) and MacKenzie (1990) may well be explored as more dynamic. Attention to distances of social relations and knowledge as intertwined offers an alternative to ideas of knowledge gaps as merely overcome in the making and exchange of market knowledge. Over the following sections, I inquire into how epistemic distances are managed by inducing non-knowledge about certain parts of knowledge making.

Methodological approach

This exploration of practices to limit knowledge in the production of market research is based on six months' of ethnographic fieldwork at the Swedish firm Norna (pseudonym). This market-leading firm has a long history and wide national recognition. Currently it is part of a larger international marketing group with sister research companies across the world. I followed the work of one particular Norna department – *Consumption and Technology* (C&T), which employs roughly 20 staff. C&T does quantitative and qualitative research for commissioning clients in consumer services and products, including banking, IT and fast-moving consumer goods. Divided into three primary professional categories (project managers, account managers and experts in qualitative methods) the C&T employees are typically university educated professionals, often with a business or psychology profile. I have assigned aliases to my interlocutors according to role: account managers have names starting with an A, project managers' names start with a P and experts in qualitative methods have aliases beginning with an E.

In order to get a full picture of the work process at C&T I took part as much as I could in the ongoing market research projects during my time at Norna. I collected material from eight projects, including active participation in research and analysis of online focus groups on active-wear and interviews on consumer banking, as well as helping out in drink taste testing. I also collected work documents and did follow-up interviews with the researchers involved in online consumer survey projects and audience testing of TV programming. Notes from work meetings, analysis of research situations (and their results), documents and presentations were then assessed together with interviews conducted with all employees in the department. In total, I undertook 28 semi-structured interviews that were recorded and subsequently transcribed. Research materials featured initial analysis in the structuring of field notes, collected documents and transcripts. The notes were subsequently coded thematically (Saldana 2012) using NVivo software. Initially, I coded for content in terms of situations, activities, actors and topics. Recurring rounds of coding further identified analytical themes – especially those relating to work processes, ideas about knowledge and clients (cf. Nilsson 2019, 2018a).

I mostly had access to parts of the work process as it is described by Norna manuals and presentations. I was unable to attend sales meetings, or presentations with the client; but I sat in on initial client meetings, interactions with respondents and client representatives, analysis meetings, preparation meetings ahead of client presentations and decompression meetings after the presentations. This restriction on the scope of the material is not merely a limitation, but a condition which calls for questioning what comes to be considered research and what comes to be excluded.

The ethnographic section of this article will follow the steps of Norna's stated progression in a project. It is through these steps that my interlocutors organise knowledge production (cf. Helgesson *et al.* 2016). It is also the way in which knowledge making and its transfer is communicated with clients (cf. Bjerrisgaard and Kjeldgaard 2013). As such, they offer a concise overview of work processes. Norna's own models highlight methodological research stages rather than activities to anticipate and persuade clients. The following sections will discuss these activities, while also paying attention to acts of limiting what research respondents and receiving clients know. In doing so, I seek to engage with, rather than reproduce (Pollock and Williams 2016), the epistemics into which I inquire (Nilsson and Helgesson 2015). I use vignettes and examples from a couple of projects, and interview situations to make a form of bricolage (Lévi-Strauss 1966) of what it means to make knowledge in this setting. Presenting a number of different project situations according to this narrative helps to focus on how my interlocutors express, and perform, knowledge as well as non-knowledge, on the part of themselves, respondents and clients. After describing the project processes, I turn to how Norna researchers reflect on knowledge making and how it involves omitting information.

An account of market research projects at Norna

The market researchers at Norna have a straightforward solution to the conundrum of how knowledge is made. They have a model project process that is readily communicated in PowerPoint presentations, to both clients during the sales process and to new employees. According to the process, the work of completing a project (which tellingly omits the selling of the project in the first place) includes several steps in a linear progression. For the purpose of analysis, I have combined these steps into broader stages, reminiscent of how marketing textbooks tend to characterise market research processes (cf. Moisander and Valtonen 2006, Belk *et al*. 2012). These broader steps are also observed by the Norna project process in how the steps are colour-coded in five sequential colours.

(1) Preparation ('Preparation'; 'Start-up')
(2) Set-up ('Working out forms'; 'Scripting')
(3) Fieldwork ('Fieldwork start'; 'Supervise fieldwork'; 'Ordering figures and tables'; 'End of fieldwork')
(4) Sorting and analysis ('First draft of report'; 'Develop report draft'; 'Analysis'; 'Insights'; 'Preparations for presentation')
(5) Presenting ('Presentation'; 'Evaluation')

As shown by previous research into the making of marketing knowledge (e.g. Heiskanen 2005, Muniesa and Trébuchet-Breitwiller 2010, Nilsson and Helgesson 2015, Nilsson 2018a), routines and models for undertaking research shapes the knowledge that is produced by establishing what to look for, what to observe and how to analyse it. The stages of Norna's project process emphasise some parts of undertaking market research while excluding other well-recognised aspects. For example, neither discussions with the client meant to define the project (before as well as during a project), nor sales negotiations are included. Further, the uptake and wise decisions and actions on the part of the client that research purportedly informs are also left out. What the process provides is a model with a beginning, middle and end, where preparations are made and results are gathered, refined and presented in order to give answers to a question and thereby address a certain need for knowledge.

Stage 1: preparation

According to Norna's project process, the initial phase of a research project contains 'preparation' and 'start-up,' respectively. During these steps, the project undergoes initial planning. To a project manager who may not necessarily be involved in sales efforts or other client contacts preceding the research, it may be the first stage of the project.

As part of my fieldwork, I participated in a bank card project undertaken by several of Norna's branch offices in a number of European countries. Commissioned by a card company, the project dealt with the customers of a particular Nordic bank. A project member told me that the study was commissioned to strengthen the card company's ties with their banking client, possibly through documented joint research on the bank's customers. The planned study consisted of interviewing a number of premium segments of the bank's customers, to assess their preferences and habits when it comes to card payment. The set-up meeting with the client took place in the client's offices, with client representatives (an account manager, an insight manager and a representative from corporate headquarters), Eric (the expert in qualitative methods), representatives from the other Norna offices present on speaker phone, and me.

A manager from one of the Nordic sister branches of Norna began complaining about the overly long interview guide which had been agreed between the commissioning Norna office and the client. That issue had been recognised by the C&T team as well, but Eric chose to keep mum about it. As the complaining researcher kept raising the issue the client's insight manager appeared more and more flustered and finally blurted out that 'it's an interview guide, not a script!.' After the meeting Eric said that he was pleased that he was not the bearer of bad news; he would not have raised the guide, but he was happy it was brought to the table. While the issue was an uncomfortable one to bring up, there is some room for disregarding particular questions in a research project, as long as the client can be provided with adequate answers to them. In this manner, the list of questions is not necessarily seen as a script but a list of what type of answers the client should have answers for by the end of the project. The insight manager's comment further suggests that the relative open-endedness of the interview guide is a rather *well-known* secret (Barth 1990). For the sake of getting things done, the client representative wants to maintain the specified questions, but may tacitly accept that the actual interviewing may be undertaken in a more pragmatic manner.

Limitation of knowledge also happens in other parts of the research. Details that may be communicated only selectively to Norna's clients include the exact composition and capabilities of the project group. During a project on active-wear, account manager Alice had brought in other researchers as experts on a particular segmentation method involving projective interviewing. These researchers presented the merits of particular methods to be used in the study, but because of scheduling and specialised competence they were not always the people who would actually oversee the application of such methods. Instead, the projects could rely on colleagues who did not feature as part of the communicated project team. This situation, with certain researchers as spokespersons and others as executors, was not conveyed to the client during set-up or later on in the project. Such managing of information may be relatively pragmatic and business oriented: market researchers want to maintain a level of distance as part of client contact.

Stage 2: set-up

The set-up stage involves writing up detailed questions (when not already decided, as in the bank card project), deciding on stimuli for product tests, putting together screening forms for selecting respondents, etc. The overall study design tends to be decided on before the project is even formally started, as part of the sales negotiations between account managers and clients. However, many decisions about eventual execution of focus groups, interviews, or surveys, are made during set-up. The details of an interview guide or survey questionnaire, or the make-up of participants, affect the outcome of a project beyond the parameters of a client's interest and pre-set project goals.

The practice of leaving out the name of the client in respondent recruitment is a prime example of how information is limited during the set-up period. Although not necessarily the case – some qualitative market researchers discourage the practice of leaving out the name of the client (cf. Ladner 2014) – Norna recruiters often withheld such information. When I enquired about this, I was told that research participants have to be prevented from knowing who the client is in order to avoid bias. My interlocutors perceive that respondents risk failing to answer truthfully out of courtesy (cf. Gross and McGoey 2015).

In order to expedite a precise recruitment of participants while keeping the client secret, the recruiters at Norna have to ask relatively open questions in order not to give away too much about what they try to eliminate during recruitment screening. For instance, I had been introduced to a mixed qualitative/quantitative project for an insurance firm to help out in preparation for focus groups and the recruitment process was briefly explained during the meeting. Norna's recruitment department had assessed participants from their client's customer register, by asking a series of questions over the phone. Potential participants are screened by being asked questions with several alternatives where some lead to elimination, or are asked open questions where only certain answers allow for selection. The screener aims to eliminate participants with the wrong profile (in this case pensioners and young people), and sometimes people who overly dislike the client firm (recruiters ask about attitudes towards a long list of companies as to not give away the client). The recruitment and assessment of respondents for qualitative market research thus requires a certain degree of secrecy. To Norna researchers, failure to keep certain details from respondents runs the risk of ending up with biased respondents and results.

Besides recruiting respondents, an important part of setting up a project involves scripting interview guides or questionnaires. My interlocutors see potential drawbacks of specifying the contents of an interview guide too rigidly in negotiating with the client. I have been told that it is common on the client's part to want to maximise the number of questions. To do so may allow for pleasing numerous people within the client organisation as their particular questions have been included, or may be taken as a measure to cover all contingencies. However, this strategy causes concerns for the Norna researchers who see tendencies towards fatigue with respondents who are asked too many questions. Even worse, the risk of qualitative interviews or focus groups running so long that all questions cannot not be answered before the session ends may leave the researchers short on answers for their clients.

The issue of the over-elaborate interview guide may be mitigated in a few different ways – for instance, by prioritising so that at least the questions deemed centrally important by the researchers are asked early on in order to to avoid too much damage from time running out before all questions are discussed. Another tactic I observed is to use the discretion implied by the guide not being a script as previously suggested by the card company insight manager. This may not always be communicated to clients however, and during sessions with interview experts several of them readily acknowledged that there was more merit in a smoothly progressing interview where answers to all questions were arrived at than one where questions were posed verbatim. This possibility for leaving questions out creates room for qualitative researchers asking questions that they feel are better for producing answers to the questions put forward by the client. They sometimes do this without making evident the disconnection between clients' demand for particular questions and their demand for precise answers. Further, clients are not always kept in the loop about the extent to which researchers adjust the scripts. Maintaining this distance allows the researchers some flexibility, while adhering to the statures of the client's project specifications.

Stage 3: fieldwork

The formative results of market research are to be generated during fieldwork. During the fieldwork stage, the project manager oversees the compilation of data using methods such as quantitative surveys, focus groups, qualitative interviews, etc. Researchers may be in close contact with operatives within the firm who handle coding quantitative surveys, or they may directly interact with respondents through interviews and focus groups. Resulting materials (transcripts, data-sets, figures, etc.) are then to be processed to become informative in the later stages of analysis and reporting.

Contacts with clients in fieldwork sometimes pose challenges that lead to limiting of knowledge. During the active-wear project the client's involvement in research came to be discussed. The project used an online platform: a private forum with subsections and individual logins for respondents to participate in a sort of asynchronous focus group over the course of a few days. After a while I learned that not only the researchers and respondents had access to the platform but the client too. I asked Eric if this would pose problems with clients jumping to assumptions based on particular details. His reply was that knowledgeable clients could offer useful details but that less experienced clients could 'get lost in peripheral things' and that client representatives could request focus on 'some token detail of theirs.' Eric's account suggests how the making of knowledge about consumers may be both helped and impeded by what the client knows. Clients who have insight into the day-to-day progression of the online platform used in the project may offer the researchers helpful suggestions. They can also be a hindrance if they come to focus on details that are not useful in Norna's mission to inform them.

Just as in recruitment, the name of the commissioning client is often withheld during fieldwork. Either it is kept from respondents for part of the session in order to gauge respondents without risk of bias (cf. Muniesa and Trébuchet-Breitwiller 2010) or, alternatively, the client remains secret throughout the interview, survey or focus group. In the case of the active-wear project for instance, the first few steps of questions and answers were executed with respondents who were not informed about who the client was. (In the projects that I observed, the client would be kept secret for as long as was practically possible.) Expert in qualitative methods Edward expressed related concerns over bias among respondents, mentioning that they may become shy or deferent to each other based on details about work status, education, etc. For instance, the presence of a senior academic or medic was thought to be able to sway a group. According to Edward, this too prompted suppressing certain personal details about the respondents, for the sake of an 'equal discussion.' A certain degree of anonymity is regarded as conductive to producing unbiased results.

Stage 4: sorting and analysis

During sorting and analysis, the project outline designates tasks that involve organising and interpreting the materials that have been generated in the fieldwork stage. To a large extent, such treatment can be in the form of summarising quantitative results into graphs and figures, or sorting qualitative results from focus groups according to research goals. Interpretation plays a significant role, both in deciding what certain material indicates, but also in determining what is relevant for the client and what merely constitutes noise. The latter issue of mitigating noise is especially relevant for the compilation of materials into results, just as knowing the difference between signal and noise is a skill that Norna assumes in relation to their clients. Further, the decision of what is or is not noise depends on the goals of the study. In practice, such considerations also help sorting through what is worth communicating for the next presentation stage.

Eric tells me that separating 'findings' from 'noise' is an acquired skill. According to my interlocutors, the client who lacks the same know-how, is therefore best kept from certain findings as they lack the tools to discount irrelevant information. He explains this during an interview where he talks about the qualitative audience testing projects that he often undertakes:

> Say that we're doing testing of a TV-series and a lot of comments about it being boring emerges. If you haven't worked in this line of business you may think *that* is the core finding. But if the brief is about how to communicate it […] I think that should be the goal, even if there is a lot of noise in the group about not liking it. (Excerpt from interview, emphasis in transcript. Author's translation.)

Here Eric argues for the epistemic merit of keeping his clients in the dark about comments that he recognises to be 'noise' – materials not worth dealing with (cf. Lakoff 2002). Not mentioning this is considered part of the value added for the client. Curiously, sustaining ignorance is seen as providing value in a knowledge making process.

Stage 5: presentation

The last stage involves compiling and presenting materials as results to the client. Presentations are typically realised by both a live talk, supported by a PowerPoint presentation, as well as a report (a more elaborate version of the same PowerPoint document). Although Norna documents tend to describe this stage as the transfer of what was decided in the previous analysis stage, considerations over what to omit are important in realising a sufficiently informed recipient here as well.

During the active-wear project's last meeting where the team as a whole met up, discussion took place on how to plan for and finish compiling the presentation. After getting a report on how the online focus groups had been running, and hearing that they had produced very interesting and plentiful answers, the discussion turned to who on the team will present what. As the presentation was not yet finished, there was also some discussion as to who would finish the slides. Further, Alice who manages the client account called for as full attendance as possible from the project members.

She was concerned that there would be a large group of client representatives and Norna 'needs to be able to match that.' Eric, the researcher who was undertaking the online focus group would also be responsible for handling the presentation of those results, despite his qualms about lack of understanding of the analytical model that has been used in designing the study. Further, it was important that Aida, the researcher who was first presented as adept at needs segmentation in sales meetings was going to present the segmentation model, instead of the specialist at Norna who had done the analysis. Researchers were tasked with presenting the expertise on which merit the project was sold, even if it involved some degree of obfuscation over who did what in the project.

Discussion in the active-wear meeting progressed to what the quantitative surveys, undertaken in multiple European countries, had yielded and how the reporting of these results could be balanced against the qualitative materials during the presentation. Alice, the account manager, stressed that it was important that the needs segmentation model that would be used at a later project with the client received enough attention. This is because it was important to communicate the firmness of the model and how it was 'validated' by recurrent use in previous research projects in order to encourage the clients to go ahead with the next step: a new project using the full segmentation model.

Alice: 'Do we dare to show where [active-wear company] is on the [need segmentation] map? What do we dare say?'
Eric: 'Descriptions are partly overlapping to me as an outsider. I am afraid that it is not very clear to me.'
Alice: 'I don't want them to jump to conclusions from this material. There is a risk that they will then say "we know everything we need already".'
Pia: 'Can we not describe the category in light of the different categories?'
Alice: 'We have been using it as a projective exercise and it is an indicator. But with this small group we have found that the results are varying.'
Pia: 'It will differ in a quant too.'
Alice: 'But less so, and that discussion I want to avoid in the presentation […] We will come back to questions about it [need segmentation]; here it has been used as a method to get beyond the functional, to get to emotional associations. At that stage, we should not go too far into the model. Or [need segmentation] analysis, but more that it is broad strokes.' (Excerpt from fieldnotes. Author's translation)

Here, the discussion is going into not just how to present material for the benefit of making it as easy to absorb as possible; the strategies of client contact, maintaining charisma and securing further sales are also clear. Alice wants her team to present a unified front, with designated front-stage and back-stage in the process (Goffman 1974). There is also discussion on what information to skip in order to avoid the client going off on a tangent. Thus, a more epistemically oriented strategizing goes on at the same time.

Understanding non-knowledge in market research

Norna's market research practices are not only executing a plan to gather data and analysing it in a manner which produces information that is presented to clients. Rather, each stage of the process features work that limits what involved clients and/or respondents learn (see Table 1). Table 1 summarises the examples of limiting information given in the outline of Norna's research process. In an effort to be symmetrical with knowledge and how it is meant to be provided by researchers, this table also specifies who are made the recipients of non-knowledge in each stage: keeping others from knowing certain things helps the successful formation and dissemination of useful knowledge.

Studying the stages of Norna's market research projects, while considering how this process involves shaping the non-knowledge of involved parties, shows market research featuring several forms of omitting or withholding information. Although research builds on practices of finding out, organising and explaining it also involves secrecy and engineered ignorance. Further, my interlocutors at Norna interpret their work in ways that suggest a one-way process of meeting what is not known with new knowledge (e.g. the Norna project process). However, this does not convey all the detail of undertaking research, nor all the considerations of Norna researchers. In order to continue this inquiry, my interlocutors' understandings of how to limit knowledge to make knowledge will be

Table 1. Stages of the Norna work process, with practices of limiting knowledge on the part of actors.

Stage of research process	Summary of observed practices of limiting knowledge	Recipient of non-knowledge
Preparation	Using licence in describing exactly what questions will be asked; who will do what	Client
Set-up	Keeping the client secret	Respondent
	Handling clients' wishes to specify study details	Client
Fieldwork	Managing what conclusions clients draw from their observation of study situations	Client
	Keeping respondents from learning too much about study details; purpose of research; nature of client	Respondent
Sorting and analysis	Leaving out detail deemed irrelevant to client	Client
Presentation	Avoiding details not conductive to understanding	Client
	Maintaining the room for further study, rather than contentment with what is gained	Client

Source: Author's work.

assessed drawing on two things: first, the framing of secrets and the distribution aspect of non-knowledge; second, ignorance as a way for making certain understandings possible.

'Very disadvantageous to us in that it becomes transparent'

One way of dealing with the limitation of information flow at Norna is to take note of those anthropological approaches that point to the distribution of knowledge as a social tool that constitutes people into particular relationships. Such a tactic looks to how unequal distribution of information also distributes influence and power. It helps to explain Norna researchers' handling of information and secrecy as social action that limits information of ongoing research, in order to preserve a position of interpretive authority. Researchers seek to be intermediaries between clients and the market phenomena that they study (cf. Nilsson and Helgesson 2015).

A telling example of how knowledge and non-knowledge may be understood as distributed for the sake of social manoeuvring lies in the use of the term 'transparency' at Norna. Indeed, just as transparency has been derided as a problematic buzzword by social scientists (e.g. Strathern 2000), C&T researchers also regard the term as detrimental – albeit for different reasons. For example, Aaron, an account manager with a background in advertising, used 'transparent' when outlining the precariousness of a tight pricing model (cf. Hagberg and Kjellberg 2015), where too much knowledge gets in the way:

> If you don't become consultative yourself, then the client will point at you and ask 'this is what we want, and you cost more than fifteen competitors. Why are you so expensive?' […] It becomes difficult to charge. It makes for a very transparent price setting: How many hours, how many programmers' hours, how many minutes. What's the cost-per-minute? It is a pricing model which is very disadvantageous to us in that it becomes transparent and prices may be kept down. (Excerpt from interview. Author's translation)

In this case, transparency is framed as a problem as it allows clients to demand lower prices. When clients can connect the price Norna quotes for their services and the time it takes them to do it, it becomes harder to maintain profitability. While disadvantageous price setting is described as the problem of information here (Hagberg and Kjellberg 2015), it is mitigated by maintaining a higher-grade, more consultative relationship between researcher and client.

Cases where transparency is considered detrimental by enabling price pressure on the part of clients tie once again into the notion of distributing power relations through information. Knowledge might not equate to power, but its distribution is considered a factor in negotiations. Norna researchers care about limiting information to maintain room to move 'behind the scenes' (Goffman 1974), but also appear to be involved in making knowledge useful as much as making sure that useful knowledge is made. This brings the inquiry to consider how knowledge (and its limits) adds to cohesive understandings.

'At times, there has been a little too much focus on what goes on'

My interlocutors at Norna see aspects of omitting information in relation to concerns over maintaining the space for manoeuvring during the research projects, particularly with regard to freedom to design and interpret studies conducted. In such cases, the freedom to manoeuvre has to do not only with giving room to do business. Rather, the limitation of what clients know is also epistemically motivated. Alice, who specialises in consumer research, expresses this ambivalent attitude to the withholding of information in discussing 'black-box' phenomena:

> But I do remember that we spoke about … kind of … that one may think of qualitative methods a little bit like a black box. Once you had a project you went into your black box and then the client didn't understand what you were up to and then you come back. And the client doesn't know what has transpired. And it felt like the business said 'now we've to open the black box'. This is way back – er … getting the client to understand and like participate … and you know really understand what goes on in there. And that's all good and well. I on the other hand, I can feel that I would like to shut our research away again [laughs]. You don't have to mind what happens in here or which tools or methods we use, because here are questions and here knowledge comes out. Sometimes – at times there has been a little too much focus on what goes on in […] the box. (Excerpt from interview. Author's translation)

In Alice's example, transparency as a negative is paired with another unusually loaded term: the 'black box.' Common in STS literature and other social science, the black box tends to denote something that is kept from scrutiny, to be taken 'as is' (cf. Latour 1987). In the case of the account manager at Norna, black-boxing is seen as useful for the researchers and even beneficial for the client as it allows researchers to do their job more freely, purportedly producing more useful results. The working of Norna's branded methods products are less available to clients than custom solutions where the details have been reached through negotiation. Discussing this with Alex, he notes: 'But then there are people who hate the part that is any kind of black box. And then you have to do something tailor made. And in those cases the really sharp analyses, they don't really happen then.'

In response to my interest in client reports, Eric debriefed me after some of his client presentations. These conversations made room to ask about choice of what to communicate and what to leave out. It is important, he claims, to remove unnecessary details to ensure that clients do not get lost in the detail. After the active-wear company presentation, Eric came by to let me know that it went very well. First of all, he said:

> It was good that we were prepared with a very simple pedagogic presentation. Also, since Pia went before me it gave me some time to remove a few slides that they would have jumped to conclusions from. (Excerpt from interview. Author's translation)

I suggested that it must have felt good to be able to work this out in a clear way, and he told me that

> Yes, sometimes you have to be assertive, really drive the agenda, not wait for them to let you switch slides […] It is easy to give people too many details to get lost in. Better to remove information so that they can focus on the important findings.

The debriefing also allowed me to ask further about leaving things out of presentations:

Nilsson:	[Y]ou said that you had been able to remove some stuff. Live, kind of. That you were able to hide some slides and stuff.
Eric:	Yes, exactly
Nilsson:	How did you figure? What did you remove?
Eric:	I thought like this: as there were a lot of … questions about details, like the first questions put to Pia were like 'is that really the right exchange rate between Swedish Krona and Euro?' And that was a meeting with executives present, and like important things were going on, so it felt like 'ok, here it's about being able to defend what you talk about, so maybe not to say too much about stuff that will give rise to questions that are not central', So, I removed this … I had made this qualitative categorisation between protecting oneself against the external so to speak. Protecting your body, and on the other side a dimension about … multi-usage of garments, and specific garments for specific

tasks. I thought it was ok when I made it, but in the light of what was there and how easy it was to provoke questions and 'could it be like this or like that' I decided that 'no, I'll omit that'.

Nilsson: Sure

Eric: And then I ran through these need segmentation-inspired slides […] really quickly – so – not even elaborating on these that were more 'it could be like this, or like that'. And that was also because there were many of them, with a lot of words, and I felt like I was in the same boat as Pia [who had just previously had a difficult time explaining the quantitative survey] where I felt I had results that I could not explain if they put forward questions on it, like. (Excerpt from interview. Author's translation)

Eric put a lot of emphasis on some more conceptual slides on the dichotomy between sports and leisure wear, which worked well with the client representatives. This offers alternative ways to understand what goes on beyond just keeping things from clients to assert that they are convinced. It also seems to be about making sure that clients understand materials in the way that the researchers intend. Both readings of the use of ignorance suggest that there is epistemic merit at play.

Discussion

This inquiry has identified different practices and understandings of making non-knowledge. As shown throughout the work process at Norna, several different practices appear to limit what clients and respondents know in order to produce research material. As shown in researchers' explanations, metaphors such as transparency and black-boxing indicate work to mitigate the spread of information. These manoeuvres constitute actors and their relations in order to produce compelling knowledge and relationships. In the case of seeing secrecy at work, Norna's researchers' reluctance to part with client information, or presenting already familiar faces as experts, manages social relationships with respondents and clients, respectively. The same is true in the active-wear project where researchers present a select amount of results from segmentation techniques to receiving clients. Such a strategy aims to entice clients to purchase a further study. The theme of epistemic cohesiveness becomes relevant when looking at further aspects, such as how Norna researchers consider transparency as a problem beyond the politics of price setting and wish for more daring solutions than those with which the client is already familiar.

The penchant for black-boxing at Norna furthers the tendency of obscuring that which risks being plain in order to bring clarity: keeping clients from too many details may be deemed necessary to ensure that they receive results in a manner which reduces noise, and allows clients to appreciate the relevant 'signals' (Lakoff 2002) of the market (c.f. Nilsson 2018a). When MacKenzie (1990) and Collins (1997) discuss the role of distance in understanding knowledge, they outline it in terms of remoteness from an imagined centre: the site where knowledge is being made. Distance and proximity in relation to this site is thought to impact how an actor understands or trusts scientific knowledge. The findings from this inquiry into market research suggest a situation where distance is not a given, but subject to active manipulation. At Norna the researchers strive to affect epistemic distance through managing what clients learn. Thinking with MacKenzie's (1990) observation of the certainty trough, it appears especially important to manage the client's stay within the confines of certainty: too much or too little information will lead to misunderstandings, senseless ignorance or awareness that feeds clients' uncertainty. Well-catered managing of knowledge and the limitation of insight that leads to doubt or misunderstanding puts the client in a sort of epistemic sweet spot.

Further, maintaining distance appears a concern in how respondents' knowledge risks becoming spurious in the eyes of my interlocutors. In respondents, the intimacy of getting to know too much about clients or each other threatens the integrity of research. Reasons for limiting information on the part of respondents appear to veer close to those in experimental social sciences (Ladner 2014). Market research respondents are thought to become less reliable if knowledgeable about who is the recipient of study results. By not knowing who the client is, respondents are unable to skew their answers in a manner they think pleases the client. Lack of knowledge is thus thought to allow for

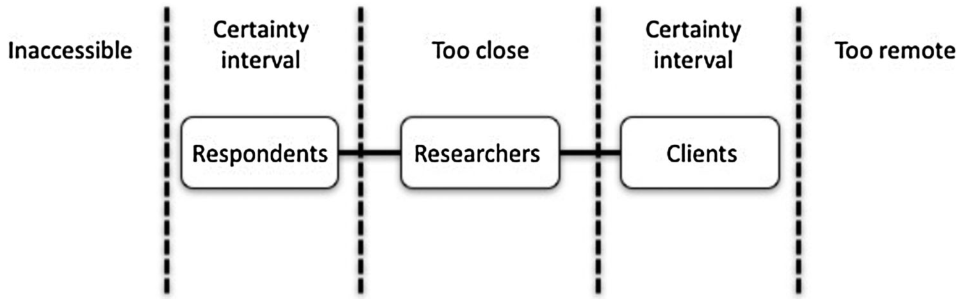

Figure 1. Relationship between researchers and actors across epistemic distance. Source: Author's work

the true attitudes of consumers and customers to be gleaned. At times, this demand for unspoilt respondents proves impractical, as respondents must sometimes be vetted to establish that they have appropriate experience of a given range of product or services, or in situations when focus group participants are to give their opinion about a client brand or company's services. However, this engineered non-knowledge aims to keep respondents at arm's length from mechanisms they may upset, while in appropriate proximity to be assessed.

Attention to manoeuvring vis-à-vis clients and respondents suggests another aspect of how market researchers attempt to manage the epistemic distance between respondents, clients and themselves. Market researchers are involved in handling and manipulating distances in order to maintain an intermediary position for themselves. This position features the role of expertise (Collins 1997), as well as privileged access to both respondents and clients (cf. Barth 1990). The role of the market researcher is to assess and analyse respondents on behalf of clients who are to be informed and ultimately helped by the results that researchers produce. Clients' direct involvement in situations such as focus groups or encounters with respondents is thought to risk misunderstandings and may challenge the position of the market researcher as an authority on what is going on. Similarly, direct involvement of clients may lead to exposure to the respondents.

In order to show how market researchers are involved with managing their relationships through epistemic distance, their work can be illustrated as a relationship between actors (see Figure 1). Researchers maintain ties with both respondents and clients. In both cases, these connections are maintained not just through tightening relations. Rather, the researchers maintain a particular epistemic distance. Respondents are to be close enough to be assessed, but not close enough to get too familiar. The clients are to be kept in the right *certainty interval* where they are informed enough to feel confident in results, but not so close that they get overexposed to details. Further, market researchers maintain their middleman position by adjusting relations in a manner that does not put clients and respondents in direct proximity to each other. My interlocutors' clients are both given details and kept ignorant as a way to foster understanding, need and trust in the services of researchers. Respondents on the other hand are often kept from the nature of clients in order to mitigate their perceived tendency to say what they think their audience wants to hear.

If making knowledge relies on making certain non-knowledge with certain actors at Norna, this is relevant in light of the linear process descriptions espoused, both within the particular firm and in the market research business more generally. Instead, certain forms of ignorance are maintained and devised for the successful move from setting up and studying people to the eventual presentation and information of clients.

Conclusion

The Norna case suggests how the managing of distances and maintaining relationships go together in undertaking a market research project. In general terms, the case features strategies to shape connections in two related modes: one is to make sure that market researchers are intermediaries – a necessary interpreting and executing agent in between the clients and the respondents. The other is keeping both groups ignorant about certain things in order to make knowledge possible. Collins's note that distance brings enchantment (Collins 1997) is telling for the closing of knowledge gaps in market research. Such distance is neither given, nor static. Rather they are subject to manipulation by market researchers who want to do compelling research.

This inquiry suggests treating market research as an endeavour that encompasses both knowledge production and marketing practice. Rather than assuming the separation between client relations from research concerns, between the market and the social or cultural or the banishments of ignorance through facts, this article has discussed how market researchers address clients' needs by shaping epistemic distance. In this, a different kind of spatiality is suggested. Research may tie worlds and people together, but it is not only a matter of closing gaps; it is also work that relies on sustaining certain distances and blind-spots.

Doing market research relies not only on improving on knowledge but also on limiting information in order to bolster respondent relationships, client reception and trust. Maintaining non-knowledge is not only part of the strategic play for client relationships and sales but also plays a part in epistemic practice. This dual nature of doing market research speaks to the tensions between the product of market research being a good that is to be bought and sold efficiently and knowledge that is meant to see use. Studies of research respondents or how clients receive market research reports, can provide perspective to what it means to address separation and the unknown by removal and omission. Further research into ideas and practices of producing market knowledge may provide greater detail into how social and knowledge concerns intermingle through the shaping of epistemic distance.

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Notes on contributor

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Nine Lives of Neoliberalism

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BOOK REVIEWS

Nine Lives of Neoliberalism, edited by Dieter Plehwe, Quinn Slobodian, and Philip Mirowski, London and New York, Verso, 2020, 368 pp., £25.00 (paperback), ISBN 1788732537

'A cat has nine lives,' a popular proverb goes. 'For three he plays, for three he strays, and for the last three he stays.' Rather than providing yet another account of what neoliberalism 'is,' three eminent scholars of the intellectual history of neoliberal thought – Dieter Plehwe, Quinn Slobodian, and Philip Mirowski – mobilize the 'Nine Lives' metaphor as a cultural heuristic through which they try to make sense of why neoliberalism survives one crisis after another.

There are at least three, oftentimes overlapping, ways in which we can study neoliberalism: by tracing its intellectual history and the formation of its ideas, by conceiving it as an epistemological program, or by studying it as a product of the structural contradictions of globalized capitalism. In trying to make sense of neoliberalism's longevity, Plehwe, Slobodian, and Mirowski opt for the first approach, which allows for conclusions regarding the second. And they have 'no quarrel with' the third way, as they do not 'insist dogmatically on the primacy of ideas' and consider Marxian approaches 'essential for making sense of the present'(p. 2).

What the 'Nine Lives' metaphor adds to these approaches analytically is 'an irruption of one context upon another' (Bontekoe 1987, p. 211), because, as anthropologist Begoña Aretxaga (2005) tells us, metaphors are not simply representations detached from social reality. Rather, they 'do' things: they display and disguise significations, and engender and enact political affectivities. For the editors, the 'Nine Lives' metaphor signifies the ways in which a 'body of thought and set of practices,' has proven 'agile and acrobatic, prone to escaping alive from even the most treacherous predicaments' (p. 2). Here, neoliberalism is 'less a policy orthodoxy than a consistent approach to policy problems' with the ultimate aim of 'safeguarding what neoliberals call a competitive order and exposing humanity ever more to the price mechanism' (p. 6). Garrett Hardin's (1974) or Friedrich von Hayek's (1992) Darwinian-utilitarian theorizations on the calculus of human lives, amongst others, have shown that 'many neoliberals are more than willing to find a middle ground between their own principles and those of an exclusionary culturalist, and even racist, right' (p. 7).

And herein lies the book's central claim: neoliberalism has been able to survive precisely because of its malleability, not least due to how it, almost parasitically, encroaches upon competing worldviews. The book's object, therefore, is to make these entanglements visible, by observing the historical development and progression of neoliberal ideas, while also 'tracking the linkages of elements of those worldviews to competing ideologies, or the mixed morphologies of both conservative-neoliberal and progressive-neoliberal perspectives' (p. 11). In order to do so, *Nine Lives* is organized in four parts and explores the conflictual formation of neoliberal ideas in their respective *zeitgeist*, theorizations on individual and collective forms of subjectivity, the popularization efforts of neoliberal politics, and the translation of ideas into policy practice via personal, academic, and think tank networks through the eyes of lesser known neoliberal figures, such as Fritz Machlup, Herbert Giersch, and Günter Schmölders.

Part One of the book is concerned with the epistemological groundings of central neoliberal ideas. Martin Beddeleem traces the epistemological reconfiguration of (neo-)liberal thought in 1930s Vienna in light of the increasing popularity of scientific reasoning, state planning, and the rise of socialist ideas. Drawing on the debates between early thinkers such as Karl Popper, Michael Polanyi, and Ludwig von Mises, Martin Beddeleem delineates the construction of a scientifically grounded neoliberal epistemology that sought to further the ideological project of neoliberalism. The strength of Martin Beddeleem analysis lies in shedding light on the contradictions of this project: on the one hand, neoliberalism is a strictly scientific program of knowledge construction that mobilizes the doxa of the superiority of the market. On the other hand, there is a somewhat anti-democratic ideological goal of controlling, diffusing, and implementing this knowledge. Martin Beddeleem elucidates the ambiguities of trying to bridge these efforts.

Edward Nik-Khah too engages with neoliberal approaches to knowledge construction, by following the views of Chicago economist George Stigler on the university and 'whether and under what circumstances the university upheld the epistemic virtues of the marketplace' (p. 48). How could the market, an 'information processor more powerful than any human brain' (Mirowski 2014, p. 54), give rise to intellectual positions that are hostile to its very existence? Nik-Khah shows how Stigler's initial position against the student-as-customer changed as he grew increasingly suspicious of the knowledge of the public, not least because of his growing disdain of the 1960s student movement. In following Stigler, Nik-Khah allows us to make sense of the early days of the 'neoliberal university' and the commercialization of science (e.g. via private donors).

Quinn Slobodian illuminates neoliberal positions on intellectual property rights, which historically were far from consensual. Can ideas be treated as property? While Chicago School thinkers like Stigler were key in elevating today's intellectual property regime to the level of status quo, libertarian and Austrian neoliberals – such as Fritz Machlup – were, at times, radically critical of them. Slobodian shows that those neoliberal ideas about intellectual property most compatible with corporate interests have translated into law, tacitly fusing the history of ideas with the distributive power of the capitalist class.

Part Two delves into modes of subjectivity in neoliberal thought. Melinda Cooper's insightful take on neoliberal positions on family and kinship shows how neoliberal thinkers did not promote, as one would assume, the freedom to (individualizing) lifestyle choices. Rather, neoliberals revived poor law traditions and mobilized conservative morality conceptions about the economic function of the family, so as to offload state responsibilities of basic welfare provision onto the family unit. Indeed, as Jessica Whyte has recently argued, 'social conservatism, including explicit appeals to family values, Christianity and "Western civilisation," was foundational to the consolidation of organised neoliberalism in the mid twentieth century' (Whyte 2019, p. 9). Cooper's contribution sheds light on the instrumental rationality of these developments, while simultaneously indicating the erosion of (state-organized) solidarity in the name of (Christian) morality.

Dieter Plehwe brings us to the heroic figure of neoliberal pop culture – the entrepreneur. His contribution critiques the tendencies of business gurus and critics of neoliberalism alike of essentializing the entrepreneur to its Schumpeterian conception. By dissecting the entrepreneurship theorizations by Giersch, Schmölders, Mises, and Kirzner, Plehwe shows how in fact discourses shifted between 1950 and 1980 from a naturalized and idealized entrepreneur, to one that is politically contingent, and that reacts to market opportunities. This conceptual shift allowed for critiquing state policies, as now entrepreneurship opportunities became a question of (overcoming) structural constraints. The strength of Plehwe's analysis lies not least in laying bare the think tank-funded double effort of furthering entrepreneurship as an object of empirical analysis, as well as a heroized subject position.

Rüdiger Graf draws attention to the ambiguous relationship between neoliberal thought and behavioral economics by shedding light on the often-overlooked taxation economist and former president of the Mont Pelerin Society (MPS), Günter Schmölders. A former member of the NSDAP and the SS in Nazi Germany, Schmölders praised the potentialities of authoritarian regimes for offering 'greater opportunities for technocracy' (p. 149) than democracies. Graf convincingly illustrates how behavioral economics can serve both the extension of state regulation, as well as de-regulation. In so doing, he hints at the ways in which neoliberals have flirted with authoritarianism historically, despite their liberal proclamations.

Part Three of the book pays attention to the transnational elite networks of neoliberals. Hagen Schulz-Forberg takes us to the early discussions among neoliberals before and after the 1938 Walter

Lippmann Colloquium. He sheds light on their discourses about 'good society,' the necessity of bridging Christianity and liberalism, and the kinds of values a new liberal order ought to represent. Central to Schulz-Forberg's analysis are discussions amongst such neoliberal luminaries as Hayek, Marjolin, and Baudin regarding the role of freedom as either a means of achieving human dignity, or an end in and of itself. Far from today's often utilitarian precepts of neoliberalism, which seem to 'eliminate the very category of value in the ethical sense' (Fisher 2009, p. 17), Schulz-Forberg explicates historical neoliberal presuppositions regarding moral authority. In connecting these discussions to the elite networks of neoliberal figures at the time – from the MPS to the League of Nations – Schulz-Forberg illustrates how 'they can be thought of as normative actors fully aware of their very norm making' (p. 194).

Matthias Schmelzer investigates the disputes among neoliberals in the 1950s and 1960s about a monetary order post Bretton Woods. For neoliberals such as Hayek and Friedman, free capital movement was essential for a new order, as direct controls to monetary exchange were seen as 'the most effective way to convert a market economy into an authoritarian economic society' (Friedman 2002, p. 57), revealing much about neoliberal notions of freedom. While in the 1947 founding MPS conference almost all participants argued for the reintroduction of the gold standard, neoliberals' mistrust of governments to stick to the rules, as well as rising inflation in West Germany and the US at the time, led to the increasing support for floating exchange rates. In tracing the formation of this changing position, Schmelzer highlights that neoliberalism is in a 'constant process of becoming' (p. 213), transforming according to shifting conditions. This way, he lays bare the concerted effort of a transnational network of neoliberal figures to first define, and then 'popularize their vision for taming democracy and liberalizing capital' (p. 217).

Philip Mirowski's contribution on the often mistakenly called 'Nobel Prize in Economics' also elaborates on the strategic efforts of normalizing and popularizing neoliberal positions via the cultural capital of institutions. In this case, he traces the equally contingent, concerted, and, at times, dubious efforts of the Swedish Riksbank in the 1960s to introduce what Mirowski eloquently refers to as an *Ersatz* Nobel Prize. The invention of this award ultimately supported the elevation of the previously marginal discipline of (orthodox) economics to what is today generally considered a science proper. Mirowski shows how the prize not only gave credibility to many neoliberal thinkers, but also how it promoted their intellectual positions.

The *Part Four* of *Nine Lives* investigates the influence and expansion of neoliberal ideas through the invention of think tanks and what may be called the 'academization' of the knowledge they produced. Marie Laure Djelic and Reza Mousavi trace how the Atlas Network went global, in order to develop their important claim that 'not all ideas that circulate become performative – only those that are framed, carried, adopted, appropriated, enacted, and institutionalized successfully' (p. 257). The authors show how the relationships between influential figures such as Antony Fisher and later on Alejandro Chafuen on the one hand, and considerable funding possibilities on the other, furthered the development of a globalized think tank network that strategically influenced public opinion in countries of the Global North and South alike, so as to then persuade legislators to favor neoliberal positions.

Alas, Stephan Pühringer final chapter of the volume certainly is the odd one out, methodologically speaking. In developing what he calls a 'performative footprint,' Pühringer seeks to quantify the 'potential impact of' over 800 economists at German universities 'on politics and society' between 1954 and 1994 (p. 290). Perhaps unsurprisingly, Pühringer's data brings the dominance of neoliberal figures in German academia and think tank networks to the fore, which simultaneously are more likely to have a higher media presence and key positions in policy advising.

Overall, *Nine Lives* provides a telling and accessible history of the formation of key neoliberal (policy) positions and, therefore, of how neoliberals mobilized the market discursively as a seemingly impartial communication mechanism so as to not merely produce knowledge, but rather to produce the ideological precepts of the 'right' kind of knowledge. At the same time, by pointing to the intellectual struggles among neoliberals, and situating them in historical context, the contributions of this volume are careful to point to the fact that neoliberalism is far from homogeneous and consensual – despite the fact that it managed to popularly position itself as such, even within the ranks of its critics. This volume therefore deserves to be read alongside other standard works of the intellectual history of neoliberalism, including Walpen's (2004) unfortunately not (yet?) translated *Die offenen Feinde und Ihre Gesellschaft*, Mirowski and Plehwe's *Road to Mont Pelerin* (2009), as well as Chernomas and Hudson's (2017) *The Profit Doctrine*, which all in their own way trace the intellectual history of neoliberal thought and its thinkers, so as to make sense of why certain ideas became accepted, while others were ignored.

By including understudied figures of neoliberal history, the empirical strength of 'Nine Lives' lies in adding to the corpus of either forgotten, or previously invisible, historical actor-network configurations. However, it would have been much welcome if the volume included marginalized neoliberals of the Global South, which continue to be understudied – although, to be fair, Djelic and Mousavi at least touch upon the topic from a think tank viewpoint.

If there is one critique to be made, it is about the relationship between neoliberalism and the ascendance of right-wing populism globally. There are some intriguing questions tacitly lurking in the volume regarding the peculiar relationship between the authority of neoliberal expertise and intellectual primacy on the one hand, and the assumed *Mündigkeit* (maturity) of individuals (in a Kantian sense) via freedom, on the other. This ambiguous relationship is touched upon in Beddeleem and Graf's chapters. But considering the importance the editors attribute to these 'mixed morphologies' (p. 11) in the introduction, there is surprisingly little that follows regarding the conditions of possibility for fusing neoliberal thought with anti-democratic, authoritarian, at times even racist, positions and state-institutional arrangements. This would have been possible in a conclusion chapter, which is, unfortunately, missing.

Nonetheless, *Nine Lives* convincingly elucidates why it is important to continue inquiry into the history of neoliberal ideas. From a pragmatist viewpoint, this is because revisiting observations about the past through the lenses of ever-changing presents allows us to re-signify historical configurations anew. In line with the metaphor, *Nine Lives* illuminates neoliberalism's three lives of playing, and its three lives of straying, so as to hopefully provide its readers with a hunch for how many more of its last three lives it's staying.

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Bubbles and Machines: Gender, Information and Financial Crises, by Micky Lee, London, University of Westminster Press, 2019, 164 pp., £18.99 (paperback), ISBN 978-1-912656-00-4 / Open Access (EPUB), ISBN 978-1-912656-02-8 / Open Access (Mobi), ISBN 978-1-912656-03-5 / Open Access (PDF), ISBN 978-1-912656-01-1

Human greed and irrationality have commonly been conceived as the ultimate cause of economic disasters, such as the global financial crisis in 2008, in a market economy that is presumably rational and stable. Setting out to reject the idea that economic crises are the result of a natural economic cycle or innate human flaws, Micky Lee's *Bubbles and Machines* provides a unique perspective for us to look at how economic crises, as well as the narratives surrounding them, are constituted discursively and materially. Specifically, it asks: what have gender and technology to do with economic crises that are deemed gender-neutral and immaterial? The book utilises the lens of materialist feminist theory to advance current communication and political economy perspectives on finance capital in two important ways (e.g. Karamessini 2014, Bhattacharya 2017), both empirical and theoretical. First, it demonstrates the way in which gender ideology is used to explain economic crises and, in turn, 'legitimise an unequal distribution of resources between women and men, and between developed and developing economies' (p. 2). Second, it seeks to find a common ground between critical political economy and Actor-Network Theory (ANT), as the latter has often been criticised as ahistorical and insensitive to the workings of the capitalist economy (e.g. Fine 2005, Garcan 2005). It does this by highlighting how economic crises, vis-à-vis the ways we understand them, are technologically embedded and made intelligible through media technologies such as the camera and computer screen (e.g. Knorr Cetina and Bruegger 2002, Knorr Cetina and Preda 2005).

The book's analysis begins with a discussion of Tulipomania during the Dutch Golden Age (Chapter 2), known as the 'First Financial Crisis,' through which Lee examines the various narratives of the myth that the tulip creates 'a hysteria in the market by making men mad' (p. 24), leading ultimately to an economic collapse in 1637. 'Tulipomania is both a reference and an explanation of subsequent financial crises' (p. 33); consequently, descriptions of madness, greed, or irrationality have assumed the authority to explain every contemporary crisis: 'dot-com bubbles, property bubbles, South Sea bubbles' (p. 36). Lee points out that Tulipomania exemplifies the mainstream and dominant reading of the economy that is both gendered and Orientalist: 'Not only does the Tulipomania discourse falsely link the feminine to the Orient to the irrational, it also devalues the feminine and the Orient by showing the superiority of the masculine and the West' (p. 30). Moreover, this discourse 'denies the role of history by disguising social relations in a specific spatio-temporal context as a timeless truth' (p. 31). The book further demonstrates that these sets of binary oppositions (masculine and feminine, the West and the East, the rational and the irrational) are very much relevant in the contemporary world as they still underlie economic discourses, across history and geographical locations.

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By analysing academic discourses and popular cultural texts such as chick lit (e.g. Sophie Kinsella's *Shopaholic* series), Chapter 3 seeks to unpack two distinctive constructions of female economic figures, in the non-West and the West: namely, the Poor Woman and the Shopaholic. Their co-existence in our contemporary imagination points to a spatiotemporal differentiation, which is required by 'a financialised global economy […] to sustain itself because productive capital searches for geographical areas with excessive cheap labour and raw resources, while finance capital searches for those with surplus money' (p. 56). This spatiotemporal differentiation is furthermore maintained by microcredit loans to poor women in the developing world and credit cards for Western middle-class women, making them subjects of new forms of representational governance. For example, while 'microcredit is seen as a means for the Poor Women to be modern' (p. 60), finance capital does not bridge the gap between developing and developed economies. By tracing how the Poor Women are constructed in academic discourses, Lee shows that the abstraction of third-world women and their economic practices is used to reproduce the very spatiotemporal differentiation (male) economists promise to dismantle, i.e. 'developing economies are asked to catch up with developed economies in the name of development' (p. 58). This, in turn, perpetuates the same Orientalist fantasy 'that developing economies are different from the developed ones, and that women are not like men' (p. 58).

Chapters 4 and 5 direct our attention to the production, distribution, and consumption of financial information, demonstrating how '[t]he co-existence of multiple technologies created markets in which different qualities of financial information circulated' (p. 105). For example, Chapter 4 traces how Wall Street, as a centre of global finance, was initially constituted by a network of human (the runners) and non-human actors (the ticker, the printer, the physicality of Wall Street). In this instance, Lee demonstrates that an ANT approach is useful as it shows how networks are always temporary and how the invention of new technologies always creates new spatialities and temporalities. Chapter 5 focuses on examining the qualitative properties of trading screens and computer screens in shaping the financial market and social relations surrounding it. In a critical analysis of three Hollywood films (Oliver Stone's *Wall Street* and *Wall Street: Money Never Sleeps*, Nicholas Jarecki's *Arbitrage*) and one independent documentary (James Allen Smith's *Floored*) about Wall Street, Lee reveals various implications for human morality, often manifested through gender relations, in the pre- and post-crisis eras. While '[i]n the pre-crisis era, computer screens were believed to reflect the financial markets—it was an honest man's tool to make a living' (p. 134), they themselves constitute the market in the post-crisis era, making it impossible to identify a human culprit.

Other than its truly original and insightful analysis of economic crises and their narrative structures across time and space, the book's other contributions lie in its critical review of various scholarly approaches to finance capital in the Introduction and the diverse and creatively curated popular texts examined throughout the discussion. *Bubbles and Machines* would be of interests to scholars working not only in ANT or Science and Technology Studies (STS) but also more broadly in the fields of communication and political economy as well as gender and screen studies.

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Metrics at Work: Journalism and the Contested Meaning of Algorithms, by Angèle Christin, Princeton, NJ, Princeton University Press, 2020, 272 pp., $29.95 (cloth), ISBN:9780691175232

Social scientists are increasingly recognising popular and non-expert understandings of what algorithms are and how they work as worthy of at least as much attention as what algorithms actually do. Recent lines of inquiry in this sense include studies of how transnational workers guess at the opaque processes of migrant-sorting interfaces whose inner workings they know they cannot know (Reeves 2016), of how job seekers doctor their CVs on the basis of what they imagine the screening algorithm picks up as a match (Gusterson 2019), and of how algorithms are reconstituting questions of what counts as good medical practice or optimal political engagement (Amoore 2020; see also Beer 2017, Besteman and Gusterson 2019, Lash 2007). To the extent that we can consider these works as a single, broad research agenda, it is one showing how semiotics, phenomenology, and affects shape and even define social relations (re)produced by these algorithms.

Direct inheritor and outstanding example of this research frontier, *Metrics at Work* examines how popular interpretations of algorithmic processes are producing wholly new political economies of work, expertise, and evaluative practices. The book is based on the ethnographic analysis of two independent web publications producing news during a decade defined by media centralisation and a mass turn to online production, distribution and consumption of information. *TheNotebook* in New York City and *LaPlace* in Paris followed strikingly similar paths, not least as the latter was created as a French version of the former. Both were founded by well-reputed print journalists eager to experiment, *TheNotebook* in the mid-1990s and *LaPlace* in the mid-2000s; both were acquired by corporations requesting they attune themselves to traffic maximisation, and both implemented the same or similar software to measure and track readership and circulation. This software produced for them what Christin refers to as 'algorithmic publics': numerical aggregates of readers and engagement as calculated by algorithms. Examining how journalists and editors at *TheNotebook* and *LaPlace* interpreted these algorithmic publics, Christin argues that the historical similarities and technological convergence between publications belie strikingly different ways of understanding algorithmic processes. These ways reflect, feed on, and (re)produce different kinds of expertise, trade ethics, labour hierarchies, and even the spatial and temporal organisation of business practices.

Bourdieu's field theory frames the analysis, cast as a face-to-face comparison throughout. The first of the book's six chapters roots competing understandings of journalism in the historical constitution of each field, examining how journalism changed over time both as a type of work and as a social relation to the public at large. The comparatively early professionalisation of journalism in the USA in the 1900s constituted the trade around a duty to report and inform the public. This duty required an aseptic distance from editorial and commercial concerns and fostered an

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Social scientists are increasingly recognising popular and non-expert understandings of what algorithms are and how they work as worthy of at least as much attention as what algorithms actually do. Recent lines of inquiry in this sense include studies of how transnational workers guess at the opaque processes of migrant-sorting interfaces whose inner workings they know they cannot know (Reeves 2016), of how job seekers doctor their CVs on the basis of what they imagine the screening algorithm picks up as a match (Gusterson 2019), and of how algorithms are reconstituting questions of what counts as good medical practice or optimal political engagement (Amoore 2020; see also Beer 2017, Besteman and Gusterson 2019, Lash 2007). To the extent that we can consider these works as a single, broad research agenda, it is one showing how semiotics, phenomenology, and affects shape and even define social relations (re)produced by these algorithms.

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Bourdieu's field theory frames the analysis, cast as a face-to-face comparison throughout. The first of the book's six chapters roots competing understandings of journalism in the historical constitution of each field, examining how journalism changed over time both as a type of work and as a social relation to the public at large. The comparatively early professionalisation of journalism in the USA in the 1900s constituted the trade around a duty to report and inform the public. This duty required an aseptic distance from editorial and commercial concerns and fostered an orientation towards peer recognition as marker of distinction. Meanwhile, the labor division in French society between writers, intellectuals, journalists, and editors was weaker or non-existent. Already by the 1890s, when the famous Dreyfus scandal broke out in France, a shared ethical duty to shape public debate often meant the concrete work practices of those professions overlapped beyond distinction, as exemplified by the figure of Emile Zola (p. 22). The professionalisation of the trade in the 1940s never displaced the moral imperative to persuade and guide the people, making for a relationship with the public understood in civic and more explicitly political terms. Against this background, chapter 2 traces the founding of both sites: *TheNotebook* as a casually elite magazine, employing top print journalists, open to comments but concerned about information standards and more intellectual arenas of cultural reproduction; and *LaPlace* as a counterculture project set up in a kitchen, concerned with enacting a flat hierarchy and creating a participatory platform with reader-generated content and intense interaction between information producers and consumers. Chapter 3 examines the development of what Christin calls the 'isomorphic convergence' (p. 69) between the publications and in the journalism industry at large. Both *TheNotebook* and *LaPlace* were eventually bought by (different) larger corporations in the late 2000s and again in the early 2010s; their buyers required they entered an industry-wide strategy of monetising clicks, maximising traffic and attuning their work to a more mercantile than qualitative bottom-line. As both publications sought to publish more, faster, and more often, this new ethos added to the more canonical, editorial mode of evaluating journalistic work than a click-based one.

The fourth chapter carries the weight of the book's main argument. *TheNotebook* and *LaPlace* deployed the same user-tracking algorithms to pin down and measure their publics. Journalists in the former still understood the quality of their pieces through peer approval, regardless of commercial success. Editors remained responsible for (re)titling pieces, shuffling them around pages, newsfeeds, and social media, and interpreting and tapping into a public measured in what they took to be an objective, abstract way. Meanwhile, *LaPlace*'s journalists saw in algorithmic measures of engagement a reflection of the quality of their work, sharing with editors the responsibility for visibilisation strategies and dividing up their public qualitatively, as a people that needed to be persuaded, educated, represented, and commodified. Chapter 5 traces how these different understandings of algorithmic publics shaped different kinds of power relations. *TheNotebook* worked through a bureaucratic, hierarchical, and centralised power, where editors deployed editorial or click-based evaluations in consistent patterns. Meanwhile, a disciplinary, horizontal and diffuse power at *LaPlace* meant these conflicting modes of evaluation were constantly renegotiated and combined. The last chapter examines how other algorithmic publics, particularly those generated on Twitter and Facebook, mediate the trade-off between exposure and paid work for journalists in both fields. A methodological/epistemological appendix reflects on doing fieldwork amongst journalists as well as positionality considerations and strategies to work through them.

The argument is convincing and develops organically, backed by an impressively interdisciplinary array of sources, spanning media and information studies, communication studies, anthropology, sociology, philosophy, and gender studies. One could argue that the author's framing of algorithmic publics and digital metrics as symbols is not the most obvious epistemological choice. Yet it works well, first, because of Christin's awareness that good semiotic analysis always hinges on tracing the tensions between irreducible, competing meanings – a sociopolitical density 'within the symbol.' Algorithmic publics as a term helps her pin down and characterise the fuzziness of these aggregates without explaining them away or dissolving in literalist technicalities that would miss the point. It also contributes to a certain purification - not of algorithmic publics themselves, which remain felicitously fuzzy, but of the nature of the relationship journalists and editors can have with these publics and amongst themselves. Labor relations, economic strategies, and reflections on expertise are here cast in a predominantly cultural grammar. This purification could niggle those on the more political edges of the culturalist spectrum, or those concerned with the politics of labor in an age of algorithms; yet the second reason the author's approach works is her constant analysis of economic, political, and industrial considerations framing specific meanings of algorithmic publics. Christin shows repeatedly how editors and journalists mobilise these publics to produce or legitimize labor management policies (pp. 95, 99–100, 121). This careful triangulation between algorithmic publics and a political economy 'outside the symbol' enriches the semiotic analysis as such and situates these publics, as symbols, in other-than-cultural conversations. In this sense this book is a great example of a simultaneous exploitation of the strengths of culturalist and political economy approaches in a theoretically consistent way.

This triangulation, accomplished through five chapters of cumulative argumentation around a granular, careful reading of quite particular kinds of professions, institutions, and jobs, travels less well into the last chapter and the conclusion. Here the author extends the analysis to algorithmic publics mediated by Twitter, Facebook, and other social media and, fleetingly, to the analytic craze in contemporary academia. Yet the logics of either scholarly citations or retweets, even at the intuitive level of non-expert user engagement, are different to each other and to those of institutionalised journalism in both cultural and political economy terms. The author realises this, and emphasises how these algorithmic publics mediate personal branding strategies and salary negotiations in new ways (pp. 140–149). But these very particularities draw attention to a need for a sturdier triangulation, like the one we have been offered so far, to stabilise the same symbol in this different context and put its fuzziness to work again.

Christin's argument remains persuasive, in any case, and *Metrics at Work* stands as an exciting and timely contribution to the pressing concern with what happens at the intersection between what algorithms do and how people understand, and act on, these doings – and imaginations thereof. The clean, efficient prose, the solid yet unobtrusive use of theory and the narration through ethnography make for a text relevant across the Humanities and social sciences, and highly accessible to the general public. It would also work well as a coursework choice from early undergraduate years onward.

Notes on contributor

Juan M. del Nido is a postdoctoral Fellow at the Max Planck Cambridge Centre for Ethics, Economy and Social Change, University of Cambridge, UK. His research focuses on political and economic reasoning; the logics, rhetoric, and affect of neoclassical economics; consumption, markets, and popular sovereignty; and new technologies. His manuscript examining the conflict around Uber's arrival in Buenos Aires is forthcoming with Stanford University Press.

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Correction

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Correction

Article title: The precarious Chinese financial ecology of expertise: discontent in the mix
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When the above article was first published online, the following errors in the author list were committed:

- The citation "AUTHOR 2015" and "AUTHOR 2019" (in text) should be "Dal Maso 2015", and "Dal Maso 2019".
- The references below are missing and should be added in the reference list:

Dal Maso, G. (2015). The financialization rush: responding to precarious labor and social security by investing in the Chinese stock market. *South Atlantic Quarterly, 114*(1), 47-64.
Dal Maso, G. (2019). The Financial Crisis and a Crisis of Expertise: A Chinese Genealogy of Neo-liberalism. *Historical Materialism, 27*(4), 67-98.

These have now been corrected online.

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