

Exploring the organisational proliferation of new technologies: an affective actor-network theory

Abstract

In this paper we explore the role of affective encounters between human and non-human bodies in the proliferation of new technologies within and across work organisations. Our exploration challenges not only the long-standing rationalism within studies of technological innovation but the anthropocentrism of burgeoning studies of technology, innovation and affect. Responding to these proclivities, we propose and elaborate an affective Actor-Network Theory (ANT) as an alternative analytical approach by cross-fertilizing ANT concepts with Deleuze's reading of the affective philosophy of Spinoza. Our approach is elaborated further with the technological innovation of zero-carbon homes in the United Kingdom. Affective ANT is proposed to explain the profound role of affects in the circulation of technologies and technologies in the circulation of affects. This theory contributes by challenging: studies of affect, innovation and technology to examine the significance of relational human affects in the proliferation of new technologies; organisational studies to consider the interplay of human and technical affects; and Deleuzo-Spinozian organisational studies to conceptualize how affects are organised to serve managerial interests and agendas, such as technological innovation.

Introduction

Organisational scholarship has long been concerned with how new technologies proliferate across work organisations (Orlikowski and Barley, 2001). Across recent decades research has not only considered how specific socio-institutional contexts influence the proliferation of new technologies, from neoliberal capitalism (Fleming, 2018) to professional associations (Swan and Newell, 1995), but also how those contexts and technologies are shaped by encounters with human agents, including: opinion leaders (Fitzgerald, 2002), professionals (Korica and Molloy, 2011), and entrepreneurs (Hung, 2004). Related organisational research (Cochoy, 2009; Harrison and Laberge, 2002; Joerges and Czarniawka, 1998; Locke and Lowe, 2007), strongly influenced by Actor-Network Theory (ANT) (Callon, 1986; Latour, 1987), has also challenged the idea that the proliferation of new technologies involves the circulation of discrete material objects and fixed designs and uses. Technological proliferation is instead reframed as a socio-material process where technologies spread through adaptations of their designs and uses as human and non-human agencies are transformed and enrolled in support of technologies (Akirch et al. 2002). Recent organisational studies of technologies are thus increasingly defined by explorations of how lived encounters between humans and non-humans influence the development, circulation, use and transformation of new technologies.

Despite this attention to encounters with technologies, this research contains a significant blindspot: it desists from engaging with the affectivity of organisational life (Lamprou, 2017). The significance of this neglect of affect is increasingly thrown into relief by a series of mostly psychological studies (e.g. Chaudhuri et al. 2010; Choi et al. 2011; Wood and Moreau, 2006) exploring the mediating role of human affects in the proliferation of technological innovations.

Yet, while this scholarship on affect, innovation and technology offers a compelling corrective to rationalist treatments of innovation diffusion (e.g. Rogers, 2003), it remains disconnected from organisational studies of technologies and its focus on lived encounters with technologies. Consequently, technologies are conceptualized as affectively inert, discrete, material objects, instilled with fixed designs and uses, while the congruence of expectations about those designs and uses induces human affective responses that exogenously influence the spread of those objects (Chaudhuri et al. 2010; Choi et al. 2011). Our purpose in this paper is to challenge both the rationalism of organisational studies of technology and the anthropocentrism of burgeoning studies of technology, innovation and affect. We instead explore how transformative encounters *between* human and non-human bodies mediate affects that do not exogenously shape, but more profoundly constitute the proliferation of new technologies within organisational life.

Our approach interweaves ANT (Actor-Network Theory) technology studies (Akrich et al. 2002; Callon, 1986; De Laet and Mol, 2000; Latour, 1987; Law, 2002) with Deleuze's reading of the affective philosophy of Spinoza (Deleuze; 1988; 1992; 2017). Our decision to cross-fertilize ANT with Deleuzo-Spinozian theories of affect is partly inspired by insightful arguments by the geographers Müller and Schurr (2016) that Deleuzo-Guattarian affect theories can help in exploring the (affective) conditions that enable new technologies to proliferate through actor-networking processes, while ANT can assist Deleuzo-Guattarian thinking in explaining how those processes are subject to purposive organisation, as in management. But instead of effecting one-way theory borrowing into organisation studies (Oswick et al. 2011), we develop Müller and Schurr's (2016) thinking – especially their lack of specificity in how particular concepts in ANT and Deleuzo-Spinozian thinking relate – through empirical theory elaboration (Fisher and Aguinis, 2017). Indeed, our re-thinking of

ANT with affect was originally empirically inspired within a government funded research project following UK ‘zero-carbon’ housebuilding technologies with ANT. Several ethnographic encounters with housebuilders awarded for their ‘pride’ in innovating (NHBC New Homes, 2016), suggested to us that the ANT refrain of ‘following the actors themselves or rather that which makes them act’ (Latour, 2005: 237) falls short when following how technologies are organised through and with affects. But rather than simply diagnose the limitations of ANT to register affect (e.g. Lamprou, 2017: 1744; Thrift, 2008: 113), we move to develop some overlooked potentials in ANT to engage with affect – potentials which, to us, are best realised when ANT is connected to Deleuzo-Spinozian, not Deleuzo-Guattarian, theories of affect (Deleuze; 1988; 1992; 2017). Thus while the primary purpose of our paper is to inform organisation studies of technology, affect and innovation, we also intend it to contribute to wider discussions on the affectivity of ANT (e.g. Lamprou, 2017; Latour, 1999; 2004; Müller and Schurr, 2016; Thrift, 2008) and Deleuzo-Spinozian scholarship on organisation and affect (Anderson, 2012; Carnera, 2012; Hjorth and Holt, 2014; Michels and Stayaert, 2017; Pullen et al. 2017; Thanem and Wallenberg, 2015).

Two questions guide our cross-fertilization of ANT/Deleuzo-Spinozian thinking. The first concerns how Deleuzo-Spinozian affect theories can inform ANT: *how is the purposeful organisational work of the kind that enables the proliferation of ostensibly discrete technologies, conceptualized here as actor-networking, constituted by affective bodily encounters?* The second question corresponds with how ANT can inform Deleuzo-Spinozian affect theories: *can such affective encounters themselves be purposefully organised, or actor-networked, by managers to serve their interests and agendas?* The imperative to ask these two questions would seem particularly salient for organisational scholars due to both the neglect of affect in ANT organisational studies (e.g. Cochoy, 2009; Harrison and Laberge, 2002; Locke

and Lowe, 2007), and the predisposition within extant Deleuzo-Spinozian organisational studies (Carnera, 2012; Hjorth and Holt, 2014; Michels and Stayaert, 2017; Pullen et al. 2017; Thanem and Wallenberg, 2015) to emphasize the transformative openness of affective life rather than explore its involvement in purposeful organisation, as in the management of technological innovations.

We arrive at our exploration of these two questions across five sections. First, we critique the anthropocentric limitations of extant studies of affect, innovation and technology. Secondly, we start to elaborate our alternative approach by re-reading ANT with sporadic expositions of affect by ANT proponents (e.g. Latour, 1999; 2004; Müller and Schurr, 2016). Thirdly, we engage with Deleuze's reading of Spinoza's affective philosophy (Deleuze, 1988; 1992; 2017) to overcome the shortcomings of ANT expositions of affect, particularly a reliance on happenstance and a neglect of human agency. We then specify the concepts and relations of our cross-fertilized approach with an empirical study of zero-carbon housebuilding and directly explore our two research questions. We conclude by discussing the multifaceted contributions of our proposed 'affective ANT' within and beyond organisation studies.

Affect and technologies

Studies of the proliferation of new technologies have long been gripped by a cool rationalism (Chaudhuri et al. 2010). Exemplifying this proclivity, Rogers' (2003) much-cited diffusion framework revolves around four coldly rationalist concepts to explain the circulation of technologies – *innovation properties* (relative advantage), *communication channels* (knowledge of the innovation), *time* (rate of adoption) and *social systems* (influence of social

structures such as power hierarchies). This rationalist orientation is increasingly being questioned within a burgeoning body of scholarship employing mostly psychological theories of affect to explain the spread of new technologies (Chaudhuri et al. 2010; Choi et al. 2011; Wood and Moreau, 2006). These studies explain how rational decisions over what technologies to develop, adopt and use are always mediated through human affects, from delight to anger. Less explicitly, this work also acknowledges such affects might be technologically mediated. For example, it is in the congruence between linguistic-cognitive expectations about the simplicity of a technological innovation (e.g. a mobile phone) and lived interactions with its more or less simple materiality that affects, such as delight/anger, are said to be formed, fostering respective adoption/rejection (e.g. Chaudhuri et al. 2010; Choi et al. 2011; Wood and Moreau, 2006).

These affective studies of technology diffusion challenge organisational studies of technology to consider the shaping influence of (human) affects in the proliferation of technologies across work organisations. However, these approaches remain limited in developing more profound insights into the affective role of technologies as they employ survey-based and experimental methods that cannot (and do not set out to) analyse lived encounters between humans and non-humans. In particular, this work largely dichotomizes such encounters as a relationship between affectively charged humans and affectively inert technologies. Technologies, to the extent they can influence human affects can only do so as a passive and predictable affective stimuli, for example as related to congruence between their designed properties and user expectations (see e.g. Chaudhuri et al. 2010; Wood and Moreau, 2006). This notion of the affective force of technologies as reducible to their designed properties stems from a neglect of both relational approaches to technology and affect. Regarding technology, diffusionist approaches (Rogers, 2003) are favoured that explain how discrete material objects circulate or

not as their human designed properties interact with a social milieu of affectively charged cognitive expectations. These approaches disregard ANT studies suggesting technologies proliferate within transformative encounters, wherein new actors, human and non-human, are purposefully transformed as they are enrolled to support that technology, while that technology, and its design properties and uses, are adapted to sustain that support (Akrich et al. 2002; Locke and Lowe, 2007). ANT's relational ontology tacitly thus suggests that human (and perhaps non-human) affects may also be transformed and enrolled within technologies. Relational theories of affect, including those influenced by Deleuzo-Spinozian thinking, are similarly overlooked. This scholarship explores how affects are not the sole possession of human minds but constituted within encounters between human and non-human bodies (Anderson, 2014; Deleuze, 1988; 1992; 2017; DeLanda, 2006; 2016; Hjorth and Holt, 2014; Michels and Stayaert, 2017) or even between exclusively non-human bodies (Ash, 2015). Taken together, these relational understandings of technology and affect offer novel opportunities to expand the significance of affect in analysing technologies in organisational life. In the next section we move to develop these opportunities by first explicating and then challenging the ostensive rationalism of ANT studies of technology.

Rationalist ANT and beyond

ANT explanations for the proliferation of seemingly discrete technological objects (e.g. mobile phones, cars) typically figure technologies as *black boxes* wherein the 'inner workings' of a technology are hidden from view and 'we need to know nothing but its input and output' (Latour., 1987: 3); thus the technology moves as 'one unbreakable whole' (Latour, 1987: 132). But this black boxing does not stem from a technology's designed properties (as in Rogers,

2003), rather it emerges from ongoing purposive processes of ‘translation’ (here called ‘actor-networking’), where actors, human and non-human, and their explicit (rational) self-interests, are encountered, redefined, aligned, and enrolled, in support of a technology that is then adapted to uphold that support (Akrich et al. 2002). Technologies thus proliferate along ‘narrow and fragile networks’ (Latour, 1987: 232) that mirror their internalized, black boxed, relations. If the translation work fails to enrol an encountered new actor, or does not hold existing actors in stable alignment, the technology cannot travel, or will turn into something different (Law, 2002: 93). According to Callon (1986), actor-networking consists of four transformative moments of translation: (i) *problematization* – the hypothetical definition of actors and their interests around a common problem and solution (‘obligatory passage point’); (ii) *interessement* – mechanisms used to impose the problematization upon actors, or their ‘spokespeople’, including isolating them from opposing problematizations (or ‘counter-enrolments’ – Callon and Law, 1982); for a range of these avowedly Machiavellian mechanisms see Latour (1987: 108-120); (iii) *enrolment* – the multilateral co-ordination of roles, and interests, within the network between the different parties; (iv) *mobilization* – the existence of a stable network of actors and a moveable and discrete black box. Later ANT work has revised technological actor-networking by emphasising *fluidity*, wherein enrolled actors and relations may be substituted, if sufficient overarching functionality endures within the network (De Laet and Mol, 2000; Law, 2002) – here technologies travel as adaptable ‘fluid’ objects rather than black boxes (cf. Lock and Lowe, 2007: 796).

ANT challenges diffusion models underpinning extant studies of affect, innovation and technology by rejecting notions of humans as an affectively charged *milieu* of cognitive resistances to discrete technologies. Instead, societies and technologies, humans and non-humans, are mutually transformed to allow technologies to proliferate. Yet, in most guises, ANT shares with diffusion studies a decidedly rationalist orientation: human network builders

enrol heterogeneous actors to support a technology by prescribing, aligning and enrolling their rational self-interests in support of technology, or, equally rationally, they negotiate degrees of fluidity in actors and their relations, while insisting on some minimal functionality. ANT has consequently often been criticized for instilling a deadpan managerialism that neglects encounters with emergent events (Thrift, 2008: 112; Whittle and Spicer, 2008: 617), imagined futures (Bear, 2013: 24; Thrift, 2008: 113), and indeterminate, and lingering, affects (Lamprou, 2017: 1744; Thrift, 2008: 113). Put simply ‘the focus of ANT is often on “what is required” and not “what is possible”’ (Bear, 2013: 24). However, although un-acknowledged within the above critical commentaries, some ANT technology studies have fleetingly gestured to the organising role of human affects such as ‘love’ (Latour, 1996: 288) or ‘care’ (De Laet and Mol, 2000: 235). For example, considering how network builders struggle to find reliable spokespeople in interessement, Akrich, Callon and Latour explain how ‘Doubt, trust, then gratitude and admiration, or on the contrary, suspicion, defiance and even hate, are at the heart of innovation’ (Akrich et al. 2002: 222). The above short glimpses of affect in ANT technology scholarship have been supplemented by two longer expositions that serve here as a bridgehead to move beyond the ostensive rationalism of ANT.

The first of these is Latour’s (1999; 2004) concept of attachment. Latour (1999; 2004) proposes what ANT lacks is a concept to adequately specify the *quality*, rather than mere existence or not, of attachments between actors’ *bodies*. That is, ‘how one is *affected*’ (Latour, 1999: 22; emphasis added) by ‘objects, properties, *fears*, techniques that make us do things unto others’ (Latour, 1999: 25; emphasis added). Expounding the concept of *attachment*, Latour (1999) describes ‘good’ bodily attachments as ties between actors that ‘make existence possible’ (p29) while ‘bad’ attachments are those that ‘kill’ us (p30). Action is thus explainable through configurations of good and bad attachments rather than in analyses of enslaved attachment

versus autonomous detachment (i.e. structure/agency) (Latour, 1999). Latour's (1999; 2004) notion of attachment promises to address questions of affect usually unamenable to ANT analysis, including: how are actors affected to enrol and be enrolled in support a technology, or why and how do actors learn to become sensitive to new actors, and their affective longings, as well as their explicit interests? Latour's answer to these questions is that 'To understand the activity of subjects, their emotions, their passions, we must turn our attention to that which attaches and activates them' (Latour, 1999: 27). Notwithstanding its appealing relational simplicity, two limitations persist that undermine the analytical potential of 'attachment' to develop an affective ANT. First, in his effort to displace dichotomies of attached structural determinism versus detached autonomous agency, Latour (1999) relies on what might be termed 'networked happenstance' to explain how *new* desires are serendipitously produced. This is usefully exemplified with his account of the desire to stop smoking cigarettes: 'I do not control it [the cigarette] any more than it controls me. I am attached to it, and if I cannot hope for any kind of emancipation from it, then *perhaps* other attachments will come to substitute for this one' (Latour, 1999: 27; emphasis added). Secondly, while purposeful *human* capacities for 'distinguishing those attachments that save from those that kill [e.g. cigarettes]' (Latour, 1999: 31) now appear crucial in understanding why processes of actor-networking are desired, Latour (1999) does not explain how such human capacities are produced.

Recognizing these limitations, the geographers Müller and Schurr's (2016) propose blending ANT with Deleuzo-Guattarian theories of affect and especially human desire (Deleuze and Guattari, 2004). This, they contend, will allow ANT to address unanswered questions regarding 'what brings actor-networks into being, makes them cohere or pulls them apart' (Müller and Schurr (2016: 224) and avoid the sense of happenstance that inflects Latour's (1999) reasoning. Müller and Schurr (2016) introduce their approach by stressing that Deleuzo-Guattarian human

desire is neither subjectively possessed or a serendipitous network aftereffect (as with Latour, 1999; 2004), rather it ‘becomes together with the assemblage [i.e. the actor-network of human and non-human bodies], not as a result of it’ (p224). Illustrated with an In-Vitro Fertilization (IVF) programme, they describe how multiple, disparate, human desires are relationally produced to ‘bind together human and non-human elements’ (Müller and Schurr (2016: 225) – facilitating the subsequent actor-networking of explicit, rational, interests. Although they do not quite express it this way, these desires are clearly produced in lived (including imagined) encounters between human and non-human bodies, from parents desiring children when viewing images of the ‘happy family’ to surrogates desiring to help distressed infertile couples. Müller and Schurr (2016) propose actor-networking ‘is unthinkable’ (p226) without this diffusive, quasi-autonomous, production of desire. We might agree, but they do not unpack *how* desire emerges within bodily encounters or *how* it relates to specific purposive processes of actor-networking. Moreover, it is difficult to discern the extent to which the production of such desire, or perhaps conditions for its emergence, might be purposeful – reintroducing the spectre of happenstance. There is much in Müller and Schurr’s (2016) cross-fertilization of ANT and Deleuzo-Guattarian thinking that inspires our proposals here but their approach lacks granularity in explaining how specific categories of affect, such as human desire, influence specific organising processes of actor-networking (e.g. enrolment) and how and why such purposive organising processes might themselves produce affects. This shortcoming in specifying relations between concepts limits its potential for informing empirical analyses (Fisher and Aguinis, 2017). For this reason, our own engagement with affect and ANT now proceeds to elaborate specific concepts and their relations in Deleuze’s reading of Spinoza’s affective philosophy (Deleuze, 1988; 1992; 2017), before then elaborating how these specific concepts relate to ANT, and processes of technological innovation, through our empirical example of zero-carbon housebuilding.

Actor-networking with affective bodies

Gilles Deleuze's readings of Spinoza (Deleuze, 1988; 1992; 2017) constitute arguably the strongest influence on his theorization of affect, including within his later collaborations with Félix Guattari (e.g. Deleuze and Guattari, 2004: 253-260). While Deleuzo-Guattarian philosophy is hardly new to organisation studies (e.g. Cooper and Burrell, 1988), Deleuzo-Spinozian organisational studies remain relatively embryonic. Thus far, these studies largely consist of critical explorations of organisational politics (Carnera, 2012; Michels and Stayaert, 2017; Pullen et al. 2017) and ethics (Thanem and Wallenberg, 2015), although studies of technology, creativity and innovation have been proposed (see Hjorth and Holt, 2014: 90-1). Given the novelty of our undertaking here, we will first elaborate some key tenets in Deleuzo-Spinozian affective philosophy when thinking about technologies, and purposeful desires to innovate, before then developing our cross-fertilization with ANT.

Deleuze explains affective bodies as the ontological building blocks of Spinozian philosophy. These bodies encompass all organised conglomerations of matter and energy, from stars, to mobile phones, to human beings, and are definable along two dimensions – their '*constituent relations*' (Deleuze, 2017: 6): (i) 'the relations of motion and rests, of speeds and slowness between particles' and (ii) their 'capacity for affecting and being affected' (Deleuze, 1988: 123). The speeds and slowness of 'particles' are capacities that enable bodies to connect: 'it is by speed and slowness that one slips in among things that one connects with something else' (Deleuze, 1988: 123). Speed is distinctive because, unlike other qualities like volume and

length that only increase quantitatively, increasing speed effects *qualitative* changes in bodies when thresholds are reached, imbuing new connective potentials between bodies; for example, the speed shift in fluids from laminar to tubular flows creates new potentials for fluids to interact with other bodies (DeLanda, 2016: 76). The second dimension of affective bodies are capacities to affect and be affected by other bodies, within encounters, as well as specific ‘variations or transformations’ in those affects, or their ‘thresholds’ (Deleuze, 1988: 125). In short, affects are changes in thresholds of potentials to act and be acted upon. And as ‘you do not know beforehand what a body or a mind can do, in a given encounter’ (Deleuze, 1988: 125) these changes are only knowable within bodily encounters.

In what follows we redefine technologies, humans, and indeed all organised conglomerations of matter and energy, as *affective bodies* not ‘actors’ as with ANT. We then propose the verb ‘actor-networking’ (not the noun ‘actor-network’) to refer to a particular set of purposeful processes of translation (Callon, 1986) that can help explore how such affective bodies are organised and proliferate. In order to elaborate the analytical advantages of this Deleuzo-Spinozian reframing of the ontological foundations of ANT to explore the organised proliferation of technologies, it is useful to first compare Deleuzo-Spinozian affective bodies with ANT actors. Some similarities are evident. As with the infinite regress of ANT, affective bodies are composed from more affective bodies *ad infinitum* (Deleuze, 2017: 10). Affective bodies and actors are also constituted by heterogeneous agencies, encompassing designed material artefacts, animals, humans, even, as we will discuss shortly, ‘a current of air’ (Deleuze, 2017: 19). But affective bodies differ in two important respects. First, affective bodies are defined by their *future* capacities for action as well as their present abilities. That is, affective bodies are also constituted by what they *can become* and *can do* formed from distinctive bodily speeds, affects and encounters with other affective bodies, while ANT actors are typically only

defined only by *what actors are* and *what they are doing*, as given from their more or less tightly enrolled agencies and components (DeLanda, 2006: 11). Second, Deleuze's theorization of affective bodies suggests the usefulness of an analytically, if not ontologically (Ash, 2015: 86), distinct category of *human* affects including desires. This notion breaches ANT's customary prohibition on registering *a priori* differences between humans and non-humans (Callon, 1986). Our wager is that these two conceptual shifts can significantly help in exploring the affective conditions that enable purposeful actor-networking, and then how ANT concepts can inform Deleuzo-Spinozian analysis of the purposeful organisation of affect. To develop this line of thinking it is necessary to first explain more about the range of specifically *human* affects, how they are produced, and their involvement in the organisation of bodies, such as technologies.

Understanding *human* affects with Deleuze requires an expansion of our above definition of affective bodies to be 'taken in its broadest sense [so as] to include "mental" or ideal bodies' (Massumi, in Deleuze and Guattari, 2004: xvi). This is crucial because conceptualizing *human* bodies and their affects, unlike the technical affects produced between exclusively non-human bodies (e.g. the capacity of a key to open a lock and the capacity of a lock to be opened by a key – Ash, 2015: 87), involves addressing encounters that are also imagined within representational ideas and language, as well those that are materially present in the here and now. Despite sentiments to the contrary (notably Thrift, 2008), Deleuzo-Spinozian thinking does not support an exclusively 'non-representational' understanding of human affects. This is because, as Deleuze (2017) explains, while all human affects can be defined as 'non-representational' (p1) thoughts, they are always already 'enveloped' (p17), and indeed triggered by, representational ideas and language. Understanding the interplay between non-representational affect and representational ideas is critical to not fall back on Latourian notions

of relational happenstance (Latour, 1999; Müller and Schurr, 2016) in the production of human desires and agencies to create new bodies, like technologies.

Deleuze's explains the relation between representational ideas and non-representational affects with reference to two inescapable aspects of human life: first, 'my body never stops encountering bodies.' (Deleuze, 2017: 20); and second, these encounters are *always* manifest to us as representational ideas: 'one idea chases another, one idea replaces another' (Deleuze, 2017: 3). For Deleuze, as we encounter other bodies, whether in the here and now or as ideas in our imagination, they are *always* presented to us within our minds as representational ideas: a planned holiday, feeling tired, a meeting we had yesterday, a fly on the wall, and so on. The simplest, and most prevalent, type of these ideas are those that relate solely to the effect (not affect) of one body mixing with our own; these ideas are called *affections (affectio)* as distinct from *affect (affectus)* (Deleuze, 2017: 4). Affections are the most confused, least reasoned of ideas: 'affection-ideas are representations of effects without their causes, and it's precisely these that Spinoza calls inadequate ideas' (Deleuze, 2017: 5). That is, two bodies encounter each other and mix and we then represent an idea of that effect, for example: "I feel the sun on me" (see Deleuze, 2017: 4) or "what is that noise – it's a fly" or, more imaginatively, "thinking about that holiday I had makes me feel good", "that meeting yesterday was so dull!". But crucially we do not know how or why we feel, or experience, this or that effect – these ideas are highly serendipitous, imaginative, and experimental, not determined, reasoned, or knowledgeable (Deleuze, 1992: 220). When we pass from what we feel is an agreeable idea (e.g. planned holiday) to one that is disagreeable (e.g. how tired we feel) this passage to disagreeability can be understood as a diminishing of our *power of acting* (Deleuze, 2017: 5). This diminishment means our *constituent relations* (our connective speeds and capacities to affect and be affected) become increasingly invested in trying to ward off, in this case, the

feeling of tiredness, so that our total power of acting is reduced (Deleuze, 2017: 8). If instead we pass from thinking about feeling tired to a planned holiday this may increase our power of acting – ‘bodies are mixed with you in proportions and under conditions which are favourable to your [constituent] relation’ (Deleuze, 2017: 8). The passage in the diminishment of our power of acting, *is* sadness, while joy corresponds with an agreeable passage – an increase in our power of acting (Deleuze, 1988; 1992; 2017). Affect (*affectus*) is thus defined as a non-representational thought (Deleuze, 2017: 1) corresponding to the constant modulation in our power of acting, as we are affected by other bodies, while affection (*affectio*) refers to the enveloping representational ideas that (with other types of ideas) effect this variation. But one is never reducible to the other: ‘affect is not reducible to an intellectual comparison of [affection] ideas, affect is constituted by the lived transition or lived passage from one degree of perfection to another’ (Deleuze, 2017: 4). ‘Perfection’ refers here to the increase or decrease in our power to act *with* our constituent relations – hence power of acting is also discussed in terms of ‘force of existing ... it’s what we call existing’ (Deleuze, 2017: 4).

Equipped with this relational concept of human affect as the product of open-ended encounters between tangible and ideational bodies we can employ it to conceptualize how human desires to actor-network – to, for example, proliferate a technology are produced. And importantly, we can now do so without evoking networked happenstance (Latour, 1999; 2004), while also explaining the emergence of the desire to differentiate between ‘good’ and ‘bad’ attachments (Latour, 1999). Such desires are now to be understood as the will (*conatus*) to ‘persevere in existing’ (Deleuze, 1988: 98) by cultivating joyful (or in Latourian terms ‘good’) encounters with bodies that affirm our force of existing, and warding off, transforming and destroying sad (or ‘bad’) encounters (Deleuze, 1992: 243). All bodies, from stars to frogs to cars, possess this striving to endure by affirming encounters that create thresholds for existence as is self-evident

by their enduring organised existence (Ash, 2015; DeLanda, 2006; 2016). However, humans (and some non-human animals) are unique in being able to become reflexively aware of how entering into relations with another body in an encounter affirms diminishes their constituent relations (Deleuze, 2017: 5). This knowledge then constitutes our active desires. But crucially, this actively purposeful desire is only produced when the mind can determine from an encounter between bodies not simply that affects have modulated joyfully or not in the ebb and flow of affection-ideas, but their common effects and causes. This transition into knowing the cause of an affect is termed a ‘common notion’ (Deleuze, 1988; 1992). Here our mind arrives at ‘an idea which, instead of representing the effect of a body on another, that is to say the mixture of two bodies [as in affection-ideas], represents the internal agreement or disagreement of the characteristic [or constitutive] relations of the two bodies (Deleuze, 2017: 9). Common notions also themselves produce affects (joy, sadness, desire) but these affects are understood as active, not passive, in that the passage to positive affect stems not from the passive flow of affection-ideas and chance encounters, but from the flow of adequate ideas produced by our mind of the cause of the relation between bodies: we thus become in ‘*full possession* of our power of action’ (Deleuze, 1992: 280). Deleuze (2017) goes on to explain how common notions can be universal and less locally useful (e.g. Spinoza’s common notion that all bodies vary in capacities of speed) or more local and useful (e.g. two automotive designers meet and recognize they share a passive joy in thinking about an electric car that may render that joy active, creating active desires and actions to collaborate to build one). It is also important to note why active desires can *only* form through encounters that envelope joyful affects. The reason for this is that: ‘As long as you have a sad affect, a body acts on yours, a soul acts on yours in conditions and in a relation which do not agree with yours. At that point, nothing in sadness can induce you to form the common notion, that is to say the idea of a something in

common between two bodies and two souls' (Deleuze, 2017: 10; see also Deleuze, 1992: 282-3).

This Deleuzo-Spinozian exposition of affect dovetails with ANT in two respects. First, by figuring the formation of active desires through common notions, the disparate desires of actors to enrol and be enrolled in support of a technological innovation, as in the IVF programme described in Müller and Schurr (2016: 225), can be said to *only* form under certain affective conditions: (i) certain capacities, or thresholds, of speed that allow particles, and bodies, to mix; (ii) a passive release of joyful affects between mixed bodies enveloped by increasingly agreeable affection-ideas; and (iii) ideas of the common effects and causes of those affects within that bodily encounter (as in common notions) – giving rise to active desires and thus purposive action. We propose the term *enrolment affects* to describe affects enveloped when bodily encounters fulfil these conditions and unfamiliar bodies can be enrolled within existing technological bodies and new ones created. And secondly, sad affects appear equally salient to actor-networking. Sad affects, such as 'hate ... antipathy, derision, contempt, envy, anger and so on' (Deleuze, 1992: 243), appear valuable to network builders seeking to instil enrolled bodies obedience to their allocated roles in an actor-network within the moment of intersement (Callon, 1986). This is because they curtail the capacity of affective bodies, once enrolled in support of a given technology, to possess their power of acting. That is, they prevent affective bodies from forming new common notions and active desires not commensurate with previous problematizations as they encounter new bodies. Or, as Deleuze (2017) puts it: 'Inspiring sad passions is necessary for the exercise of power' (p4). These sad affects are here termed *obedience affects*. In the remainder of the paper we further elaborate and specify these two 'bridging concepts' between ANT and Deleuzo-Spinozian thinking with our example of zero-carbon housebuilding technology.

Affective actor-networking (or what Deleuzo-Spinozian affect theory can do for ANT)

We begin our empirical elaboration of affective ANT by discussing enrolment affects across a brief encounter on a zero-carbon housebuilding project in the English Midlands – here named Ecoville. For our purposes this encounter involved three main bodies (and their components): an assistant site manager, here named Brian, the second author of this paper, and a (soon to be insulated) light switch. The successful enrolment of the (insulated) light switch within zero-carbon housebuilding technology was valuable to allow the Zero-Carbon Homes (ZCHs) on this site to pass the airtightness testing, as required to evidence government imposed definitions of ‘zero-carbon’ standards to meet wider sustainability targets (ZCH, 2017). Only by achieving these airtightness standards would the then government be able meet its target to help firms roll out ZCH technology across the UK housebuilding industry. The following encounter took place on a cold November day in 2015 in a half built living room of a four-bedroom detached house as Brian inspected a light fitting:

Brian: What you’d do is generally, the rule of thumb, a light switch goes up, sockets, run down. So that should be sealed, again when you do, put your full dab on an external wall, your full dab of plaster should seal that, stop any airflow like that [Feels around recently finished light switch to indicate the presence of cool air, then nods]. And what we do on the, on here, on a [ZCH], when we put the trunking on, on top of the cables, we would then air tape say 150 mil down again, and then that would seal onto that as well, just to stop any ...

Researcher: So that the [cooler] air doesn't run up, along?

Brian: That's right because, believe it or not ... you won't believe how much air escapes through an electrical socket ... They weren't doing it until I come here, and it, but I've changed the system [the method statement] and now the, we, with the air test results [for the ZCH standards] are better and they're sailing through.

To start to elaborate affective ANT we can first analyse this encounter with ANT alone. We might begin by determining how Brian encountered an emergent actor, the 'leaky' light switch, whose 'interest' ('interest' in ANT can refer to non-humans – Callon, 1986) in releasing cold air was disrupting the enrolment of other actors (e.g. planning approval officials, air tightness testers) to support the spread of ZCH technology into Ecoville. Consequently, Brian isolates the light switch from its disruptive interest, or counter-enrolment (Callon and Latour, 1982), by enrolling a new 'interessement device' – insulating air tape – in the method statement for constructing the ZCH (the air tape being a black boxed actor that is easy to enrol as it is already interested in preventing cold air loss). The leaky light switch is thus successfully enrolled by being translated in the ZCH actor-network into an insulated light switch. And ZCH technology is transformed too – it now possess new tangible properties and abilities as evidenced within the airtightness testing. All that was required to stabilize ZCH technology and allow it to proliferate elsewhere at Ecoville, and beyond, is described here, but there is less consideration of *why* it was *possible* (Bear, 2013; Müller and Schurr, 2016). What is missing from this analysis is how the specific bodies involved (i.e. Brian, the light switch, and their constituent parts – hands, leaking air, and so on) combined to produce *this* outcome; that is, what might have produced this desire for Brian, not others, to become sensitive to the leaky light switch and enrol the air tape? And also, importantly, why, once enrolled, might other human actors

desire to comply with this translation? We will explore the first question within this section. While the second, which concerns our second research question around how affects might be targeted to serve managerial ends, is examined in the following section.

To illustrate how Deleuzo-Spinozian concepts of affect extend ANT we can return to two initial conditions Deleuze (1988; 1992; 2017) suggests have to be met for Brian to possess the capacity to enrol the leaky light switch. First, Brian's hands and the cool air from the light switch had to have the *capacity* to move and rest to connect. If perhaps Brian was running late on inspecting the previous house, and he had been rushing this building inspection, his hands or thoughts may move too fast, or if the air molecules had already been heated on a summer day and they had moved more quickly, bodily connections (i.e. the detection of relatively cooler air around the small gaps around the light switch by a slow moving hand) would not have occurred. Second, Brian must have then formed inadequate affection-ideas concerning the effect of another body on his (e.g. "my hand is cool", "where is that coming from?", "what is that – it's gone now, back again", "It could be coming from X or Y"). As Brian indicates, we might then determine that when previous colleagues encountered 'unruly' technologies like light switches this would typically trigger a run of thoughts along the lines of: "what's that?", "where is that coming from?", "that's probably nothing", "better not tell anyone", "that should be ok", "hopefully that'll be fine". Such uncertain affection ideas envelope what we can read with Deleuze and Spinoza as an oscillation between hope/fear, between joyful/sad affects. Spinoza explains how hope and fear correspond with 'ideas of a future or past thing whose outcome [for respective affective joy or sadness] we to some extent doubt' (Spinoza, 1996: 106).

And yet, for Brian, his bodily mixing with the leaky light switch did more than oscillate fear/hope – it enveloped a constant passage of joyful affect wherein the constituent relations of Brian and the light switch resonated to produce something new (rather than destroying each other): the insulated light switch. As Deleuze (2017) explains, the strongest evidence of joyful affect, and interconnected bodily speeds, is that two bodies create a new body, as in a new affective composition and its unique speeds: ‘when the relations are composed, the two things of which the relations are composed, form a superior individual, a third individual which encompasses and takes them as parts’ (Deleuze, 2017: 21). Ultimately this new body was the insulated light switch and its new connective speeds and ‘technical affects’ (Ash, 2015) *to be insulated, and to insulate* as added to the ZCH – creating, in turn, new affective capacities for ZCH technology to spread across the firm and UK housing industry. But new technical bodies and affects initially require a passive human joy that enables the resonance of constituent relations between bodies (Deleuze, 1992: 285). We can elaborate how such passive joy is assembled with a further comment by Brian reflecting on how he identified the leaky light switch:

... you know from experience, you know that’s where the air goes through ... if that’s your external wall there and there’s your brickwork coming down there, if somebody misses an area of insulation out of here, then that will be a cool spot, won’t it? (Brian, Assistant Site Manager, ‘Ecoville’).

This explanation suggests that Brian’s ‘geo-historicity’ (Anderson, 2014: 92) of encounters with similarly leaky objects helped him form joyous, not sad, affects. While Deleuze (1988; 1992; 2017) does not discuss affective memory in detail, Spinoza (1996: 79-80) proposes that

as any passage of (inadequate) affection-ideas progresses with enveloping passive affects such as hope and fear, past and future bodies, are imaginatively added to the present encounter on the basis of their affective similarity. We propose ‘affective memory’ as a useful conceptual addition to Deleuzo-Spinozian thinking to explain how distal (imagined) and proximal (embodied) bodily encounters intertwine, allowing, in our example, Brian’s escape from the oscillation of fear/hope he suggests in his colleagues. We might hypothesize Brian’s run of affection-ideas was interjected by past encounters thus: “what’s that?”, “where is that coming from?” “That’s probably nothing”, “*But I feel* like I’ve seen something like this before?”, “What did we do then?”, “What can I do now?”, “We dealt with it then and I think it could work now”. The movement to other bodily encounters, the affective force of our hypothesized “*But*”, intensifies the existing feeling of hope over fear: joyful encounters with bodies from the past effectively leverage joyful encounters in the future. But Brian’s joy, and desire, still remains passive at this stage as it is still generated by chance encounters with a flow of bodies not his own ideas; he remains separated from his power of acting (Deleuze, 2017).

Having already encountered similarly leaky bodies elsewhere, and resolved to enrol air tape or a similar insulating body, Brian appears predisposed to being positively, not negatively, affected in the encounter above with the leaky light switch. But more than this, in our encounter with Brian he appeared to lack any doubt about his actions – hope had been replaced by ‘confidence ... a joy born of the idea of a future or past thing, concerning which the cause of doubting has been removed’ (Spinoza, 1996: 106). Brian had now formed a common notion, an adequate idea: he understood that the constituent relations of several bodies – the air tests, ZCH technology, the light switch, Brian, air tape, trunking – shared a capacity (not) to insulate and (not) be insulated. Tellingly, this common notion was explicitly expressed by Brian as reasoned knowledge not confused ideas, as in ‘you *know* that’s where the air goes through’

(emphasis added). As Brian encountered this common notion, it enveloped an active confidence in him (not a passive hopefulness). Equipped with confidence and adequate ideas, Brian could reflect on the joyous form of his idea: the idea, not the chance bodily encounter, became the cause of his joy (Deleuze, 1992: 284). Brian now possessed not simply the knowledge to enrol the light switch but his *power of acting*. But our affective ANT approach suggests that while Brian's active confidence proceeded from the removal of doubt, it necessarily requires an initial fear/hope similar to that which he ascribes to past colleagues. Spinoza (1996) explains that the removal of doubt occurs either because 'man [sic] imagines the past or future thing is there [without doubt] ... or 'he imagines other things [i.e. the air tape], excluding the existence of the things which put him in doubt' (p107). The leaky light switch was translated into an insulated light switch not simply because air tape was required, as rationalist ANT has it, but because it was *possible* for Brian to act within a series of interwoven encounters with distal and proximal bodies – encounters which resonated joyfully across space and time. Once Brian's active desire for purposive actor-networking, for enrolment, was assembled, ZCH technology possessed new capacities to proliferate.

Actor-networking affect (or what ANT can do for Deleuzo-Spinozian affect theory)

Affective ANT helps render visible the affective conditions for actor-networking. What is less amenable to Deleuzo-Spinozian affect theory alone, however, is how managers might purposefully enrol bodily capacities, speeds and encounters, as well as actors' rational interests within a technology, and thus enact its proliferation. The salience of this question becomes clear if we hypothesize a counter-enrolment (Callon and Law, 1982) at Ecoville: the possibility that Brian was unable to enrol his site manager in support of the use of air tape because his site

manager was already enrolled in a far cheaper and more readily practised solution to enrol the leaky light switch – sealing air gaps with expanding foam. The issue here is that foam quickly degrades. The ZCH might travel as it passes its airtightness test but it will not travel beyond a few years as warm air is lost and (unknown to the home owners) increasing amounts of carbon are released by the thermostatically controlled boiler. Why did Brian's site manager, Peter, not desire this alternative option, this counter-enrolment? The answer at Ecoville was Peter was already affected by pride: 'He's a NHBC [National House Building Council] award winning site manager. So he really does go that extra mile [...] he's a very proud man' (Regional project manager). Peter had received numerous NHBC 'Pride in the Job' awards as displayed within his site office, and, as the regional project manager explained, Peter was actively recruited to this project due to his pride in innovating.

The purposive assembly of a version of pride at Ecoville helps us elaborate how classic ANT concepts can be reworked to understand how bodily capacities, speeds, and encounters are acted upon to 'shape what a body can do in a given situation' (Anderson, 2014: 93). That is, fear, hope and confidence do not simply emerge organically by happenstance under given geo-historical conditions, rather those affects are always already mediated, though never determined, by other affects, like pride, that are purposefully assembled, rendered knowable and actionable (Anderson, 2014: 92). Such affective interventions draw together relations between actors to attach specific versions of affects, like pride, not just to other bodily encounters, speeds and other affects, but rational interests and agendas including those of senior managers and policymakers – purposefully creating conditions that create capacities, never determinations, for specific bodily actions to take shape. To be clear, bodily capacities can never be fully determined as they remain partly excessive to any encounter (Deleuze, 1988:

125) but this does not mean that managers do not try to work on and through affective bodily capacities with techniques of power.

We propose it is highly productive to analyse such managerial interventions by reworking classic ANT concepts, such as Callon's (1986) four moments of translation. At Ecoville 'pride' was partly rationally problematized by the NHBC as a shared solution, or 'obligatory passage point', to help to avoid 'sub-standard building practices' (NHBC, 2017b: 7) through 'the celebration and sharing of best practice. Site managers that win an ['Pride in the Job'] award are creating houses of an outstandingly high standard' (NHBC, 2017b: 2). This problematization hypothesizes the rational self-interests of various actors to be enrolled in support of this version of pride: site managers interested in having their success recognized for career development; housebuilding firms interested in boosting their reputation; and homeowners interested in a high quality products (NHBC, 2017c: 1). But the problematization of such affects does not only proceed through the rational self-interests of actors, but also their future bodily encounters, speeds and capacities. In the NHBC Marking Guidelines, for example, 'Pride in the Job' is defined across hypothesized bodily encounters between eight building elements (foundations, sub-structure, superstructure, roofs, first fix, second fix, surface finishes, external work) and five aspects of work organisation (health and safety, planning, protection of work, site tidiness and personal impact) (NHBC, 2017). Pride in the foundations is defined as:

... attention to detail of concrete placement in readiness for the masonry or frame, leaving a smooth, level surface. Accuracy, squareness, cleanliness and the build quality of both the concrete and the steel reinforcement cages. Care taken with the

setting up of cages within the trench and the support system. Particular attention given to cleanliness of working areas around the foundation sides (NHBC, 2017a; emphasis added)

Pride is problematized here in a way remarkably consistent with Deleuzo-Spinozian affective thinking: the NHBC criteria renders pride knowable not only in terms of explicit rational self-interests in the present but imagined past/future encounters between human and non-human bodies and their interacting capacities to affect and be affected. If, for example, concrete foundations are affected with smoothing and levelling by encounters with human bodies, poured concrete and other tools, they can, in turn, assemble certain technical affects to support walls and so on. But more than this, by identifying human ‘care’ and ‘detail’ in these encounters, this problematization of pride also targets the capacities of human bodies for speed and rest. Pride is said to be recognizable in the capacities of site managers to slow down their hands and thoughts and connect with ‘detail’ and ‘care’ with the affective capacities of certain non-human bodies, such as leaky light switches.

Following on from this moment of affective *problematization*, site managers must become interested and enrolled in support of the hypothetical version of (their) pride. Again, our example suggest this interessement process is both rational and affective. Site managers’ rational interests are readily enrolled: the NHBC is the largest supplier of UK building warranties; in the UK these warranties are obligatory for mortgage lending on new homes – all site managers (and *only* site managers) working on NHBC warranted homes are thus automatically enrolled to be evaluated for the pride awards within the building warranty inspection. But this hardly explains why site managers would be interested to *desire* to win an

award (or display them). To affectively, not merely effectively, enrol site managers' in support of this version of (their) pride, involves working upon human bodily encounters, speeds and affects. We can explore how this occurs with the following recollection of how a past winner of an NHBC 'Pride in the Job' felt when his name was called out at the award ceremony:

Sometime in everyone's life you get that split second, that rush, and winning a Pride in the Job Award gave me that exact feeling ... You've got to keep ahead of the field. The competition is fierce but the rewards are great I'm always anxious when the judges arrive on site because they turn up unannounced, but in fact I'm happy for them to see my site at any time. It's always run as if a Pride in the Job judge was about to arrive (Housebuilder, 2017).

This account was used by the NHBC to market their awards, seemingly to inspire a passage of joyful affect in potential winners ("that rush ... that split second ..."), whereby the force of existing, or power of acting, of prospective winners was augmented relative to others ("You've got to keep ahead of the field"). What is less obvious here is how pride renders actors obedient to managerial ends. That is, if positive affects inspire our powers of acting, as Deleuze (2017) explains, how can pride, a seemingly positive affect, also inspire obedience to others? To understand how it is useful to revisit Spinoza's definition of pride as:

When the imagination concerns the man himself who thinks more highly of himself than is just, it is called pride, and is a species of madness, because the man dreams, with open eyes, that he can do all those things which he achieves only in his

imagination real and triumphs in, so long as he cannot imagine those things which exclude the existence [of these achievements] and determine his power of acting (Spinoza, 1996: 83-4).

What Spinoza is suggesting here is that pride, unlike say confidence, is a peculiar joy to the extent that it cannot inspire *active* desires. This is because pride is produced within passages of both joyful and sad affects. Pride is certainly composed partly of passive affects of joy produced by ideas related to an aggrandized sense of our power of acting (“that rush ... that split second ... that exact feeling...”) but this passage is not produced by a common notion of our connections with others. Instead, pride involves denying ‘those things ... that determine his power of acting’ (Spinoza, 1996: 84) – for example a site manager denying their reliance on good colleagues, favourable weather conditions, sheer luck, corporate and governmental policies, etc. Moreover, for Spinoza, pride also involves a passive affect of sadness, namely envy, produced by a flow of competitive ideas related to the achievements of others (“You’ve got to keep ahead of the field”). This envy inspires negative desire, or hate: ‘the proud man must be envious and hate those most who are praised’ (Spinoza, 1996: 145). When reading accounts from past winners, prospective winners may be inspired to feel pride but they cannot form common notions, and thus active desires that allow them to possess their power of acting. The reason for this is that by being enrolled in this vainglorious version of their pride, site managers necessarily cannot form common ideas of the shared effects and causes of their constituent relations with certain others, especially their human colleagues, and so they cannot become the adequate cause of their own joy and possess their power of acting (Deleuze, 1988; 1992; 2017). Indeed, award winning site managers are explicitly conceived as unable to adequately know their relations with other humans: ‘They must ... demonstrate excellent

leadership, technical expertise, robust health and safety processes and a certain ‘X’ factor to *set them apart from the competition*’ (NHBC New Homes, 2016; emphasis added).

These examples help us elaborate why affective interventions in and through pride are especially beneficial in the UK housebuilding industry as they encompass both enrolment and obedience affects. Regarding enrolment, pride is knowable through the NHBC Marking Guidelines as a higher degree of ‘attention to detail’ and ‘care’ within future bodily encounters, producing new technologies and their affects (e.g. insulated light switches). As discussed in the previous section, this dimension of pride can help slow the speeds of bodies, creating conditions to release passive affects (e.g. hope/fear), and some active positive affects and desires (confidence) – helping managers enrol unruly non-human bodies, like leaky light switches. But this version of pride also operates as a technique of power to inspire obedience to remain enrolled within the technological innovation strategies of senior managers. The cultivation of obedience proceeds through the purposeful circulation of two sets of encounters. One set is more imaginative: the Marking Guidelines prescribe imagined encounters and transformations with material objects (as in the attention to detail and care with future foundations), under the auspices of ‘Pride in the Job’; yet encounters and transformations with other related imagined bodies are excluded, in particular corporate innovation policies, and decisions, and even the criteria of ‘Pride in the Job’ award itself. The second set of encounters are more tangible: the staging of ‘flattering encounters’ (Spinoza, 1996: 145) through the circulation of certain bodies (e.g. award ceremonies, award certificates, and articles about awards), site managers can be gripped in the pursuit of a vainglorious joy as they are invited to downplay the contributions of their own colleagues and envy the achievements of their peers elsewhere. Such atomizing encounters do not fulfil the affective conditions necessary for site managers to form expansive common notions of their constitutive relations with other bodies

(site managers, colleagues, distant sites and technologies, corporate and governmental policies, other affects etc.), within their firm or beyond. They cannot therefore possess their power of acting, and pursue radical problematizations and counter-enrolments of corporate strategies and decisions – even perhaps to challenge the existence of a technology such as a ZCH. In other words, if the circulation of enrolment affects constitutes a centrifugal force, allowing humans to connect with and create new technological bodies, obedience affects constitute a centripetal force forestalling and centring that process on a purposeful, managerially mandated, interests and agendas.

Concluding discussion

Our proposals for an affective ANT suggests relationally constituted human affects do more than prompt actors to adopt or reject, or use or not use, discrete technological objects (Chaudhuri et al. 2010; Choi et al. 2011; Lamprou, 2017; Wood and Moreau, 2006). Instead, human affects (re)constitute technologies. The hope, confidence, envy, hate and pride, that circulated at Ecoville, engendered conditions conducive for the enrolment, and thus proliferation, of some non-human bodies (insulated light switches) as part of the ZCH, while perhaps delimiting the capacity of others to be enrolled and proliferate (e.g. expanding foam). Human affects, and the technological bodies they gather together and transform, in turn modify ‘technical affects’ (Ash, 2015) – creating new thresholds for technologies to act and be acted upon as they circulate (e.g. new capacities for houses to insulate and be insulated) and new tipping points where those thresholds can be transformed or broken down.

In elaborating the interplay of human and technical affects, affective ANT also suggests how the circulation of new technologies involves the circulation of new technical affects that shape materially inscribed organisational norms of action and meaning (Joerges and Czarniawka, 1998; Spicer, 2005). For example, following Ecoville, new thresholds to insulate with air tape *can* allow new definitions of the components of a ‘zero-carbon home’ to be circulated across the UK housebuilding industry, perhaps shaping new working patterns and identities. Although, as Ash (2015) explains, such technical affects are never reducible to their designed intent as ‘material components and thresholds can be reworked, modified or simply broken down, which in turn generates a whole new set of thresholds within which affects can operate’ (p87). More research is required to explore the organisation, circulation and transformation of such ‘technical affects’ (Ash, 2015) in prescribing, proscribing and transforming such organisational norms of action and meaning. Our specific contribution here has been to highlight the role of humans in producing such technical affects. Typically, human agency in organisational studies of technologies is either employed to critique technological determinism (Orlikowski and Barley, 2001), or downplayed within socio-material notions of ‘relational’ or ‘symmetrical’ action (e.g. Locke and Lowe, 2007; Harrison and Laberge, 2002). Affective ANT differs by prefiguring human agency as distinctive in enabling technological bodies to proliferate through ongoing transformations of their technical affects. But, somewhat paradoxically, such agency is *not* attributable in advance to humans (as suggested by Fitzgerald et al. 2002; Hung, 2004; Korica and Molloy 2010) or the product of happenstance within a network of shifting relations (Cochory, 2009; Latour, 1999; Locke and Lowe, 2007). Rather, human bodies are said to only possess their agency to enrol together human and non-human bodies, and circulate new technical affects – or, simply put, to innovate – when encounters fulfil specific conditions: connective speeds that allow bodies (distal and proximal) to mix; the passive release of joyful affects; and (common) ideas of the shared bodily effects and causes

of those affects. The purposive enrolment of new bodies within a technological object, and the creation of new technical affects, may be locally necessary for technologies, like ZCHs to form transformative connections with new bodies (e.g. insulated light switches), but it can also radically transform the intended purpose, or ‘problematization’ (Callon, 1986), of a technological object – even perhaps destroying it (Latour, 1996). This is why, as with our example of ‘Pride in the Job’ award winning site managers, inspiring encounters to counterbalance the inspiration of creative enrolment affects with obedience affects that instil compliance to extant innovation strategies becomes a central managerial task.

By directly exploring managerial interventions into the affective life of organisations our approach thus also informs Deleuzo-Spinozian studies on organisation and affect. Most importantly, our analysis highlights the significant interplay of joyful and sad affects in the survival of bodies. This idea, which follows as much from our cross-fertilization of Deleuzo-Spinozian affect theory with ANT as from our empirical case, runs somewhat counter to Deleuze’s (1988; 1992; 2017) reading of Spinoza and extant Deleuzo-Spinozian organisational studies. That is, in these treatments of affect, the survival of bodies is strongly associated with their capacity to develop joyful, transformative, encounters with other bodies (e.g. Carnera, 2012: 82; Deleuze, 1992: 243; Hjorth and Holt, 2014: 84-88; Thanem and Wallenberg, 2015: 241). In contrast, in our analysis, capacities to forestall transformative connections between bodies, to block the emergence of new bodies, to allow bodily connections to disconnect, even if temporally short-lived and spatially localized, appear equally essential to their survival. However, within Deleuzo-Spinozian organisation studies, and beyond (Anderson, 2014: 16-17), the term ‘affect’ has almost become a synonym for joyful affect: the open-ended transformation of life to countermand ‘order’ (Hjorth and Holt, 2014: 92), ‘moralism’ (Carnera, 2012: 82), ‘organizational authoritarianism’ (Thanem and Wallenberg, 2015: 248), domination

(Michels and Stayaert, 2017: 100) and ‘gendered organization’ (Pullen et al. 2017: 115) – in short, against oppressive management.

For us, this joyful treatment of affect, no matter how seductive when figured against the perceived deadness of organisations, is problematic in two respects. Firstly, ontologically, as it underplays the role of sad affects in the endurance of all bodies, even radical ones. And secondly politico-ethically, as it prefigures negative and positive affects as respectively reproducing and challenging relations of power. In our study the important cuts to explore relations of power did not concern abstracted distinctions between positive and negative affect. Rather they concerned distinctions rendered within managerial interventions into affective life, as in the ‘Pride in the Job’ award, where affects like pride circulated to attach some bodies within transformative connections with hope and care (e.g. hands and light switches), while disconnecting others through envy and hate (e.g. site managers and their colleagues). By mapping such affective interventions – and the specific affects and bodily connections and disconnections they assemble – their role in sustaining and transforming certain bodies over others can be better understood and so perhaps critically reworked. But even in this refashioning process, sad obedience affects play a vital role. After all, even radical bodies, such as Spinoza’s concepts, can only endure into the twenty first century, and transform new bodies, like ANT, because their transformative capacity is also, to an extent, disconnected, from certain bodies through obedience affects – from words reproduced consistently in published texts to the routinized work of power station employees that helps nudge chains of electrons to electronically display those texts. To rephrase Deleuze and Guattari (2004: 500): never believe that a joyful encounter alone will suffice to save us. And this maxim applies as much to the transformative potential of zero-carbon homes as it does affective ANT.

Acknowledgements

We are extremely grateful to the three anonymous reviewers at Organization Studies and Daniel Hjorth for their care in helping us improve the manuscript. We must also thank the Institute of Science, Technology and Innovation Studies at the University of Edinburgh where an earlier version of this paper was presented. This study was also supported by the United Kingdom's Economic and Social Research Council (grant number: ES/M000249/1).

References

Akrich, M., Callon, M., Latour, B. (2002). The key to success in innovation part ii: The art of choosing good spokespersons. *International Journal of Innovation Management*, 6(2), 207-225.

Anderson, B. (2014) *Encountering affect: capacities, apparatuses, conditions*. Farnham: Ashgate.

Ash, J. (2015). Technology and affect: Towards a theory of inorganically organised Objects. *Emotion, Space and Society*, 14, 84-90.

Bear, C. (2013) Assembling the sea: materiality, movement and regulatory practices in the Cardigan Bay scallop fishery, *Cultural Geographies*, 20(1), 21-41.

Carnera, A. (2012) The affective turn: The ambivalence of biopolitics within modern labour and management, *Culture and Organization*, 18(1), 69-84.

Cochoy, F. (2009) Driving a Shopping Cart from STS to Business, and the Other Way Round: On the Introduction of Shopping Carts in American Grocery Stores (1936–1959), *Organisation*, 16(1), 31-55.

Callon, M. and Law, J. (1982) On Interests and Their Transformation: Enrolment and Counter-Enrolment, *Social Studies of Science*, 12(4), 615-625.

Callon, M. (1986). Some elements of a sociology of translation: domestication of the scallops and the fishermen of St Brieuc Bay, In J. Law (Ed.) *Power, action and belief: a new sociology of knowledge?* (pp.196-223). Routledge: London.

Chaudhuri, A., Aboulnasr, K. and Ligas, M. (2010). Emotional Responses on Initial Exposure to a Hedonic or Utilitarian Description of a Radical Innovation. *Journal of Marketing Theory and Practice*. 18(4), 339–359.

Choi, J., Sung, S., Lee, K. and Cho, D. (2011). Balancing cognition and emotion: Innovation implementation as a function of cognitive appraisal and emotional reactions toward innovation. *Journal of Organisational Behavior*, 32, 107-124.

Cooper, B. and Burrell, G. (1988) Modernism, Postmodernism and Organizational Analysis: An Introduction, *Organization Studies*, 9/1, 91-112.

De Laet, M. and Mol, A. (2000). The Zimbabwe bush pump mechanics of a fluid technology. *Social Studies of Science*, 30(2), 225-263.

DeLanda, M. (2006) *A new philosophy of society: Assemblage theory and social complexity*. London: Continuum.

DeLanda, M. (2016). *Assemblage Theory*. Edinburgh: Edinburgh University Press.

Deleuze, G. (1988) *Spinoza: Practical Philosophy*, City Lights Books: San Francisco.

Deleuze, G. (1992) *Expressionism in Philosophy: Spinoza*, Zone Books: New York.

Deleuze, G. (2017) *Gilles Deleuze, lecture transcripts on Spinoza's concept of affect*, <https://goo.gl/VASv4K> (last accessed 6th November 2017).

Deleuze, G. and Guattari, F. (2004) *A Thousand Plateaus: Capitalism and Schizophrenia*, Continuum: London.

Fisher, G. and Aguinis, H. (2017) Using Theory Elaboration to Make Theoretical Advancements, *Organisational Research Methods*, 20(3), 438-464.

Fitzgerald, L., Ferlie, E., Wood, M., and Hawkins, C. (2002) Interlocking interactions, the diffusion of innovations in health care, *Human Relations*, 55(12), 1429-1449.

Harrison, D. and Laberge, M. (2002). Innovation, identities and resistance: the social construction of an innovation network. *Journal of Management Studies*, 39(4), 497-521.

Hjorth, D. and Holt, R. (2014) Baruch Spinoza, In J. Henlin, T. Hernes. Hjorth. D. and R. Holt (Eds) *Oxford handbook of process philosophy & organization studies* (pp.78-93). Oxford University Press: Oxford.

Housebuilder (2017) Pride in Perfection, Housebuilder in partnership with NHBC, http://www.housebuilder.co.uk/issues/index.php?page=article&id=6156&magazine_section=&orig=default (last accessed 15th May 2017).

Hung, S. (2004) Explaining the process of innovation: The dynamic reconciliation of action and structure, *Human Relations*, 57(11), 1479-1497.

Fleming, P. (2018) Robots and Organisation Studies: Why Robots Might Not Want to Steal Your Job, *Organisation Studies*, <https://doi.org/10.1177/0170840618765568>.

Joerges, B. and Czarniawka, B. (1998) The Question of Technology, or How Organisations Inscribe the World, *Organisation Studies*, 19(3), 363-385.

Korica, M. and Molloy, E. (2011) Making sense of professional identities: Stories of medical professionals and new technologies, *Human Relations*, 63(12), 1879-1901.

Lamprou, E. (2017) Spatiality as Care: A Heideggerian Perspective on Sociomaterial Perspective, *Organisation Studies*, 38(12), 1733-1752.

Latour, B. (1987) *Science in action: How to follow scientists and engineers through society*. Harvard university press: Cambridge, MA.

Latour, B. (1996). *Aramis, or, The love of technology*, Harvard University Press: Cambridge, MA.

Latour, B. (1999) Factures/fractures: from the concepts of the network to the concept of attachment, *Res*, 36, 21-31.

Latour, B. (2004) How to Talk About the Body? The Normative Dimension of Science Studies, *Body & Society*, 10(2-3): 205-229.

Law, J. (2002) Objects and Space, *Theory, Culture and Society*, 19(5/6): 91-105.

Lock, J. and Lowe, A. (2007). A Biography: Fabrications in the Life of an ERP Package, *Organisation*. 14(6), 793–814.

Michels, C. and Stayaert, C. (2017) By accident and by design: Composing affective atmospheres in an urban art intervention, *Organization*, 24(1), 79-104.

Müller, M., and Schurr, C. (2016). Assemblage thinking and actor-network theory: conjunctions, disjunctions, cross-fertilisations, *Transactions of the Institute of British Geographers*, 41(3), 217-229.

NHBC New Homes (2016) New home site managers take great Pride in the Job, Industry News – NHBC New Homes, <http://www.nhbcnewhomes.co.uk/industry-news/new-home-site-managers-take-great-pride-in-the-job/> (last accessed 15th May 2017).

NHBC (2017a) Pride in the job assessment sheet 2016/17, NHBC, <http://www.nhbc.co.uk/AwardsandEvents/Pride-In-The-Job/Downloads/filedownload,70069,en.pdf> (last accessed 15th May 2017).

NHBC (2017b) Pride in the job media pack, NHBC, <http://www.nhbc.co.uk/AwardsandEvents/Pride-In-The-Job/Downloads/filedownload,70070,en.pdf> (last accessed 15th May 2017).

Orlikowski, W. and Barley, S. (2001) Technology and institutions: what can research on information technology and research on organisations learn from each other? *MIS Quarterly*, 25(2), 145-165.

Oswick, C., Fleming, P. and Hanlon, G. (2011) From borrowing to blending: rethinking the processes of organisational theory building, *Academy of Management Review*, 36(2), 318-337.

Pullen, A., Rhodes, C. and Thanem, T. (2017). Affective politics in gendered organisations: Affirmative notes on becoming-woman. *Organisation*, 24(1) 105–123.

Rogers, E. M. (2003) *Diffusion of Innovations*. London: Simon and Schuster.

Spinoza, B. (1996). *Ethics* (trans. Curely, E) London: Penguin.

Swan, J. and Newell, S. (1995) The Role of Professional Associations in Technology Diffusion, *Organisation Studies*, 16(5), 847-874.

Thanem, T. and Wallenberg, L. (2015) What can bodies do? Reading Spinoza for an affective ethics of organizational life, *Organization*, 22(2), 235-250.

Thrift, N. (2008). *Nonrepresentational theory: space, politics, affect*. London: Routledge.

Whittle, A. and Spicer, A. (2008) Is Actor-Network Theory Critique? *Organisation Studies* 29(4): 611-629.

Wood, S. and Moreau, P. (2006) From Fear to Loathing? How Emotion Influences the Evaluation and Early Use of Innovations, *Journal of Marketing*, 70(3), 44-57.

ZCH (2017). Fabric Energy Efficiency for Zero Carbon Homes: A Flexible Performance Standard for 2016, Zero-Carbon Hub <https://goo.gl/LSrzNa> (last accessed 5th April 2017).