

Networks: open, closed or complex

Connecting philosophy, design and innovation, part 3

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Abstract—This is the third and final paper of a series bringing a philosophical investigation to matters of design and innovation. With the others examining: first, the urges to reconsider innovation from a creative, specifically design, direction; and second, the type of dynamic innovation that may be thus reconsidered; this paper will investigate a way of constructing this type of design-driven innovation. It will begin by looking at the networks that can be created to deliver a dynamic, continually innovative innovation and will start by considering two concepts of network: the open and the closed. While there seems to be an easy distinction to be made between open and closed, and its mapping onto similarly convenient ideas of good and bad, I hope to show that this is not the case. The complexity of networked forms of organisation demand that we bring to them a complexity of thought that comes from philosophy. Nevertheless, such an account will also need to engage with discourses from other disciplinary areas: notably organisational theory, innovation management and design. The outcome is of importance to thinking the organisational structures in which innovation is managed.

Keywords—Deleuze and Guattari; innovation; networks; organisation

“To succeed, the new [management] model must replace the win-lose nature of the assembly line with the win-win nature of the network.” Marty Neumeier (2009)

“Whoever masters the network form first and best will gain major advantage.” John Arquilla and David Ronfeldt (2002)

“Never believe that a smooth space will suffice to save us.” Gilles Deleuze and Félix Guattari (1987)

opening remarks

Two papers have preceded this one: ‘Beyond Success’ and ‘Restless Innovation’ (both work-in-progress). The first examines the conditions according to which innovation can be thought and rethought, and focuses upon the concept of ‘success’ as it is an important part of a very succinct definition of innovation given by Sir George Cox (2005) produced for the UK Government’s then Department of Trade and Industry: where innovation is told to be the “successful exploitation of new ideas” (p.2). There I consider how one of the material conditions for innovation being distinguished from

creativity, its success, also leads to its downfall. The conclusion is that an innovation driven by design needs to be critically self-reflective, at least, and dynamically self-innovative at best, in order to ensure success and the structural non-retrenching upon that success. The second paper, examines the dynamic, creative outcomes proposed by such a rethinking, and details the type of innovation that does not rest on its success: the innovation that once success has happened, keeps moving. It does this by providing a philosophical investigation into three themes: first, the relation between space and ontogenesis (the dynamic, constant re-expression of the conditions for existence); secondly, the relation between such an ontogenesis and the conditions for a creative, design-driven innovation. And finally, the strategic mapping that these dynamic ontogenetic acts demand. It concludes by positing that an organization or individual in dynamic, re-imagining is one that is connected, spaced and operating in a context of openness and closedness. The paper that follows, this one in front of you now, is the next step from these, and engages with the types of networks that a dynamic, ontogenic design-driven innovation necessarily builds.

For some any continued engagement with the concept of the network may seem clichéd, at best, and misguided, at worst. Christopher Kelty (2004) wonders whether the term is so ambiguous in current times, in ways that was not the case in the 1980s, that it demands its own axiomatics each time that it is used. He writes: “Twenty years earlier, the network was an obscure engineering object [...]. Today, of course, all that has changed: we need more than a new concept (or a new word for a set of old concepts), we also need a way to understand how the thing – the very material, electronic, and complex network that we live and work with every day – has changed the very meaning of the concept of ‘social relations,’ never mind that of ‘network’” (Kelty, 2004, p.90).

Roberto Verganti highlighted a similar issue regarding design in *Design-Driven*

Innovation (2009). The lack of a normative definition of design for him was a problem that led, at the very least, to any collection of designers when first meeting to spend much time arguing over what it is. For many designers, design educators – and innovation management educators for that matter – the lack of a standardising concept of design allows it to engage in a perpetual, dynamic, reassessment of its value, impact and the constituents of its being (see Julier (2007), Poggenpohl (2008) and Hestad and Jamie Brassett (2013)). Kelty (2004) notes that there is a similar innovative quality regarding the concept, and actuality, of the network, of networks. The concept of the network has been impacted upon by the world in which it moves becoming more technologically and materially networked, and in turn has led to the need to redefine itself and the world in which it has currency: increased networked conditions demand the rethinking of both the conceptual and material realities of networks.¹ Podolny and Page (1998), an article reviewing sociological and economic literature on networks, place them as neither market nor hierarchical forms; where market relations are purely episodic and do not endure beyond the transaction, and where all connections in a hierarchy support a centralised node. In a way, they say, all organisational forms are networks, they merely differ in the endurance, strength or function of their bonds: massively open (spot markets) or rigidly closed (empires). As technologically mediated networks – that these days are the first thought when considering networks – mature, and as they coalesce around familiar economic and socio-cultural forms of power and control, and disperse around new forms of insurgency,² we are at a moment when the

¹ It is worth adding here that there are many instances of material network throughout history, many relating to empires, and we should not think that they have only arisen given recent technological abilities. Deleuze and Guattari write compellingly of the networked power of the Nomad War Machine in ‘1227: Treatise on Nomadology – the War Machine’ (1987, pp.351-423) for example; while others discuss the relation between trade, skilled workers and the flow of capital and new technologies in Mediæval times (for example: Gimpel (1988) and De Landa (1997)) in ways that we would regard as expressive of networks.

² See Newfield and Rayner (2005) on philosophy (particularly Deleuze and Guattari), organizational theory and insurgency. On relations between design and activism see also Vina (2012) and Julier (2013).

nature of the network is both at its most powerful and challenging. Under these conditions, of the complexity of contemporary organisation, of immanence (where the transcendental conditions for existence and the material expressions of existence come together) and ontogenesis (where focus is on processes of becoming, rather than the stability of being and identity), networks highlight a need for an engagement with philosophy.

There are a number of other reasons why a philosophical examination of the concepts of openness and closedness, especially as they emerge from innovation discourse, is relevant to this discussion. First, some current innovation discourses advocate the principles of networking, multidisciplinary and openness that are also expressed in philosophy (notably Deleuze and Guattari's work (1984), (1988) and (1994)) and design (especially that which collects around the term 'design thinking': e.g. Brown (2008), Berger (2009), Martin (2009), Neumeier (2009), Lockwood (2010) and Johansson-Sköldberg *et al.* (2013)). From the innovation thought that deals with – among others – political economy (e.g. Benkler (2006)) and marketing (e.g. Kozinets (2008)), organisational psychology (e.g. Paulus and Nijstadt (2003)) and, of course, Open Innovation (e.g. Chesbrough (2003)), we find championed the positive impact upon innovating of connectivity and the openness that this promotes. While making mention of some of concepts from the areas listed here, I will look at the work of Chesbrough with a focus on the notion of open innovation with which he has become so synonymous. But will test it against some concepts from *A Thousand Years of Nonlinear History* (1997) by Manuel De Landa, which deals with many of the same issues as Chesbrough, albeit from a philosophical perspective on history and chaos theory.

Secondly, one of the aspects of the contemporary shift in the loci of power over the flows of international capital, and the transference of centres of production and

technological development (Appadurai (2001) and (2002)) as manifest in terms of design practice that this shift produces, is a movement into innovation and strategic opportunity development evinced through a focusing on the ‘front-end’ research phase of the design process (see Fulton-Suri (2003), Lunenfeld (2003), Findeli and Bousbaci (2005), Julier (2007), Joanna Brassett (2008), Kimbell (2011) and (2012)). There is a sense in which some contemporary design firms are reconfiguring themselves accordingly, incorporating new practices and opportunities for practice into their offer in light of the dynamic changes in the global economy.³ Guy Julier has noted that if “the design profession is concerned with innovation, change and invention, then during its relatively short lifespan it has consistently reinvented itself” (2007, p.9). That design has been critically self-organising and not resting on any specific formulation of its identity is a sign both of its innovativeness, and of the increasing importance to the world (and therefore design) of discourses and practices of innovation and strategy.⁴ Furthermore, we are not only seeing here a reconfiguration of what design is by its engagement with innovation and strategy, but also innovation and strategy (and the business worlds in which they have traditionally been located) being redefined by an encounter with design: specifically in terms of ‘design thinking’. The complex interconnectibility between front-end design research, strategy and innovation offers itself perfectly as an expression of concepts of rhizome and smooth space as put forward by Gilles Deleuze and Félix Guattari (1984) and (1987), to which I’ll return later.

³ This change in practice effected by a shift in meaning of the designed object – from design being an adjunct of manufacturing and engineering (roughly 1950s to 70s), to it being under the auspices of marketing and advertising (c.1980s to 90s), to design being an element of strategy (90s to present) (see Findeli and Bousbaci (2005)) – mirrors the economic changes outlined by Pine and Gilmore in *The Experience Economy* (2007). Though their view of economic progression seems rather “stagist”, with each economic form “progressing” linearly until it reaches the present condition, this is not the view of design that I would like to propound. As I will argue later in the paper, different forms of society can co-exist, though with a dominant characteristics at different historical moments. It seems to me that different meanings and practices of designing can also co-exist.

⁴ I discuss this notion further in ‘Ecstatic Innovation’ in terms of design and innovation’s ontogenesis: the need for it to be constantly changing their nature.

Thirdly, in addition to this and further to the more obvious visualisation and concretisation abilities, it is regarded that designers have a peculiar ability (when ranged against more traditionally-minded, academically-contextualised research) in negotiating a variety of stakeholders (from colleagues to clients to cultures and consumers) and managing diverse value positions in the promotion of a creative or innovative opportunity.⁵ Moreover, ‘design thinking’ discourses have highlighted “abductive” reasoning (the ability to make creative, ‘sideways’ connections) as one of the key transferrable skills of the designer of value to the business and management community (see Martin (2009) and Neumeier (2009)). However it is not enough simply to create connections and therefore make a network; any network needs constant nurturing and critique. It is with this in mind that we need to come back to Deleuze and Guattari’s concepts of territorialisation, deterritorialisation and reterritorialisation (1984), (1987) and (1994), because with this nest of concepts we are introduced to a much more complex arrangement of activities than a simplistic account of ‘connecting is good’ might suggest.⁶ Briefly, Deleuze and Guattari (1984) posit *territorialisation* as the forging of organisational structures of hierarchy on the mass of undifferentiated flows (of desire, of capital); *deterritorialisation* as the undoing of these structures, in order to maximise potential for profiting from these flows’ energies (as surplus value) due to increased proximity to them; and *reterritorialisation*, which folds the deterritorialised back onto familiar forms of hierarchical organisation and control. While the Capitalist Machine is one that deterritorialises – as this is where the creative energies driving profit

⁵ See Julier (2007) for a discussion of this in terms of the changing nature of design practice.

⁶ It is worth noting here that there are examples of philosophy – especially from poststructuralist French thought – being brought to considerations of organisational theory. Robert Cooper is an early pioneer of this and though his accounts are generalising, they do highlight where such philosophy can make an impact (see Cooper (1986) and Cooper and Burrell (1988)). Spoelstra (2005) gives a good overview of Cooper’s work, and also makes good use of Deleuze and Guattari’s work in the same context. Newfield and Rayner (2005) perform a similar activity, with a particular focus on Deleuze and Guattari’s work and the ‘learning organisation’.

and growth can be found – it also reterritorialises on familiar forms of State, control and power in order to ensure that it is not destroyed by its proximity to the chaotic, creative forces it needs. “Movements of deterritorialisation,” they write, “are inseparable from territories that open onto an elsewhere; and the process of reterritorialisation is inseparable from the earth, which restores territories” (1994, pp.85-86). Therefore any move away from a familiar form of organisation – a territory – into something unfamiliar that is either the consequence of or may lead to disruption and uncertainty (a deterritorialisation, as Deleuze and Guattari might say) is dangerous, and familiar organisational forms may need to be reassessed in order to avoid collapse. It is important, then, for anyone in an innovation function to be aware of the territories and material organisational structures within which they are working. And thereby to understand the knowledge, commercial and other landscapes within which one is working or wanting to work, and the attendant dangers therein. Simple abduction or deterritorialisation is not enough, designers – and the innovators they inspire – in connecting and making networks through these connections, must have a strategic relationship to the spaces in which they are operating. They need to have a vision of where they need to dissolve, to push through the edges, and where to regroup and reorder. They need to know where the creative energy lies and where the organised forms of action reside. It may be true that the edges of any system must be unravelled for innovation to occur, demanding openness, making connections to the outside and the constant reappraisal of the relative value of the ordered inside of the system and the chaotic outside. But it is not enough just simply, singly, to unravel the edges of the dominant discourse within which one has been operating, or to shift into the next paradigm and sit there. ‘Thinking outside the box’ is not enough. The strategies one employs to navigate the landscapes inside and outside, to position the edge and the

nature of its relations to inside and outside, are important for the designer and innovator to consider. A design-driven innovation is, in its strategic capacity, primarily a cartographic machine: it maps the landscape in which it works as an important first step in managing its strategic development and continues this with every new act (see Serres (1982) and Jamie Brassett (2013)). Thus, deterritorialisation on its own will not save the stagnant designer or innovator, and a simplistic abducting into design will not save every struggling business: it is more important to know where and how to fold back into which organisational forms and practices, and then where to dissolve and disrupt again, in a constant movement. Both those who move (voluntarily or through force) and those who are left when the contexts within which they are familiar shift around them, must be continually creative in the construction and reconstruction of their opportunities for ontogenesis, for rethinking who they are and what and how they become. It seems, then, that any contemporary account of design and innovation needs to engage with concepts of networks, openness and strategic mapping: these will provide the focus of this paper.

There are two theoretical models to which I would like to draw attention: “open innovation” named as such by Henry Chesbrough (2003), (2006) and (2011) and Deleuze and Guattari’s mapping of smooth space (1987). The first because the issue of openness (or closedness) is of importance to any account of networks of innovation. And the second because as strategy is first and foremost a cartography (see Serres (1982) and Jamie Brassett (2013)) any design-driven innovation constructed in and as a strategic act, needs to understand the nature of the space in which it is (or wants to be) working. While it is not possible to follow the intricacies of each of these in such a short paper, I hope to highlight a few key ideas showing some points of connection and divergence in order to consider what is needed in order to promote the successful and continual creative reimagining constitutive of innovation.

open and closed...

For Henry Chesbrough, (2003), (2006) and (2011), the changing economic, technological and social contexts of the late twentieth and early twenty-first centuries have led to the need for a shift in the way that companies develop, manage and implement creativity, its outcomes, and the ways that companies relate to other entities in these contexts. In short, the new socio-cultural, political and economic realities demand a change in the make up, the products and the outlooks of contemporary organisations. Talking of a changing “knowledge landscape” (a phrase used throughout *Open Innovation* (2003) for example) Chesbrough outlines the types of innovation practice that need to be built in order to respond to such change. These changes he describes, using Kuhn’s famous concept (1996), as constituting a “paradigm shift”. While it is arguable whether Chesbrough’s use of this concept is correct, I will use it for the moment in order to articulate Chesbrough’s arguments.

Under the paradigm of “closed innovation,” Chesbrough explains, companies built Research and Development departments that contained within tight boundaries their knowledge creation and its channels for dissemination, filtering ideas according to dominant business, innovation management and marketing models, until a few choice projects are exploited to make it to market. Here the knowledge landscape is dominated by large organisations, controlling all aspects of innovation within massive, vertically integrated economies of scale and across vast ranges of scope. Under this paradigm companies demand power and control over all elements in the research, development, production and consumption processes – from raw commodity or zeroes and ones, right down to the experience and authenticity of the consumer, and beyond to waste and recommodetisation – in order to determine as much about the market and their position within it as possible. These organisations close themselves off to the knowledge creation

of others and their own idea production is rigidly defended against competitor organisations (routinely positioned as enemies). This paradigm of total control, massive vertical integration and horizontal reach, and proprietary creativity, Chesbrough identifies with twentieth century industrialism. Such control⁷ and its related necessary activities may work well in a paradigm in which the knowledge landscape is organised and the systems of power and control are clearly located and their boundaries rigorously defended, but when this paradigm shifts, as he argues has happened, so too must the model of innovation. The new, and current, paradigm, he posits, is one in which knowledge is distributed more chaotically across the global landscape, clumping and clustering in places outside of the traditional citadels of corporate structure and their areas of control. Upon this knowledge landscape, which is not only new but also undergoing constant transformation, Chesbrough asserts, the controlled and controlling, defensively postured, closed model must open up to the opportunities that now abound. It is well known in science and philosophy of science that the ways of considering dynamics in closed systems do not translate to open systems (see Prigogine (1980), Serres (1982), Stengers and Prigogine (1997) and Kuhn (1996)), and so with a new paradigm of thought we need new ways of acting. Thus an “open innovation” model demands that the once impervious boundaries of a corporation are made more porous, permitting two key movements.

First, knowledge is allowed, if not encouraged, to come in from other sources: some individual, some previously thought of as competitors, some outside of the normal constraints of the business model. To exemplify the rationale for this, Chesbrough quotes from the 2000 Annual Report from the pharmaceutical company Merck: “Merck accounts for about 1 percent [*sic*] of the biomedical research in the world. To tap into

⁷ The issue of control is an important one and I will return to it below.

the remaining 99 percent [*sic*], we must actively reach out to universities, research institutions and companies worldwide to bring the best of technology and potential products into Merck” (2003, p.53). There may be more ideas under the sun pertinent to the needs of a company than are generated by its own team, and the accessing of these ideas is one way of ensuring a creatively dynamic organisation. Related to this is the need for openness when approaching one’s creative and innovative task. In a case study given by Keith Goffin and Rick Mitchell in their *Innovation Management* (2010), John Lagerling – a strategy team manager at DoCoMo, the Japanese mobile telephone service provider – says: “We regularly conduct research outside the mobile telephone market, as we are interested to see how ‘lifestyle’ changes affect customers’ needs. ... *You do not get...insights for new products if you only research your own industry*” (p.37; my emphasis). For Lagerling, creative insight generation by his team must come when one encounters ideas, concepts, practices and events from outside one’s specific demands. For an organisation to ensure its creative production and growth, its edges need to be open to flows of energy from outside. This is not only true at the microbiological level,⁸ but also at the macro-organisational one (regarding large-scale business concerns in a global market), and every level in-between (including the personal and the team).⁹ If an organisation or an individual is to ensure a dynamic creative engagement within a changing socio-economic, political or cultural context, or a revolutionarily changing business paradigm, it must – at the very least – remodel its boundaries so that they allow flow of intellectual, cultural and commercial energy in. Openness becomes both a response to dynamism and uncertainty in an organisation or individual’s

⁸ Both the biologist Stuart Kauffman (1993) and the philosopher Manuel De Landa (1997) discuss this.

⁹ See: Powell (1990), Powell, Koput and Smith-Doerr (1996), Newfield and Rayner (2005) and De Landa (2006) for examinations of this from organisational, sociological and psychological perspectives.

context/paradigm and a way of modelling in dynamic terms the continual fluid play within such a context/paradigm.

Secondly, open innovation demands that ideas generated within a company's own research structure which do not reach the market through its innovation model, should be allowed to move out into the world, rather than left to stagnate. Chesbrough (2003) cites many examples from Xerox to IBM where disaffected researchers have taken their unwanted creations away from the company and started-up new competitive businesses. It would be much better for the company, he says, to perforate the boundaries of its system and allow ideas that seem not to fit the current business model out: to be licenced to competitors, or to form new businesses with connections to the original. In this way a company will generate a connected community of collaborators in which they are a key member, rather than remain alone within a multitude of competitors in an antagonistic space. Again this is of value to the individual (or team), where flows out need as much strategic management to ensure creativity as those in. Organisation theory and organisational psychology have known the value of openness to group creativity and innovation for some time.¹⁰ "The idea that diversity can promote creative and innovative outcomes in groups is widely accepted" (p.33), write Frances Milliken, Caroline Bartel and Terri Kurtzberg in 'Diversity and Creativity in Work Groups' (2003), citing references to research going back to 1989. However they also highlight that diversity can prove challenging to groups, leading to lack of cohesiveness and increases dissatisfaction (Milliken *et al.*, 2003, p.33). Heterogeneity and the openness that leads to it are not simple aims for any individual or organisation. When groups come together to work, the nature of the group and the principles according to

¹⁰ With this body of work in mind, it is easy to see that Chesbrough's work on open innovation is a rebranding of already-existing, well-wrought theories, rather than something entirely new. But a successful rebranding nonetheless.

which it is constructed will make a difference to the group's performance. Thus while the principles of openness, connectivity and heterogeneity are essential in ensuring creative innovation, so too are the organisational forms upon which the diverse, open, connected reconstitute themselves in the very acts of innovating, and so on.

There are many issues thrown up by the open model that Chesbrough propounds, not least those dealing with the ownership of and remuneration for creativity borne out of an open network, and that coalesce around intellectual property (this particular issue, however, sits outside the scope of this paper, as I want to concentrate upon practical expressions of conceptual models, not legislative ones). Nevertheless, Chesbrough's open innovation model quite simply seems to regard a matching of a networked, dynamic innovation to a world that is regarded as networked and dynamic. The inference being that old forms of doing business – even successful ones – are not adequate in new paradigms. We may think that it is better to approach new uncertainties as opportunities for development which demand untried practices and principles for working – even if this means a radical restructuring of an organisation, the adoption of new practices by a team, or a reconsideration of an individual's subjectivity – than to treat them as problems to be solved using tried and trusted methods in order to preserve the status quo. As I mention above, reproducing the processes that led to success in an earlier paradigm will not only fail to replicate success in a later one, but will set the conditions for future failure. This issue also leads to a problem with Chesbrough's account of open innovation. Its focus upon dominant *producers* leaves it still in the realm of what he identifies as the old paradigm. Whereas the open innovation paradigm is meant to champion engagement with a number of different originators of ideas, the main organisations for impacting such ideas upon the world are *still* companies and corporations seen in the traditional sense. Ideas may be flowing in and

out, but the loci of such flows, and therefore the entities in which resides *control and power*, are still the companies and organisations of the ‘old’ model. The relations between open and closed, new and old, good and bad are much more complex than Chesbrough’s account suggests.

We return to the concept of control and its role in the development, distribution and dissolution of the relationships between elements upon which organisations are established. While it is fair to assert that the concept of control looms large throughout his philosophical works, Deleuze produces two short pieces dealing specifically with the subject, ‘Control and Becoming’ (1995a) and ‘Postscript on Control Societies’ (1995b). Though he emphasises that societies are not reducible to their machines, or *vice versa*, Deleuze (1995b) characterises societies by their relationships to the dominant machinic models that they both enable and of which they are expressions. First, the clockwork regularity of sovereign states focus on *subjection* of constituent elements to points of absolute, God-given power (see also Deleuze and Guattari (1984)). Next, for industrialised nations the thermodynamic machine’s progression of entropy – and the need to manage and overcome the impact of time on its processes (see Prigogine (1980), Jamie Brassett (2005) and De Landa (2006)) – produces concentrations of power that are massified and distributed, as well as being localised. With this formation we have an emphasis upon *discipline* and *confinement*.¹¹ Finally, the information machine, the computer and the network characterised by its nonlinear distribution and connection, demands more emphasis upon *control*, Deleuze argues. He writes, “In disciplinary societies you were always starting all over again (as you went from school to barracks, from barracks to factory), while in control societies you never finish anything – business, training, and military service being coexisting metastable states of single

¹¹ Following Foucault (1971) and (1995).

modulation, a sort of universal transmutation” (1995b, p.179). While there is a certain amount of post-disciplinary freedom announced by the information society, the very fact of its general liquidity and that the workers are much closer to the flows of capital than they were in the industrialised machine means that they are in need of greater controlling. In an article on learning in creative organisations using thought from Deleuze and Guattari (among others), Paul Newfield and Timothy Rayner write: “Whereas discipline drills norms into individuals, control normalises in the process of setting individuals free. [...] While the forms of subjectivity produced within regimes of control are infinitely more fluid and transformable than those produced within disciplinary regimes, we believe it is correct to say that they represent normalised subject forms nonetheless” (2005, p.5). The subjects under control are not *moulded* by top-down imposition of standards as in disciplinary regimes, but *modulated* (Deleuze, 1995b), encouraged to adopt positions within organisations where they are urged, for example, “freely” to “mobilise tacit knowledge for the benefit of the organisation” (Newfield and Rayner, 2005, p.5). It is for this that contemporary learning organisations emphasise the personal development opportunities of Continual Professional Development: so that staff become the right kind of networker subjects, with internalised systems for controlling their desires to meet the ends of the organisation. Once workers in this new machinic regime have remodulated their values and ends in line with that of the organisation as information machine, Newfield and Rayner explain, they can truly be said to have reconfigured their characters according to the norms and standards of that organisation: *ethos* (Greek for character and custom) is now aligned with, and through, the organisation’s values and ends. “The control of narrative-identity is an essential technique,” they add, “in the normalisation of the corporate ethos” (2005, p.6). It is important for us to remember that these three characteristics of machinic

society and organisations are not stages through which they must progress, from one to another in a linear fashion. As Deleuze and Guattari write of other machinic formations in their work (especially in *The Anti-Oedipus* (1984)), their alignment with a particular historical moment is not a tethering. It is possible that the three formations coexist in the same society at the same time, in different concentrations and with different functions. The same network, or organisation, can either exhibit diverse features at the same time in different places (rigid, sovereign, territorialising production and rigid discipline at centres; liquid, networked, de- and reterritorialising, and controlling at the edges), or swing between ways of being at the same place across different times (one moment disciplinary, another controlling). It is for this that Deleuze (1995b) writes of the production of “dividuation” as a function of societies of control. The *dividual* is one who has gone beyond the isolating and disciplined solitude of an individual identity and has entered into the forging of common subjective modalities with others (see 1995b, p.180, and Newfield and Rayner (2005)). People are networked; and these (people and their networks) are both contingent upon the spaces and politics of the organisations within which they find themselves, and under constant flux. Simple oppositions – between us and them, masses and individuals, for example – are no longer adequate and paradoxes and ambiguities are not only the outcome of this way of organising, but also the conditions for it to come into being. Deleuze and Guattari’s account of capitalism in their work on schizophrenia and capitalism (1984) and (1987), as we have seen, is similarly complex. Capitalism needs to flirt with the breaking up of normal ways of thinking that can be characterised as schizophrenic (*schizo* is the Greek for splitting, parting or separating), to entrap the energies of the chaotic in order to fuel its creative growth through innovation. It is not purely by luck that the contemporary cliché for creative innovation asks for ‘thinking outside the box.’ Of course this risks complete

dissolution and destruction, the mitigation of which other machinic regimes of organisation need to be accessed. So the Capitalist Machine needs to have a much more complex attitude to the flows of Capital upon which it relies, the spaces constitutive of its being and the energies needed both to promote its growth and mitigate against its destruction. It is not a case of simply choosing chaos over order, (or *vice versa*); but of negotiating complexities of flows, spaces and organizational forms in similarly mixed, paradoxical and complex ways.¹² For Newfield and Rayner (2005) this paradox of control through freedom inherent in learning organisations under networked capitalist societies of control, is both a challenge and an opportunity. On the one hand the inception of control and organisational ethos *as* workers' beings is to be guarded against. On the other, the creative, liberatory opportunities that the urge to ever-increasing creativity demands offers the possibility for pockets of "creative insurgencies" (Newfield and Rayner, 2005, p.6) to abound. It is with this in mind that we can come back to our account of Chesbrough on open innovation.

The knowledge landscape in which organisations now operate may be more chaotic, or even just more diversely populated than before, but large organisations remain the dominant attractors of innovation activity. The only difference seems to be in the porosity of such organisations' boundaries and their relation to the flows that are captured or leaked by the now-porous organisation. The paradigm may not be shifting, only the models, and that the burgeoning models will sit with each other in ever-complex arrangements. This makes sense in the terms set out by Chesbrough (the subtitle of *Open Innovation* (2003) being "The New Imperative for Creating and Profiting from Technology"): immediate reterritorialisation of the more fluid, open ways

¹² The concept of the mixture of forms is important in Deleuze and Guattari's work. I examine the philosophical, scientific, design and innovation issues regarding this concept in more detail (forthcoming) through unpacking order, chaos and complexity.

of operating onto familiar capitalist discourses of profit, are thus announced at the very outset of the book) but in the context of design and designing – and the approaches to innovation that they can drive – it needs examination. I argue elsewhere (Jamie Brassett, forthcoming) that the flows and forces constitutive of innovation operate according to principles that are both biological and philosophical (among others, of course, it is just these two that I have been highlighting). In Stuart Kauffman’s discussion of order, chaos and emergence of creative complexity of evolution at the boundary zone of the two (1993), he argues that for sub- and supracritical systems, there is a sense in which too much order (closedness, subcritical) leads to stagnation and too much chaos (or openness, supracritical) will lead to dissolution. For Kauffman, a system “poised” (1993, p.391) between the two generates that best conditions for evolutionary creativity. Chesbrough’s Open Innovation model should be poised just so: open enough to let creative chaos in, closed enough to make it work. The next question should be: is there a ‘sweet spot’ of poise between order and chaos where we find optimum energetic flow and the maximisation of value creation or innovative growth? Or is it a case not of occupying a poised position, but of never-ending fluctuation between chaos and order? To consider these questions, we will need to investigate the nature of networks such openness promotes and in so doing we will begin to complexify Chesbrough’s articulation of open and closed paradigms.

Connecting disparate, antagonistic or just simply different elements into a network is, in itself, obviously not enough. To be innovative the connections forming a network need to be strategically formed; there needs to be something driving the formation (or even dissolution) of connections. The network must cohere and the resulting organisation will have a characteristic based upon the nature of the ties

between its nodes: wholly rigid connections will give a stable, but closed organisation; too loose and chaos reigns, and the network dissipates.

...spread and centralised...

In *A thousand Years of Nonlinear History* (1997) on history's "nonlinear combinatorics," Manuel De Landa engages with a number of processes that he investigates from geological, biological and linguistic perspectives whereby elements from temporally previous moments infiltrate, combine with and mutate current events. The benefit of looking at how he examines history in this way comes from the model of a complex, nonlinear networking that he articulates. For De Landa, different processes can be expressed by the same principles, leading to moments when seemingly different, and chronologically distant, events make an impact at the same time. At a transcendental level – where we are discussing the conditions for existence of things –, the same concept can find their actual, material expression in different ways. This describes Deleuze and Guattari's concept of the "abstract machine" (1984) and De Landa's use of it here (1997). The machinic relations between flows, their blockages and their diversions operate in the same way whether we are considering flows of magma or sedimentation, capital and profit, or genes and language: the abstract machine provides the conditions upon which such flows etc. operate or are actualised. In order to exemplify this, De Landa presents the principles underlying the relationship between – in one example – geographical loci, their spheres of influence and the myriad resources upon which they rely. Furthermore, the places he describes in his sections on geology (which encompasses flows not only of rock but of capital too) – countries, regions, cities, rural areas, continents – are in tension between being open and closed, in ways not dissimilar to Chesbrough's discussion of innovation and business. There are two models of the network, as pure forms, that De Landa gives to describe a city's

relationship with its surroundings: the first is the Central Place in a Hierarchy; the second a node in a spread out network. The city that is a Central Place, sucks-up all the resources within its purview, ensuring that everything moves upwards towards itself and presses down through the network various moral, social, religious, aesthetic, economic and other strictures that reinforce its position at the top of the hierarchy. Resources flow upwards for the benefit of the city only and its distribution of codes of practice through its network ensures that these flows continue. In the nodal example, the city acts as an accelerator of flows in the expression of mutuality with other such nodes (cities, regions, and so on). Neither is more important than the other, but all benefit from being hooked together in a system that is always dynamic and fluid. While the connections to Chesbrough's work on openness may be drawn immediately with these examples of cities, we must beware of being too simplistic in equating the Central Place in a Hierarchy with the organisation operating in the closed innovation paradigm and nodes in a network with open innovation. In one way we could say that Central Place cities are closed systems just like closed organisations: enclosing all necessary productive energy for its own benefit and developing rules according to which this activity is rationalised and the system as a whole perpetuated. However, they are open insofar as they operate in a wider, fluid context; and necessarily so, as their ability to extract (surplus) value from their context demands such openness. Similarly, the organisation operating in an open innovation paradigm as Chesbrough asserts, while ensuring its constitutional porosity and the free flow of ideas in and out of its environs, may use its position as an attractor in a diverse landscape to draw all flows through itself and, in so doing, construct a range of codes according to which this must happen. De Landa states (1997) that pure forms of the models he describes are difficult to find (echoing Deleuze and Guattari (1987)), and that complex hybrids of the hierarchical and spread-out models, in

different mixtures, are more likely to occur. It appears, then, that more than openness and closedness, it is the *attitude* of dominance or mutuality one has to/within one's networked context that is most important in a diverse and dynamic knowledge landscape. An organisation operating an innovation model which seeks to dominate and is largely closed, is one Chesbrough identifies with Twentieth Century business practice; we may also add that the organisation innovating openly may also fall into the so-called business paradigm of the last century if its urge for openness comes from the desire to dominate and control. Furthermore, the lack of 'purity' of exemplification of the model, of the abstract machine, shows that reality positions itself, largely, at the boundaries between the open and closed, networked and hierarchical. Reality is a complex landscape of difference and similarity, where forms blend in and out in a nonlinear spread, rather than tend towards one or the other in a linear opposition. Indeed – as Podolny and Page show (1998) – *all* organisations are networks (including markets and hierarchies). Difference comes from relative dissolution and rigidity, horizontality and hierarchy, transience and permanence.

In terms of design practice, designing and design-driven innovation, the implications of such approaches are many. An issue of creative openness, and the impact of it on an organisation for whom designing is an important aspect of its value proposition, has already been mentioned with respect to DoCoMo above. While the issue of what constitutes creative intervention may be too large for this paper to tackle, there are aspects that relate to some of the key issues discussed here. First, there is the notion of *connecting*, as I've mentioned above. Both Neumeier (2009) and Martin (2009) articulate the logical principle driving a designer's approach to working creatively as "abductive" following the example of American pragmatist philosopher C. S. Peirce. While deductive logic reasons from the general to the specific and inductive

from the specific to the general, abductive logic moves sideways, making connections between things that are not naturally connected. Martin, discussing the interest in creativity shown by Peirce, writes: “[Abductive] is not declarative reasoning; its goal is not to declare a conclusion to be true or false. It is modal reasoning; its goal is to posit what *could possibly* be true” (2009, pp.64-5; my emphasis). Martin argues that new ideas are not verified through provable or disprovable rationality according to fixed accounts of truth or falsity (or even good or bad), but just arise through “logical leaps of the mind” (2009, p.64, quoting Peirce) and the fact of their arising is enough, no verification is needed. In making these leaps, in growing the new through connecting to the strange, lies creativity. This is how Martin defines ‘design thinking’ (with Neumeier’s endorsement (2009)). Verganti declares (2009) that designers are key “interpreters” and that “design-driven innovation therefore entails getting close to interpreters. It leverages their ability to understand and influence how people *could* give meaning to things” (p.13; my emphasis). The “continuous mutual dialogue” (2009, p.12) that these “interpreters” engage in, attests to an ability – if rather vaguely articulated by Verganti – to make connections to a wide range of others within the context in which they operate. The modalities of connecting to create the new and of producing new meanings are seen as important, and transferrable, qualities of a designer. It is important for us to consider what this means for this discussion. To connect, to form a network is not enough. To rework a quotation from Deleuze and Guattari used as an epigram to this paper: never believe that an open connected network will suffice to save us. And while Verganti’s “interpreter” may involve a sideways connection between disparate discourses (intellectual and practical), the tethering to *meaning* in his work is as problematic a hierarchisation as any form of despotic control (see Deleuze and Guattari (1987) and Lyotard (1993)). The modality of Verganti’s assertion soon becomes the

imposition of meaning upon its context of use by self-appointed authority figures in a definitive hierarchy. What is more important is to ensure a dynamic, continuous reimagining of one's position, and this involves the nonstop mapping of the modalities of becoming, which I call above 'ontogenesis.'

The location of most of these texts glorifying the value of 'design thinking' to business means that what had started as creative expression is soon overcoded in totalising systems of control and power. To abduct into open network forms in order to maximise surplus value generation; to connect into other, different and new in order to overcode dominant meanings; all are examples of what Deleuze and Guattari call the reterritorialisation of deterritorialised flows. Which is not to say that they are *necessarily* bad, but that one needs to consider the *contingent* possibilities enacted or denied by these acts. The complex positions of the hybrid forms of innovation organisation poised between order and chaos – mixing up the crude valorisations of open and closed, hierarchical and networked – needs other ways of thinking complexity than is offered by simple oppositions. The modality of the 'could' must lead to increasing opportunity through creative network production, rather than an overall retrenching upon familiar and despotic forms. Deleuze and Guattari equate contingent activities with geography (1994) and Michel Serres says that the topological should always be the first move in any strategy (1982), therefore we will need to consider the spatial constitution of our knowledge landscapes and of our own beings (which coincide (Jamie Brassett, 1992) in order to develop our own attitude to innovative, networked organization. It is to the concepts of space territory and their relation to the open and the closed that we now turn our attention.

...smooth and striated...and beyond

An important discussion Deleuze and Guattari have throughout their philosophical work regards space, territory, geophysical and ecological material realities (1984), (1987) and (1994). When discussing space Deleuze and Guattari explain the relations between minor and major, nomad and royal science (1987, p.486) in ways that have relevance to our discussion. Nomad science is creative, paradigm breaking and in the hands of those at the edge and used to crossing the edge. Major, royal science is that which understands, analyses and synthesises in order to achieve advancement within well-wrought fields of knowledge. One transgresses while the other progresses; one creates while the other understands. So far, so familiar; but to see them in a simplistic dichotomy risks idealising processes that materialise in complex mixtures. However, it is worth unpacking each in order to understand what a pure instance may look like. The progressive instrumentalises the creative: it takes that which is creative and folds it back into systems of control and power in order to put it to work, extract surplus value from it or simply to make it successful. This is what we see happening with the Central Point city and the different views of the (open or closed) innovative organisation or firm (see Chesbrough (2003) and Verganti (2009)). The progressive reterritorialises the creative acts that come from deterritorialisation. Nomadic science pushes through the boundaries of thought and practice, unravels well-wrought actions in order to find the energies lurking within and to drive them in creative directions. We can see De Landa's city as a node in a network operating always in a dynamic flux of energy and matter as working in the same way as this nomad science. Deterritorialising unleashes flows of creative energy necessary for growth. It is not without reason that Deleuze and Guattari position the Capitalist Machine as the deterritorialising machine par excellence. As mentioned above, Deleuze and Guattari argue (1984 and 1987) that the Capitalist Machine needs

access to the creative energies of chaos in order to fuel its growth through the generation of surplus value – that is, it deterritorialises –, but also needs to fold back onto familiar organisations of control and power to ensure that its proximity to chaos does not lead to its destruction. We can say, then, that not only does the Capitalist machine decode and recode, deterritorialise and reterritorialise, but it smooths and striates space too. The progressive striates smooth space and the transgressive smooths striated space. Smooth space is that which is informed entirely by material and energetic flows, and at its purest is chaos; and striated space is that which is co-ordinated and controlling.

Again there is an easy option which associates closed and open networks with striated and smooth space (respectively); seemingly with Deleuze and Guattari's approval: "In striated space, one closes off a surface and 'allocates' it according to determinate intervals, assigned breaks; in the smooth, one 'distributes' oneself in an open space, according to frequencies and in the course of one's crossings" (1987, p.481). With the determinism and control of the striated working hand-in-hand with acts of co-ordination and enclosure; and the fluid reconstitution of one's own positions operating as part of the opening and smoothing of one's cultural contextualisation. But as we have seen with our discussion of open and closed networks, things are not really this simple. Smooth and striated space differ, Deleuze and Guattari tell us (1987, pp.480-1) in three ways: first, they have different attitudes to points and lines – in striated space lines join points and in smooth space points are situated between lines; secondly, the lines have different natures – striated lines are dimensional and closed, smooth, directional and open. Finally, as we see in the quotation immediately above, they characterise surface differently: striated space is a closed, allocated and hierarchical space, it is "counted in order to be occupied" (1987, p.362); smooth space is distributed, open and fluid. Striated space is the space of sovereign, progressive science mentioned

above; and smooth space that of the Nomad, creative science. To view them in total isolation is, however, too much of an idealisation, as they exist in different levels of admixture and not only always in relation to each other, but penetrating, lurking within and overthrowing each other too. As discussed above, the Capitalist Machine is one that operates by accessing and promoting the disruptive, dangerous creative flows of pure Capital, *and* protecting itself from the damage caused to it by proximity to such chaotic forces by retrenching upon more familiar (non-capitalist) regimes of State and Empire. It smooths *and* striates; drifts with the Nomad *and* progresses with the sovereign; distributes across boundaries *and* counts upon them to occupy a position. Deleuze and Guattari write: “In each instance, then, the simple opposition ‘smooth-striated’ gives rise to far more difficult complications, alternations, and superpositions. But these complications basically confirm the distinction, precisely because they bring dissymmetrical movements into play. For now it suffices to say that there are two kinds of voyage, distinguished by the respective role of the point, line and space” (1987, pp.481-2). In the end, the simple opposition between open and closed must give way to more complex arrangements that are “distinguished” by their attitude to “point, line and space”. Companies are not either open or closed, but open and closed at different times, or in different places at the same time, all for different reasons. They are dissymmetrical and will need to configure themselves differently as contingencies demand.¹³ Do they join points (act teleologically)? Or do they launch lines experimentally (act vectorally)?¹⁴ When is it right to close and allocate, or distribute and open; to striate or smooth space? These questions are key strategic ones, and are one of the reasons why

¹³ Probably the best example of a company operating a blended approach to innovation is P&G, with sections encompassing an open approach and others closed and secret; as well as reconfiguring the nature of its business over time either through internal or externally driven disruptions.

¹⁴ Work done on “design digestion” (Brassett and Booth, 2008) argues just such an experimental, vectoral approach to design-driven innovation, especially with regard to fast-moving consumer goods sector.

strategy is also cartography. Finally we can also see why Chesbrough is wrong to say that open innovation represents a shift from an old to a new paradigm. Openness and closedness are merely modes of being, modulations of organisational character that need to be adjusted and adapted, allocated and adopted as necessitated by events. The paradigms have not shifted, organisation and its network forms remain, but their attitudes and modes demand a characterisation different to what was familiar and/or successful. The questions for any organisation wishing to operate in a networked, fluid space, in a way that maximises creative opportunities, will be: which kind of voyage do you wish to take, and how to you ensure that this voyage maximises your ontogenic possibilities?

post script

Located at the end of the collection *Group Creativity: innovation through collaboration* (2003) – which provides intellectual investigation of the topic from a largely organisational psychological perspective – Dean Keith Simonton’s essay ‘Creative Cultures, Nations and Civilizations: strategies and results,’ offers an intriguing and insightful examination of the relation between individualistic-psychological and socio-cultural accounts of creativity. While coming from a background that gives a psychological perspective on questions of creativity and genius, Simonton provides some insights into the more general structuration of organisations (or other social networks like civilizations and nations) in relation to creativity and innovation that are relevant to the discussion I have put forward in this paper. Simonton provides an analysis that injects a contextual, socio-cultural perspective into a discipline – organizational psychology – that has hitherto focused on individuals. Of Simonton’s own approach, he writes that the “coming and going of great creative genius in various times and places can be better attributed to changes in the cultural, social, political, and

economic circumstances that determine the extent to which the resulting milieu nurtures the development of creative potential and the expression of that developed potential” (Simonton, 2003, p.306). Though it has not been the case of my paper to be focused on the individual, creative “genius,” it is insightful to see in Simonton’s work a locating of creative acts in a contextually contingent milieu.¹⁵ We have so far seen the ways in which we can understand the intricacies of open and closed networks of innovation, and used Deleuze and Guattari on space to provide a conceptual context within which to place this understanding. Easy oppositions are not adequate when considering the network forms organisations must take to ensure continued creative innovation. Chesbrough was right in saying that complex realities need complex ways of engaging with them; unfortunately for him, merely to posit openness as adequate does not go far enough. With Simonton, we can see that the space of creativity – and therefore an innovation with its creative aspect highlighted at that moment – becomes not merely the frame for understanding innovation, or simply the conceptualization of the transcendental conditions for the possibility of innovation happening, but also the very material of a creative innovation itself. This is what I mean by the immanence of innovation: the simultaneity of its conditions, its context and its acts. Manage the space of innovation – Simonton refers to the *Ortgeist*,¹⁶ or “‘spirit of the place,’ that is most conducive to creative development and expression” (2003, p.306) – and you will manage creativity and innovation itself. In terms that recall those of De Landa (1997) Simonton describes (from a review of previous case studies) the creative nation as: open and connected to other nations in a horizontal spread “rather than being subordinate to

¹⁵ Deleuze and Guattari place a great emphasis on the importance of “milieu” in their work: see (1987) and (1994).

¹⁶ Simonton discusses *Zeitgeist* too, but in terms of contextual contingency, focusing on the clustering of events in a way that brings to mind Deleuze and Guattari on milieu (see footnote 15) and geography and contingency in Deleuze and Guattari (1994).

some large imperial system” (2003, p.310); allowing freedom of movement and thought, and not only tolerant but encouraging of immigration; supporting a range of intellectual and creative enquiry, unrestricted by religious authority (2003, pp.309-11). Simonton’s is surely an enlightening study, reviewing literature from the last 150 years in investigating his topic and his conclusion is one that resonates well with my paper. Simonton does not posit dissolution of psychological thinking in generalized chaos, or the rigidification of thought within well-defended disciplinary boundaries. He explains that though “this inventory might seem to exclude psychology as being relevant to the scientific understanding of creativity, such a conclusion would be premature” (Simonton, 2003, p.319). To limit interpretation to the socio-cultural would be as problematic a reduction as to do valorise only the psychological. He continues: “societal-level effects complement and expand rather than render utterly irrelevant a genuine psychological understanding of human creativity. [...] A comprehensive psychology of creativity must view it as a complex phenomenon that occurs at multiple levels, from individuals, interpersonal interactions, and problem-solving groups to cultures, nations and civilizations” (Simonton, 2003, p.320). His own discipline is one that must be open to modes of thinking and ways of conceptualising its areas of study in order not only to guarantee that all possibilities are accounted for, but also that the discipline itself remains innovative. It must also ensure that it does not lose sight of the insights that it has generated traditionally. The openness providing range of input and the closedness producing focus are both necessary in defining both the approach to the subject – any subject – and the subject itself. This is why I have emphasized ontogenesis over identity, becoming over being. The innovative organization (which includes the self, discipline, company, nation and so on) is one that makes sure that its familiar forms and past successes provide energy for a dynamic, modal future, rather than the stable

template on which to mould all thought and practice. Creativity needs both the movement to a position of openness and the consistency of a focused position. It is not a simple choice between smooth and striated, open or closed, order and chaos, different or similar. Rather we need to be poised between these: chaotic enough to create the new and ordered enough to direct it successfully. Such poise is also an indication of the immanence of thought and action, where the conditions for existence and the processes of existence come together. When innovation is poised, weaving between two seeming opposites and resting nowhere, it enacts its theoretical conditions and conceptualises through its practice: this is what Simonton found. A philosophical innovation, then, is also an innovative philosophy, and a design-driven innovation is also an innovative designing. The network this produces is a fluid one, neither only open nor closed, but sometimes open and at others closed. It unravels at the edges and congeals at the centre, but the context changes so quickly – not least as a result of its, the network's, actions – that what was the edge and the centre yesterday isn't so today, and tomorrow is another issue altogether. A networked innovation is the result of connecting myriad different concerns, subjects, objects, concepts and practices and as long as it has an attitude that values flexibility, ontogeny, immanence and connection over the dominance of authority, identity, transcendence and isolation, then we might see it always becoming innovative.

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