"Deleuze and DeLanda: A new ontology, a new political economy?"

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Dr Karl Palmås

Abstract

This paper will explore how the social ontology of Gilles Deleuze, as recently summed up by Manuel DeLanda (2006), can be used in the context of economic sociology. In particular, the text will study the divergences (as well as similarities) between Deleuzians such as DeLanda and Actor-Network theorists such as Michel Callon and Bruno Latour.

The text starts off from the concept of 'assemblage' (*agencement*), using it as a point of departure for sketching the differences between the two strains of thought. Whereas the concept of assemblage is often used by ANT-inspired writers to loosely denote 'hybrid collectives' under constant reconfiguration, in particular in the context of economic agency, Deleuze's original use of the term is more specific (featuring a number of special properties), and at the same time more generic (used to describe wide variety of entities).

As an example of this usage, the the paper will describe the modern corporation as a Deleuzian assemblage, using the automobile industry as a case study. With the help of some 'classic' studies of the rise of the modern corporation, this rendering will (hopefully) clarify concepts such as 'territorialisation', 'stratification' and 'abstract machine'.

The text is concluded with a brief discussion on how the two perspectives explored in this paper can contribute to a new way of sketching 'the political' in the economy. Here, the text will expand further on the divergences between ANT-inspired and Deleuze-inspired writers, for instance comparing the notion of 'performativity' with the concept of 'molarity'.

Assemblages and strata

This first section of the text will explore the concept of assemblage (*agencement*), as used by Deleuzians such as Manuel DeLanda, as well as by actor-network theorists such as Michel Callon.

Two uses of the assemblage

Readers of Actor-Network Theory (ANT) are probably somewhat familiar with the concept of the "assemblage", or the original French term *agencement.* Within this literature, it is often used as a loose descriptor of heterogeneous structures, consisting of human as well as non-human elements. While these structures may have a more or less consistent identity, they are at the same time constantly put together in a dynamic manner. Hence, "assemblage" is a verb as much as a noun, a process of becoming as much as a state of being. Hence, in discussions on ANT, the concept assemblage is often used to steer readers away from construing actor-networks as fixed structures, and instead conveying an image of them as dynamic entities under constant reconfiguration. (cf. Barry, 2001)

In recent years, the notion of the assemblage has been explicitly used by Michel Callon when describing (economic) agency. (cf. Callon, 2005) From this perspective, he defines assemblages in the following way:

> *Agencements* denote sociotechnical arrangements when they are considered from the point [of] view of their capacity to act and to give meaning to action. […]
>
> (Re)configuring an agency means (re)configuring the socio-technical agencements constituting it, which requires material, textual and other investments. (Callon & Caliskan, 2005: 24-25)

On the choice of agencement, Callon writes that he uses "the French word *agencement*, instead of arrangement, to stress the fact that agencies and arrangements are not separate" (Callon, 2005). In a forthcoming book chapter, he extends this argument.

> The term *agencement* is a French word that has no exact English counterpart. In French its meaning is very close to "arrangement" (or "assemblage"). It conveys the idea of a combination of heterogeneous elements that have been carefully adjusted one another. But arrangements (as well as assemblages) could imply a sort of divide between human agents (those who arrange or assemble) and things that have been arranged. This is why Deleuze and Guattari proposed the notion of *agencement*. *Agencement* has the same root as agency: *agencements* are arrangements endowed with the capacity of acting in different ways depending on their configuration. This means that there is nothing left outside *agencements*: there is no need for further explanation, because the construction of its meaning is part of an *agencement*. A socio-technical *agencement* includes the statement[s] pointing to it, and it is because the former includes the latter that the *agencement* acts in line with the statement, just as the operating instructions are part of the device and participate in making it work. (Callon, forthcoming)

In other words, Callon uses the concept of *agencement* to clarify his own view on economic agency. (This view, first put forward in his 1998 edited volume *The Laws of the Markets*, states that economic actors are made up of human bodies but also of prostheses, tools, equipment, technical devices, and algorithms.)

This use of *agencements* is somewhat different than the Deleuze and Guattari's original treatment of the term, as specified in *A Thousand Plateaus* (1988), and Manuel DeLanda's recent effort to build an 'Assemblage Theory' for the social sciences. (DeLanda, 2006) In some ways, the original meaning of the term is more general, as Deleuze and Guattari used assemblages to describe a wide variety of entities – not just economic actors. In other ways, the DeleuzoGuattarian meaning of the term is more specific, as *A Thousand Plateaus* (from hereon ATP) lists a number of properties for such assemblages. They also provide a number of additional terms for describing assemblages – such as "content" and "expression", "territorialisation" and "stratification".

Deleuze and Guattari state that assemblages can be defined along two axes:

> On a first, horizontal, axis. an assemblage comprises two segments, one of content, the other of expression. On the one hand it is a *machinic assemblage* of bodies, of actions and passions, an intermingling of bodies reacting to one another; on the other hand it is a collective *assemblage of enunciation*, of acts and statements, of incorporeal transformations attributed to bodies. (Deleuze & Guattari, 1988: 88)

So, in other words, assemblages are entities that consist of bodies and objects (referred to as 'content'), as well as non-material entities, such as statements (referred to as 'expression'). Assemblages are thus heterogeneous entities, just like the actor-networks familiar to ANT readers. Deleuze and Guattari go on:

> Then, on a vertical axis, the assemblage has both *territorial sides*, or reterritorialized sides, which stabilize it, and *cutting edges of deterritoralization*, which carry it away .

Assemblages can thus also be characterised by ongoing processes of territorialisation, and deterritorialisation. These are processes that stabilise/consolidate, and destabilise/dissolve (respectively), the identity of the assemblage. As Manuel DeLanda explains,

> territorialisation must first of all be understood literally [as] processes that define or sharpen the spatial boundaries of actual territories [such as an organisation]. Territorialisation, on the other hand, also refers to non-spatial processes which increase the internal homogeneity of an assemblage, such as the sorting processes which exclude a certain category of people membership of an organisation […] (DeLanda, 2006: 13)

In this way, territorialisation concerns the 'content' components of assemblages – the stabilisation of bodies and objects. In Deleuze's terminology, there is a similar term that denotes the stabilisation of an assemblage with regard to *both* the 'content' components and the 'expression' components. In the case of organic assemblages, genetic code serves as expression components; in the case of assemblages such as human bureaucracy or

technological systems, linguistic entities (texts, discourses etc.) serve as expression components. The process in which these two forms of components – content and expression – co-evolve into a stable and consistent whole is called “stratification”. Correspondingly, the structures that this process of stratification yields are called “strata”.

In particular, Deleuze describes the concept of strata in relation to Michel Foucault’s work on disciplinary apparatuses in *Discipline and Punish* (1977). The ‘modern’ prisons emerging in the 18th and 19th centuries, Deleuze suggests, be seen as strata:

> Strata are historical formations […] made from things and words, from seeing and speaking, from the visible and the sayable, from bands of visibilities and fields of readability, from contents and expressions. (Deleuze, 1999: 41)

Deleuze argues that *Discipline and Punish* marks a new stage in Foucault’s work, inasmuch as it does not subjugate the material entities (the visible; prisoners in the panopticon prison) under the discursive (the sayable; penal law and the concept of delinquency). He writes that they “may have emerged at the same time, in the eighteenth century, but they are none the less heterogeneous” (28) In this reading of Foucault, Deleuze is particularly interested in how the panopticon and the discourses on delinquency coalesced, in a contingent and seemingly spontaneous manner. As we shall see in the next section, Deleuze has a very particular way of accounting for how such heterogeneous components create (semi-)stable wholes.

In his recent book, DeLanda has chosen to simplify Deleuze's terminology somewhat. First, he translates Deleuze's “content” into “parts in the assemblage playing a material role”. Similarly, he translates “expression” into “parts in the assemblage playing an expressive role”. Secondly, he scraps the term strata altogether. Instead, he speaks simply of assemblages that are more or less “coded”. So, along with Deleuze's two axes that define assemblages (the degree of involvement of content and expression components, and the degree of territorialisation), DeLanda adds a third axis,

> an extra axis defining processes in which specialised expressive media [i.e. genes and words] intervene, processes which consolidate and rigidify the identity of the assemblage or, on the contrary, allow the assemblage a certain latitude for more flexible operation while benefiting from genetic or linguistic resources (processes of coding and decoding). (DeLanda, 2006: 19)

In this way, DeLanda makes clean delineation between processes of territorialisation and deterritorialisation on the one hand, and processes of coding and decoding on the other. While territorialisation concerns assemblage components that play a material role, coding concerns parts that play an expressive role – specifically genes and words that may sometimes, in complex ways, serve as 'blueprints' for the assemblage in question.

By this point, the divergences between the ANT use, and the Deleuze/DeLanda use of assemblages should be clear. In the two subsequent sections, these divergences will be fleshed out further. First, the text will survey how the two camps account for consistency and dynamism, secondly, it will explore differences in how ANT and Deleuze/DeLanda endeavours to reinvent realism.

Accounting for consistency and dynamism

In comparing the two uses of the assemblage term, it is useful to survey the respective aims of the ANT and Deleuze/DeLanda projects, contextualising them in what philosophical fights they are picking. Incidentally, this will lead us on to see the divergences in how they account for consistency and dynamism in assemblages.

ANT should be seen in context of debates within Science and Technology Studies (STS) in the 1980s. At this point, the field was populated by a strong contingent of social constructivists who arguing that technological development should be seen in light of power structures on a macro level. Arguing against this strand of thought, Michel Callon and Bruno Latour argued that technical change cannot be *purely* socially constructed. As Andrew Barry and Don Slater explains,

> they argued that the idea that technology was either socially constructed or socially shaped was problematic for two reasons: first, because the distinction between what was 'social' and 'technical' and what was 'human' and 'non-human' was itself disrupted through the process of technical change; second, [it] was impossible to give a purely 'social' explanation of technical change because technical objects (facts, artefacts, devices) themselves formed a critical part of what the social is. (Barry & Slater, 2002: 177)

Callon expressed his position in the following way, also cited by Barry and Slater:

> How can social elements be isolated when an actor-network associates the spin of an electron directly with user satisfaction? How can any interpretation of social interaction be established when actor-networks constantly attempt to transform the identities and sizes of actors as well as their interrelationships? (Callon, 1987: 99)

The position developed within ANT was one where the delineation between nature and society, non-human and human was dismantled. This allowed the ANT authors to critique the constructivist position. As Bruno Latour has more recently summed it up as "yes, society is constructed, but not socially constructed" (Latour, 1999: 198).

To understand ANT's view of how that which is being constructed – the actor-networks – gains consistency, we first of all have to bring technology and artefacts into the study of social structure. Latour writes that

> sociologists […] are constantly looking, somewhat desperately, for social links sturdy enough to tie all of us together or for moral laws that would be inflexible enough to make us behave properly. When adding up social ties it does not balance. Soft human and weak moralities are all sociologists can get. The society they try to recompose with bodies and norms constantly crumble. Something is missing […] To balance our accounts of society, we simply have to turn our exclusive attention away from humans and look also at nonhumans. […] What our ancestors, the founders of sociology, did a century ago to house the human masses

> in the fabric of social theory, we should do now to find a place in a new social theory for the nonhuman masses that beg us for understanding. (Latour, 1992)

In this way, "technology is society made durable" (Latour, 1991). Networks of heterogeneous components – including artefacts – "configure the actors" into behaving in certain ways. However, the other side of the actor-network coin is that these networks are reconfigured through the process of translation. Barry and Slater state that in the development of ANT,

> translation emphasized the way in which the identity of actors, and their relations, was always in process. But it also implied that translation was a political process in which politics was conceived not so much in terms of competing ideologies or interests, but as a calculated Machiavellian act. Seen in these terms, the process of technical change could not be explained by reference to the kinds of social, political and economic interests which determined it. Rather, technical change was itself a form of politics that both revealed and translated the identity of social and economic actors.

Hence, the dynamism of actor-networks stems from Machiavellian power games. The reconfiguration of Callonian assemblages is an outcome – however contingent – of actors' deliberate strategies and calculation on how to further their interests. In this way, ANT has not completely given up on traditional sociology's aim of studying how human subjects navigate their social worlds.

The aims of the projects of Deleuze and DeLanda, however, are somewhat different. First, it should be noted that Deleuze was a wide-ranging philosopher, whose work spanned much more than the social ontology discussed in this text. However, in relation to social ontology, Deleuze's work – as continued by DeLanda – can be seen as a critique of the "imperialism of language" (Deleuze & Guattari, 1988: 65). DeLanda, in particular, has long argued that philosophers and social theorists have to move on from their recent obsession with language. In his recent book, he argues that

> language should be moved away from the core of the matter, a place that it has wrongly occupied for many decades now. (DeLanda, 2006: 16)

As a replacement for the language-based social theory of the past decades, Deleuze presents a new materialist ontology that explains the identity of entities through the existence of immanent processes, in which flows of matter-energy follow patterns of self-organisation, giving rise to structure.

In order to explain the operation of such immanent processes, it might be worth returning to Deleuze's reading of Foucault's *Discipline and Punish*. As mentioned above, Deleuze is interested in the process by which content and expression, the panopticon and the concept of delinquency/penal law, co-emerged into a stable formation. While the result of this combination is extraordinarily effective, there was no external body – neither God nor king – who proposed a grand plan for assembling them. The merging of the two was contingent and spontaneous. Based on this observation – order emerging without a transcendent force that provided a design for the assemblage – Deleuze writes that

> *Discipline and Punish* poses two problems […] On the one hand, outside forms, is there a *general immanent cause* that exists within the social field? On the other, how do the assemblages, adjustments and interpenetration of the two forms come about *in a variable way in each particular case*? (Deleuze, 1999: 29, italics added)

Here we touch upon one of the key aspects of the Deleuzian notion of assemblages. Structures like the disciplinary institutions described by Foucault can emerge from immanent processes of becoming, which can be actualised in several different social settings.

> What can we call such a new informal dimension? On one occasion Foucault gives it its most precise name: it is a 'diagram', that is to say a 'functioning, abstracted from any obstacle' (30)

In other words, *Discipline and Punish* is about how the same 'diagram' was increasingly enacted in prisons, schools and workshops during the late 18th and early 19th centuries.

Thus, assemblages claim their consistency because they are assembled along certain 'diagrams' or 'functioning, abstracted from any obstacle'. For instance, strata are put together through the process of "double articulation" – the congealing of content and expression (mentioned above).

> The first articulation chooses or deducts, from unstable particle-flows, metastable molecular or quasi-molecular units (*substances*) upon which it imposes a statistical order of connections and successions (*forms*). The second articulation establishes functional, compact, stable structures (*forms*), and constructs the molar compounds in which these structures are simultaneously actualized (*substances*). (Deleuze & Guattari, 1988: 40-41)

This process of double articulation can be used to describe the becoming of Foucault's prison, first imposing an order on bodies (sorting out and ordering prisoners in the Panopticon), and secondly congealing this structure through penal law and notions of delinquency. (See quote above.) However, this process can also be seen in other settings. DeLanda (1997: 57-70) discusses it in a variety of structures – in the building of hierarchical organisation and social classes, as well as in the formation of sandstone. (Note: This same process can take place in different spatio-temporal scales – for instance, the formation of sandstone is a very slow process in comparison to the formation of a human bureaucracy.) In all of these cases, the same 'abstract machine' (the Deleuzian word for 'diagram') is used to produce a structure with certain properties.

Deleuze's world, then, consists of an actual realm – inhabited by content and expressions, visibilities and sayabilities, bodies and statements – and an 'informal', virtual realm, inhabited by abstract machines. These realms form different parts of reality, as abstract machines are constantly being *actualised* – for instance in the form of prisons, organisations, and sandstones. The virtual, DeLanda explains,

> does not refer, of course, to the virtual reality which digital simulations have made so familiar, but to a *real virtuality* forming a vital component of the objective world. (DeLanda, 2002: 30)

The 'virtual' existence of structure-generating processes – abstract machines – actualised in various entities in the social world, is what enables Deleuze and Guattari to explain the emergence of form without having to rely on transcendent essences. They write that there must be

> something in the assemblage itself that […] can account for both of the forms in presupposition, forms of expression […] and forms of content […] This is what we call the abstract machine […] (Deleuze & Guattari, 1988: 141)

In contrast to Deleuze and Guattari, ANT authors have not placed as much emphasis on studying the emergence of form. Nor have they subscribed to the idea of abstract machines. Indeed, as Iain McHardie and Donald MacKenzie write, the notion of the abstract machine can "easily read as the 'functions or principles'", "a somewhat idealist notion alien to actor-network theory" (McHardie & MacKenzie, 2006). Similarly, the ANT use of Machiavellian power games among human actors to explain dynamism of assemblages is somewhat alien to Deleuzians, which tend to be more 'post-humanist' on the issue of dynamism and creativity. Mark Bonta and John Protevi write that

> Deleuze and Guattari do not deny that human subjects can initiate novel and creative action in the world. However, they refuse to mystify this creativity as something essentially human and therefore non-natural. For them, the creativity of consistencies is not only natural, but also extends beyond the human realm. (Bonta and Protevi, 2004: 5)

Bonta and Protevi go on to state that, in a Deleuzian framework, human subjects can produce creative action in the world "only under far-from-equilibrium, 'crisis' situations" (193, endnote 6), using terminology from complexity theory. Indeed, one of the interesting things about Deleuze's social ontology is that it chimes with recent

developments in complexity and chaos theory. Therefore, to explore his ‘flow ontology’ further, a brief exposition into the field of complexity theory is necessary.

Complexity theory, morphogenesis, and reality

In recent years the link between Deleuze and complexity theory has been explored by both Manuel DeLanda and Brian Massumi. This connection can be made through the concept of *morphogenesis* – the emergence of form. As discussed above, Deleuze and Guattari developed a theory to explain how form could emerge through immanent, structure-generating processes. As it happens, complexity theory is concerned with the very same problem. John Protevi explains:

> The problem is how to account for the ordered and creative nature of bodies and assemblages, for if matter is chaotic, it can’t account for order, but if it’s passive, it can’t account for creativity. Deleuze and Guattari’s materialism avoids the forced choice of matter’s chaos or spirit’s transcendent ordering by calling attention to the self-ordering potentials of matter itself, as outlined in the researches of complexity theory. (DeLanda, Protevi & Thanem, 2005)

In Massumi’s introduction to the English version of *A Thousand Plateaus*, he explains Deleuze’s philosophical project as one of tracing a line of "forgotten" theorists:

> He discovered an orphan line of thinkers who were tied by no direct descendance but were united in their opposition to the State philosophy that would nevertheless accord them minor positions in its canon. Between Lucretius, Hume, Spinoza, Nietzsche, and Bergson there exists a "secret link constituted by the critique of negativity, the cultivation of joy, the hatred of interiority, the exteriority of forces and relations, the denunciation of power". (Deleuze & Guattari, 1988: x)

The concept of *morphogenesis* can partly be traced back to the first philosopher in this orphan line, Lucretius. In his treatise on the universe, *On the Nature of Things*, he put forward his theory of the *clinamen*, the “swerve”:

> when atoms are travelling straight down through empty space by their own weight, at quite indeterminate times and places, the swerve ever so little from their course, just so much that you would call it a change in direction. If it were not for this swerve, everything would fall downwards through the abyss of space. No collision would take place and no impact of atom on atom would be created. Thus nature would never have created anything.

In other words, as Lucretius saw it, form – as well as life – emerges as a result of turbulences created by swerving atoms bumping into each other. Order emerges from, and is sustained by, dynamic and unpredictable flows of matter and energy. However, the burgeoning natural sciences rejected this perspective of the world, and chose to see Lucretius idea of the *clinamen* as a literary metaphor. The scientific discipline of physics developed in a different direction, especially after Newton, focusing on ideal states of static equilibrium that could easily be mathematised. The natural sciences developed a worldview based on simple linear equations that depicted a frictionless world where equilibrium is the norm. The emerging consensus stated that turbulence meant disorder and death, order and life was contingent upon stasis – in fact, the very opposite of Lucretius' view of life.

Nevertheless, during the latter half of the 20th century, this worldview started to buckle. For one, philosophers like Michel Serres start to argue that the idea of the swerve ought to be seen as a scientific theory, as 'physics proper'. However, maybe more importantly, the field of chaos and complexity theory started to explore the world in a new way, this time by *not* taking frictions and other 'nonlinearities' out of the equation. Scientists started to accept the idea that no physical system is ever in equilibrium. Indeed, some natural scientists showed that in far-from-equilibrium states, life and order seemed to emerge spontaneously – indeed, life could *only* exist in far-from-equilibrium states. So, in other words, the pendulum started swinging back in favour of Lucretius.

This perspective can be described in the following terms: The laws of thermodynamics state that the universe (as a whole) is be is becoming more and more disordered.

> Life, of course, seems to defy this process, by creating order and structure out of disordered (or at least, less ordered) materials. A plant builds its structure, and may make beautiful flowers, out of carbon dioxide, water, and a few traces of other materials. But it only does this with the aid of sunlight, energy from an outside source. The Earth, and in particular life on Earth, is not a closed system. It is possible to show […] that anywhere in the Universe that a pocket of order appears, it always does so at the cost of more disorder being produced somewhere else." (Gribbin, 2004: 26-27)

In other words, as all physical systems tend to strive towards maximum disorder (maximum 'entropy'), order and life can only be sustained if energy flows through the system, sustaining turbulence, maintaining and re-creating life. Only dead matter is truly in equilibrium and truly non-turbulent.

The contribution by complexity theorists is that they started to explore how processes of self-organisation – the immanent processes described by Deleuze – emerge spontaneously in far-from-equilibrium situations, as energy flows through the system. One such theorist was Alan Turing, who wrote a paper on 'The chemical basis for morphogenesis' in 1952, stipulating that order could emerge out of chaos. A few decades later, Ilya Prigonine showed that "[a]way from equilibrium, a flow of energy can, under the right circumstances, create order spontaneously". (30) Complexity theorists also found that, just as in the case of Deleuze's abstract machines, the same processes of self-organisation were often found in different settings – in weather phenomena, in populations of animals and so forth. (Gleick, 1987)

Complexity theorists also developed a way of mapping the equivalent of Deleuze's virtual realm. In 'phase space', the properties of a system can be analysed with respect to general 'states' that a system can enter. Phase spaces are often used to show that a system might be 'attracted' to a number of co-existing possible states, and the system may fluctuate between one semi-stable state to another, due to 'bifurcations' in the system. Again, this is chiming with Deleuze, who stipulates that there may be several abstract machines in the

virtual realm, and various bifurcations may cause systems in the actual realm to 'switch' from actualising one abstract machine to actualising another abstract machine.

This exploration of complexity theory and natural science also highlights another difference between the ANT and Deleuze/DeLanda projects – the different perspective on reality. As shown above, Deleuze (as DeLanda reads him) can serve to reconstruct realism – the belief in the mind-independent existence of reality – by accounting for the emergence of form due to immanent processes. DeLanda argues that

> when it comes to defend the autonomy of non-human entities (atoms, molecules, cells, species) the crucial manoeuvre is to account for their mind-independent identity without bringing essences into the picture. […] The identity of any real entity must be accounted for by a process, the process that produced that entity, in [the case of hydrogen atoms], the "manufacturing" processes within stars where hydrogen and other atoms are produced. When it comes to social science the idea is the same: families, institutional organizations, cities, nation states are all real entities that are the product of specific historical processes and whatever degree of identity they have it must be accounted for via the processes which created them and those that maintain them. (DeLanda, Protevi & Thanem, 2006)

Hence the division of reality into an actual realm (of atoms and cells, as well as organisations and nation states) and a virtual realm (of abstract "manufacturing" processes).

ANT, notably Bruno Latour, also wants to reconstruct realism, but in a radically different manner. For Latour, the notion of a mind-independent reality is problematic, or at least besides the point. According to him, a realistic realism can only emerge if we rid ourselves of the compulsion to separate our minds from the world 'out there'. In a review of Latour's *Pandora's Hope: Essays on the reality of science studies*, Felix Stalder writes:

> Both modern and postmodern science presume a gap between the cognitive subject – a "brain-in-a-vat", as Latour calls it – and the outside world. Once this

> gap is accepted, the question boils down to "is it possible to build a reliable bridge across this gap?" "Yes", says the realist, "science is that bridge". "No", says the relativist, "science is just another language game". And Mr. Latour says: "There is no gap!" (Stalder, 2000)

As Latour himself writes in the introduction to the book:

> Why not […] forget the mind-in-a-vat altogether? Why not let the "outside world" invade the scene, break the glassware, spill the bubbling liquid, and turn the mind into a brain, into a neuronal machine sitting inside a Darwinian animal struggling for its life? […] why not study the adaptation of humans, as naturalists have studied all other aspects of "life"? If science can invade everything, it surely can put an end to Descartes' long-lasting fallacy and make the mind a wriggling and squiggling part of nature. This would certainly please my friend the psychologist – or would it? No, because the ingredients that make up this "nature", this hegemonic and all-encompassing nature, which would now include the human species, are the very same ones that have constituted the spectacle of a world viewed from inside by a brain-in-a-vat. Inhuman, reductionist, causal, law-like, certain, objective, cold, unanimous, absolute – all these expressions do not pertain to nature as such, but to nature viewed through the deforming prism of the glass vessel! (Latour, 1999)

Thus, for Latour, we must build a new science, open “the black box of scientific facts”, start exploring the hybrids that one can find in “the two-culture no-man’s-land”, situated between “the humanists trying to avoid all the dangers of objectification and by the epistemologists trying to fend off all the ills carried by the unruly mob”. Based on hope rather than traditional scientific tenets, this new science would take at face value the proposition that scientific truths are elaborate, and hopefully well-functioning constructions (though not purely social ones). As such, the pragmatist roots of ANT and STS are evident – “what is true about nature is what works, at least for the moment”. (Law, 2004)

In other words, these authors are picking different fights with regards to realism. This does not, one should note, necessarily make them mutually exclusive. (Indeed, they can be applied to different problems.) The remainder of this text will however use the Deleuzian/DeLandian version of realism, and thus believe in both the existence of a mind-independent reality, and the existence of a virtual realm of abstract machines. On that note, the text will leave the issue of social ontology, and move on to apply these terms to the economy – notably the study of the modern corporation.

The economy and the corporation

This second section of the paper will interrogate how the Deleuzian framework proposed above can be deployed when analysing the economy, particularly the modern corporation.

DeLanda on hierarchies and markets

As yet, one of the most authoritative accounts of the rise of modern corporations from a Deleuzian perspective is Manuel DeLanda's *A Thousand Years of Nonlinear History*. In this publication he explains how abstract machines, such as the one that builds strata, are always 'available' in the actual realm – thus immanent – and are simply actuated at different times. There are, theoretically, an infinite number of abstract machines, and as several abstract machines can be combined, there is always a potential for an immense complexity in the world.

In the economy, there are however two abstract machines that seem to reoccur – the abstract machine that creates strata, and the abstract machine that creates 'meshwork' structures. As already mentioned, strata are hierarchies. Meshworks, on the other hand, are self-organised 'hive' structures, consisting of a large number of entities that enter into catalytic relationships with each other, with noone 'in charge'. Thus, the ideal market, and certain communities on the Internet, are based on the same process of becoming; the same abstract machine. Following on from this delineation, DeLanda describes the rise of the modern economies as a constant battle between these two abstract machines, with matter being drawn into either of the two processes of becoming. Thus, the economy is seen as a constant 'give and take' process between hierarchies and ideal, decentralised market structures.

This is, of course, the home territory of economic sociology. The delineation of the economy into markets and hierarchies is an old tradition, which features institutionalism (old and new), transaction cost economics, as well as various strands of Marxism. DeLanda draws specifically on the work of economic historian Fernand Braudel in his

account of the rise of the modern economy. In particular, DeLanda uses Braudel's description of capitalism as a mix of market and anti-markets, where the former are put together as 'meshworks' and the latter are put together as 'strata'. As hinted above, the two structures are mutually constitutive – meshworks can be formalised into rigid hierarchies, and hierarchies can be dissolved into meshworks. Moreover, there may be pockets of hierarchies within larger-scale meshworks, and vice versa.

One thing that does distinguish DeLanda's approach to the 'market-hierarchy' dichotomy from previous accounts is that he, from a radical 'post-humanist' position, argues that these two 'ideal forms' are not human inventions. In *A Thousand Years of Nonlinear History*, he goes to great lengths to show that the abstract machine that builds and sustains corporate hierarchies is also found in the formation of biological species as well as in the formation of sandstone (though on a different spatio-temporal scale). Similarly, the abstract machine actualised in traditional, decentralised marketplaces is also actualised in catalytic reactions on a molecular level. Humans did not 'invent' these forms, though we have started to participate in stabilising them (at least in the case of hierarchies). Strata and meshworks would form in a number of settings with or without our help. Thus, human theories (produced by economists, for instance) is only one component that goes into the formation and stabilisation of a market or a hierarchy.

> The hierarchies to which I have referred throughout this chapter are a special case of a more general class of structures, stratified systems, to which not only humans bureaucracies and biological species belong, but also sedimentary rocks. (And all of this *without metaphor*.) (DeLanda, 1997: 62)

There are however similarities with earlier accounts of markets and hierarchies. For instance, like Braudel, DeLanda does not see our modern economy as a 'market system'. On the contrary, DeLanda, drawing on Deleuze and Guattari's more general ideas on the stratification of the modern society, and in line with economists such as Alfred Chandler and J.K. Galbraith, argues that the modern economy is in fact consisting primarily of hierarchies. On the contrary: the rise of modern capitalism implied the rise of certain

kinds of hierarchies, not the introduction of a 'market'-based system. Indeed, the contingent of matter actualised as meshwork structures has been decreasing since the rise of the modern economy. For this reason, DeLanda has argued that the word capitalism ought not to be used to describe the anti-market economy that we live in.

> Braudel himself prefers to keep the word "capitalism" and change its meaning (so that it refers exclusively to non-market-competition, i.e., big business). However, such an entrenched meaning cannot be changed so easily. This is why I prefer to use a different term altogether, and one which bears its intended meaning on the sleeve. A term like "antimarket" is precisely what is needed here to wrest the notion of "market" both from the right (invisible handers) and the left (commodifiers). This, it seems to me, is a crucial move, otherwise we will be confined, when thinking about possible routes for social development, between two choices that are equally hierarchical: capitalism and socialism. (288-289)

Moreover, the DeLanda's Deleuze-inspired reconstruction of realism also implies that there can be no such thing as a 'capitalist system'. The focus on explaining the identity of certain entities as stemming from immanent processes, from self-organisation, precludes the existence of totalities – such as 'the capitalist system', or even 'society as a whole'. The term 'capitalist system' simply does not fit with the the view of an economy that is imbued with dynamism from non-linear, chaotic processes, completely lacking in teleological properties. This constitutes a break with Deleuze's own ideas, which rely more heavily on Marxism. DeLanda explains:

> Deleuze (and even more so, Guattari) remained a Marxist till the end, while my work is a deliberate attempt to liberate the left from the straitjacket in which Marx's thought has kept it for 150 years. (Needless to say, my book *A Thousand Years* was only the opening salvo. My serious attack on Marx is still to come, but when it does it will be devastating, or so I hope). Keeping that in mind, I believe the main contribution of Deleuze is his neo-realist ontology […]

> In this ontology all that exists in the actual world is singular individual entities (individual atoms, cells, organisms, persons, organizations, cities and so on) whose main difference from each other is spatio-temporal scale. There are no totalities, such as "society as a whole", but a nested set of singular (unique, historically contingent) beings nested within one another like a Russian Doll. (DeLanda, Protevi & Thanem, 2005)

As we shall see later in this text, letting go of both 'capitalism' and 'system' does not preclude DeLanda from drawing conclusions regarding 'the political' in the economy. A DeLandian critique of the economy can, as already hinted, be directed towards the huge hierarchies – strata – that wield such power in contemporary societies. Whereas this is not, in itself, a novel prospect, the Deleuze/DeLanda framework provides new ways of accounting for the emergence of such power structures – and it can also provide us with new tools for understanding how to dismantle them.

Modern corporations as strata

Earlier in this text, the process of assemblage, and more specifically the creation of strata was defined as a merger of content and expression, visibilities and sayabilities, through the process of double articulation. In what ways can we describe modern corporations as strata, put together and sustained through a process of double articulation? How does this double articulation manifest itself in corporations, and how did this this 'historical formation' emerge?

To approach this issue, let us return to Foucault's *Discipline and Punish*. DeLanda recounts Foucault's historical narrative in the following way:

> Medieval towns were both linguistic and epidemiological laboratories, and many things accumulated within their walls: money, skills, weeds, cattle, manuscripts, prestige, power. In the nineteenth century, as cholera epidemics were giving rise to public health organisations, [there was also a] proliferation of institutions dedicated to disentangling these dangerous mixtures: naval hospitals and schools,

> prisons and factories. These institutional sorting devices began to process particular flows and to assign each geological, biological, and linguistic component its "proper" place. As Foucault has shown, the sorting operation was carried out in these institutions via spatial partitioning and standardised tests of different kinds, as well as by an elaborate record-keeping system to store the results of those examinations. In terms of abstract diagrams, there is no difference between these institutions and the rivers that sort out the sediment that forms certain rocks, or the ecological selection processes that sort genes into species. (That is, in all three cases we have an operation of sorting, classifying, or "territorialising".) (DeLanda, 1997: 268)

In other words, in Foucault, we witness the first steps in the emergence of the modern corporation. More specifically, the operation mentioned constitutes the *first* articulation (of content) in the process of double articulation.

> The content has both a form and a substance: for example, the form is a prison and the substance is those who are locked up, the prisoners (Deleuze, 1999: 41)

Thus, the "visibilities" of the strata-building process, includes the *substance of content* (the human and physical resources arranged in the strata), and the *form of content* (the material ways of sorting and compartmentalising these resources). The story of the emergence of the modern corporation can thus be told in terms of how workers/professionals/managers (substance of content) were, in ever more elaborate ways, arranged and inspected inside the corporation (form of content).

However, this story regarding the emergence of the modern corporation cannot be told without the parallel – and intertwined – story of the emergence of 'expressive elements' in the modern corporation. As DeLanda continues about Foucault's institutions in *Discipline and Punish*,

> in a *distinct and separate* operation [from the first articulation], particular discourses (medical, pedagogical, penal) were generated in and around these

> institutional setups and codified and consolidated the results of the sorting process into larger-scale entities: organized medicine and the educational and penal systems. (DeLanda, 1997: 269)

In other words, along with the visibilities (content), sayabilities (expression) can serve to codify the stratum. While these two processes are heterogeneous and separate, they can serve to mutually reinforce each other. Deleuze writes that

> these forms continue to come into contact, seep into one another and steal bits for themselves: penal law [expression] still leads back to prison and provides prisoners [content], while prison [content] continues to reproduce delinquency [expression], make it an 'object' (Deleuze, 1999: 29)

As with content, expression has a substance and a form. In the case of Foucault's prison, "the form is penal law and the substance is 'delinquency', in so far as it is the object of statements". (41) In relation to the modern corporation, this second articulation involves the emergence of economics, management theory, corporate law etc. – *form of expression.* The result is an "emergent whole" (Bonta & Protevi, 2004: 153) that effectuates notions of professionalism (based on a rational, objective, profit-maximising), and the corporation as a single entity (with its own *raison d'etre*) – the *substance of expression*.

On this point, again to counter the 'imperialism of language', DeLanda is careful point out that words – just as genes in humans – can never be the be all and end all of how assemblages function. The *may* serve as 'blueprints' that help to stabilise a certain setup, but they can never totally discipline or dictate the functioning of the assemblage. He writes that

> despite the importance of genetic and linguistic components for the consolidation of the identity of biological or social assemblages, it is crucial not to conceptualize their links to other components as relations of interiority. In other words, the interactions of genes with the rest of a body's machinery should not be

> viewed as if they constituted the defining essence of that machinery. And similarly for the interactions of language and subjective experience or with social institutions. In an assemblage approach, genes and words are simply one more component entering into relations of exteriority with a variety of other material and expressive components […] (DeLanda, 2006: 16)

This implies that actors in organisations do not follow the theoretical texts of economists or management gurus in the same way that we would construe of members of a church following the tenets of sacred texts. Organisations to not simply become what management theorists say they should be:

> As assemblages, hierarchical organizations possess a variety of components playing an expressive role. Some of these are linguistic, such as beliefs in the legitimacy of authority, but many are not. […] In the rational-legal type [of organisation] it is the very fact that procedures work in a technical sense […] that expresses their legitimacy. On the other hand, given that sometimes it is not easy to evaluate whether a procedure really works, […] 'rationality' may be used in a purely ceremonial way. […] The more complex the outputs and production processes, the more uncertain the evaluation, and the less clear the technical expression of authority. In these circumstances it makes sense for organizations […] to stick to ceremonial 'rituals of rationality' to buffer themselves from criticism. In the manufacture of mass-produced goods, for example, the technical aspect is strong and the ceremonial relatively weak, but in mental health clinics, legal agencies and schools, the evaluation of outputs may become largely ceremonial […] (71)

In other words, the 'linguistic components' (texts and theories) supplied by management gurus can sometimes wield a kind of influence that resembles the 'ceremonial' influence wielded by sacred texts on church-goers. However, this is only in times of great uncertainty regarding the issue of whether a procedure works or not. The power of

management theorists' text is only strong when there is 'no word' from other instances – human or non-human.

With this Deleuzian/DeLandian framework firmly in place, the text will now move on to place some 'classics' of organisation theory in context.

The birth of the factory

As already mentioned, *Discipline and Punish* charts the emergence of technologies of discipline and surveillance in relation to the nascent prisons, hospitals, schools during the 18th and 19th century. These technologies, Foucault argues, also came to transform guild-like workshops into modern factories, again serving to 'disentangle the dangerous mixes' inherited from the medieval times. For Foucault, these techniques of discipline were imperative in the making of the industrial takeoff (and, if we allow ourselves to use the 'c' word, the emergence of modern capitalism). Indeed,

> the two processes – the accumulation of men and the accumulation of capital – cannot be separated; it would not have been possible to solve the problem of the accumulation of men without the growth of an apparatus of production capable of both sustaining them and using them; conversely, the techniques that made the cumulative multiplicity of men useful accelerated the accumulation of capital. (Foucault, 1977: 221)

This apparatus of production operated along the following principles:

> As the machinery of production became larger and more complex, as the number of workers and the division of labour increased, supervision became ever more necessary and more difficult. It became a special function, which had nevertheless to form an integral part of the production process, to run parallel to it throughout its entire length. A specialised personnel became indispensable, constantly present and distinct from workers; 'In the large factory, everything is regulated by the clock. The workers are treated strictly and harshly. The clerks, who are used to

> treating them with an air of superiority and command, which is really necessary with the multitude, treat them with severity and contempt; hence these workers either cost more or leave the factory soon after arrival' [...] But, although the workers preferred a framework of a guild type to this new régime of surveillance, the employers saw that it was indissociable from the system of industrial production, private property and profit. At the scale of the factory, a great iron-works or a mine, 'the objects of expenditure are so multiplied, that the slightest dishonesty... (175)

Thus, already in Foucault's account, some contours of rationalisation of labour and the 'Fordist' production are discernible.

In Deleuzian terms, the emerging factories can be thought of as strata that suck in raw materials, workers and clerks (substance of content), put together in novel factory arrangements that function in the same way as a panopticon (form of content). In other ways, the factory was built in a way that would render certain aspects of workers' operations more visible (from the perspective of the clerks). Along with these material components, the emerging factory also encompassed components playing an expressive role – not least records and written examinations stemming from the process of inspecting workers. However, as DeLanda – ever the critic of 'language-obsessed' theory – injects,

> it must be kept in mind that the kind of writing involved here is of the *logistic* type, a very material form of writing documenting relatively simple facts […] not the type of writing that lends itself to endless rounds of hermeneutic interpretation. (DeLanda, 2006: 74)

Nevertheless, as we shall see, other expressive components – such as theories of 'scientific management' – would also be added to these strata, further stabilising their consistency. These records, written examinations, and theories can be categorised as form of expression, like penal law in the case of prisons. Finally, from these components, modern notions of work, production and professionalism emerged (substance of expression).

Foucault's narrative stretches only to the rise of the modern factory in Europe, before and during the Industrial Revolution. However, in order to chart how these modern manufacturing methods intertwined with the rise of the modern limited-liability, joint stock company, one must study how factory production fared in the US.

Towards the end of the 19th century, factories had begun to replace guild-like workshops in Europe. However, large-scale, integrated production of complex goods had not emerged yet. In *The Machine that Changed the World* (the book that popularised the 'lean production' methods of Japanese car manufacturers), there is a story of how the Honourable Evelyn Henry Ellis (MP), set out to buy a car in 1894. As there were no specialised car-dealers or even specialised car manufacturers in England, he went to the the world's leading car merchant – Paris-based machine-tool company Panhard & Levassor – and commissioned an automobile. (Womack, Jones & Roos, 1991: 21)

> When Ellis arrived at P&L, which was still primarily a manufacturer of metal-cutting saws rather than automobiles, he found in place the classic craft-production system. P&L's work force were overwhelmingly composed of skilled craftspeople who carefully hand-built cars in small numbers.
>
> These workers thoroughly understood mechanical design principles and the materials with which they worked. What's more, many were their own bosses, often serving as independent contractors within the P&L plant or, more frequently, as independent machine-shop owners whom the company contracted for specific parts or components.
>
> The two company founders […] were responsible for talking to customers to determine the vehicle's exact specifications, ordering the necessary parts, and assembling the final product. Much of the work, though, including design and engineering, took place in individual craft shops scattered throughout Paris. (21-22)

As we shall see, all of these properties were about to be turned on their head, as on the other side of the Atlantic, new modes of manufacturing emerged. From the mid-19th century and onwards, New England based manufacturers had been engaged in developing the so-called 'American system of manufactures'. The crowning achievement of this development was, of course, the production system put in place by Henry Ford in 1913 – famous for its assembly line and its 'Taylorist' work tasks. However, this conception of Fordist production is somewhat misleading:

> The key to mass production wasn't – as many people then and now believe – the moving, or continuous, assembly line. *Rather, it was the complete and consistent interchangeability of parts and the simplicity of attaching them each other.* These were the manufacturing innovations that made the assembly line possible.
>
> To achieve interchangeability, Ford insisted that the same gauging system be used for every part all the way through the manufacturing process. (26-27)

Thus, the Fordist system of production was primarily based on standardisation and uniformity, in part enabled by the development of standardised gauge blocks. Ford could then reduce the complexity of assembly, eliminate the need for skilled craftsmen, and introduce short-cycle work tasks that did not require any particular skill on behalf of the worker. Instead, the onus was on the worker to conform to the uniform work process.

Over time, Ford brought more and more of the production process in-house. Through 'vertical integration', his aim was to host the full production process – from the sourcing of raw materials, to the sales offices. Many of the components that were previously provided by subcontractors were thus brought under the Ford umbrella, sometimes produced in the same production site. In 1931, this approach reached its pinnacle point, though the opening of the Rouge complex in Detroit. (33)

As is well-documented in the texts on Ford, this shift in production methods boosted productivity hugely, but took its toll on workers. As worker turnover and absenteeism soared, Ford famously started offering workers the 5-dollar salary. However, at the same

time, the company also introduced the infamous ‘Sociological Department’, that ensured that Ford workers did not spend this high salary on drinking or gambling. Instead, Ford famously decreed that workers were meant to spend their money on other, more productive consumer products, i.e. cars. This added to the imposition of a uniform behaviour, both at work and outside of it.

Thus, in Deleuzian terms, the emergence of Fordist production implied a host of developments that related to the ‘content’ side of double articulation; material tools and arrangements that imposed uniformity on both resources and workers. As such, Fordist production implied territorialisation: The workshops dispersed around Paris (in the case of P&L) were replaced by one building that hosted the full manufacturing process. Moreover, gauge blocks served to impose a standardisation and uniformity to components as well as the operations of the individual workers. This uniformity was also implied by the panopticon-like arrangement of clerks in relation to workers (described above by Foucault), but also through the ‘spies’ in the Sociological Department.

On the expression side of double articulation, Ford’s endeavour implied a new set of theories on work organisation, as embodied in the emergence of professionals (such as quality controllers and industrial engineers). However, maybe most interestingly, this form of Fordist production also implied the emergence of the modern professional – be it a worker or an industrial engineer. This ideal implied not only loyalty and clean living, but also a strict separation between life at work and at home, professionalism and amateurism, production and consumption.

The rise of the modern corporation

In conjunction with the birth of the factory, of course, there was also the rise of the modern corporation – as a unified unit of production, and as a legal entity. Prior to the rise of the limited liability, joint stock company, production was primarily organised in smaller, often family-owned, units. One exception is, of course, large trading companies such as the East India Company, which were set up on the basis of royal charters.

Again, the rise of the modern corporation is best traced from across the Atlantic. It was in the US that, in a 1819 case that set a precedent, a judge ruled that "corporation is an artificial being, invisible, intangible, and existing only in contemplation of law" (Powers, 2006). Thus, a corporation was to be seen as a legal person. In conjunction with the Fourteenth Amendment to the American Constitution – which requires the American states to provide equal protection under the law to all persons – the corporation became a single entity with legal rights and entitlements. As described vividly in Richard Powers' novel *Gain*, this new form was at first not seen as an attractive vehicle for conducting business. (The limited liability character was seen as somewhat undignified and irresponsible.) Nevertheless, over time, it was evident that being a corporation granted such privileges that businessmen could hardly avoid refashioning their organisations as corporations. (Powers, 2004)

As already touched upon, the 19th century also saw the rise of management methods that managed to control large operations. Alfred Chandler, arguably the foremost historian of the modern corporation, argues that the organisations that built the American railroads were precursors to the modern corporation. He writes that

> railroad managers were forced to work out the basic methods of communication and control essential to the operations of the modern business corporation. The railroaders were innovative not because they necessarily more perceptive, energetic, or imaginative than other contemporary businessmen, but rather because they were the first to face the challenge of handling efficiently large amounts of men, money and materials within a single business unit. (Chandler, 1979: 179-180)

In his most famous book, *The Visible Hand*, Chandler (1977) sketches the subsequent emergence of the modern American corporation. His argument goes as follows: The modern multiunit business enterprise replaced small traditional enterprise when administrative coordination permitted greater productivity, lower costs, and higher profits than coordination by market mechanisms. This was evident in the case of Ford and the

automobile industry: At the turn of the century the automotive sector had encompassed hundreds of small workshops and manufacturers. By 1919, aided by the new manufacturing techniques, Ford alone had a 50% market share in the US. By 1920, more than half of the worlds cars were made by Ford Motor Company.

However, crucially, the advantages of internalising the activities of many businesses within a single enterprise – like Ford did – could not be realised until a managerial hierarchy had been created. Once this managerial hierarchy had been formed, the hierarchy itself became a source of permanence, power and continued growth. The modern business enterprise the took on "a life of its own", to use the expression of Werner Sombart.

The careers of the salaried managers who directed these hierarchies became increasingly technical and professional. Thus, training, experience, and performance were the factors that influence whether you had a place in a company – not, as before, whether your father owned the firm, or whether you owned capital. Moreover, as corporations grew, and management became more professional, management became separated from ownership. Salaried managers took over the management of companies (but also had to convince financiers that they could be trusted with managing their assets).

When making administrative decisions, Chandler argues, career managers preferred policies that favoured the long-term stability and growth of their enterprises to those that maximised current profits. Managers controlled corporations so that they remained a secure source of income and an interesting career ladder to climb – for themselves. As large enterprises grew and dominated major sectors of the economy, they altered the basic structure of those sectors and the economy as a whole. In other words, single corporate managers were controlling the flow of raw materials into becoming products, put in the hands of consumers.

Several economic historians put forward accounts similar to that Chandler's , and J.K. Galbraith's work (in *The Affluent Society* and *The New Industrial State*) proposes a similar narrative. This story, it should be noted, stretches only up until the late 1960s or

early 1970s, at which time these corporate behemoths were challenged – first by 1968ers, then by the oil crisis, and finally by restructuring in the financial world (the rise of corporate raiding, leveraged buy-outs etc.).

Going back to the automobile industry, this process of creating an organisation was slow in coming at Ford Motor Company; Henry Ford held on to power in the corporation until his death (in 1947). Until that time, no power was handed over power to non-Ford people, however 'professional' or 'management skilled' they were. Instead, it would be General Motors that led the way in creating an organisation based on modern management professionals. In the 1910s, GM had grown to become a huge conglomerate of different car manufacturers, in dire need of coordination. Alfred Sloan became president in 1919, and set out to resolve the coordination problem though

> decentralised divisions managed objectively "by the numbers" from a small corporate headquarters. That is, Sloan and the other senior executives oversaw each of the company's profit centres […] Sloan and his executive group demanded detailed reports at frequent intervals on sales, market share, inventories, and profit and loss and reviewed capital budgets when the divisions required funds from the central corporate officer.
>
> […] If the numbers showed that performance was poor, it was time to change the general manager. General managers showing consistently good numbers were candidates for promotion to the vice-presidential level at head quarters. (Womack, Jones & Roos, 1991: 40-41)

These new management procedures – "objective" and "by the numbers" – caused GM to take the lead as major car manufacturer in the US before the end of the 1920s. However, as we shall see, Ford recuperated quickly as – after the Second World War – Henry Ford II recruited a new breed of even more numerically-driven professional managers; the so-called "Whiz Kids".

Again, going back to the Deleuzian framework, Chandler's narrative of the rise of the modern corporation adds new elements to the double articulation. Chandler's main tenet, the arrangement in which ownership is separated from management, and a new breed of professionals implies a further refinement of the process in which content is fed into, and arranged inside, the corporate strata. This enabled to corporations to grow larger than ever before – capital could be sourced from ever more capitalists, as these did not have to oversee the day-to-day management of these corporations. Thus, the territorialisation continued even further, drawing in more capital and professionals into the growing corporations.

However, crucially, this could only work in conjunction with the emergence of elements playing an expressive role. The above depiction of General Motors implies the rise of a number of new linguistic elements of logistical nature – "detailed reports at frequent intervals on sales, market share, inventories, and profit and loss", as well as capital budgets and requests for further funds. Without these components, the territorialising of capital and professionals could not be held in place – owners needed these tools to be able to delegate control to managers. Maybe even more importantly, the more general notion of professionalism as related to numbers and objectivity grew stronger during this phase. Owners could only trust managers with their assets if there were ways of proving that these managers were acting in line with objective profit-maximisation (rather than trusting their money in the managers' subjective judgement).

However, along with Chandler's depiction of the rise of the modern corporation, there are other stories of the modern corporation that should also feature in this depiction of corporations as strata. Beyond the separation of ownership and management, modern corporations can also be described in terms of the rise of specialised corporate functions, such as R&D and legal services. The emergence of these departments should thus be added to as important components playing a 'material role' in the double articulation of the modern corporation.

In *America by Design: Science, Technology and the Rise of Corporate Capitalism*, David Nobel argues that the formation of the modern corporation implied that the development of science and technology was increasingly conducted inside of corporate entities. Indeed, Henry Ford himself argued that the real path-blazer of the modern economy was Thomas Alva Edison, who set up the first industrial research lab – Menlo Park, New Jersey. Edison's creation later spawned similar entities, such as Bell Telephone Laboratories.

This development had two implications. First, research and development of products increasingly became a professionalised activity, conducted at the behest of large corporate entities. Corporate research labs benefited from great economies of scale, which made it more unlikely that a single individual could conduct similar activities. In this way, Edison had invented the 'invention equivalent' of Ford's mass production. Secondly, this meant that corporations increasingly owned and controlled research, and had a great stake in influencing future development of science and technology – particularly the knowledge that related to their particular products.

This evolving corporately held knowledge was increasingly protected by corporate legal services. Thus, the 20th century saw a development in which an ever greater share of law graduates – especially the most ambitious ones – went into protecting the rights of corporate legal persons, rather than protecting ordinary citizens. Irrespective of whether such lawyers were working in corporate legal departments, or in law firms with corporate legal departments as their main client, this development was controversial. For instance, in a 1934 *Harvard Law Review* article, a Chief Justice Harlan Fiske Stone laments that the legal profession increasingly had a duty towards

> successfully conducted business, rather than to the intangible and indubitably more durable satisfactions which are to be found in a professional service more consciously directed toward the advancement of the public interest […] [I]t has made the learned profession of an earlier day the obsequious servant of business

> and tainted it with the morals and manners of the marketplace in its most anti-social manifestations. (Stone, 1934)

Going back to the Deleuzian framework, the emergence of corporate R&D and corporate legal services (as forms of content) was joined by the emergence of patents and corporate law, as well as theories on how to control knowledge (forms of expression). The latter component also coincided with economic theories that stressed the importance of corporately held resources (not least knowledge) as the essence of a corporation. Again, this configuration was united by more general notions of the corporation as owners of knowledge of products, the notion of innovation as stemming from corporate labs, and the notion of a separation of objective professionalism from amateurism and leisure activies. All of these abstract notions can, in Deleuzian terminology be characterised as substance of expression.

‘The political’ in the economy

This third, and final, section will explore how DeLanda conceives of the political in the economy. In what ways can the DeLandian position be said to represent a new political economy?

Coltism, not Fordism

One key aspect of DeLanda’s perspective of the economy is the fact that the developments sketched above cannot be dissociated with military endeavours. While social scientists tend to depict the modern economy as an entity that operates along the lines of the market forces, he links it to nations or tribes fighting each other through the deployment of huge bureaucracies.

> One may think that with the rise of the Industrial Age in the nineteenth century, with the massive increase in size of the civilian market, the military role in economic affairs would have decreased. In fact, its role simply changed. The sectors catering to the civilian market were dependent on a small set of industries, appropriately labelled “industry-building industries”. These – including metallurgy, machinery, textiles, chemicals, paper and transportation – […] form the input for the rest of the economy. […] Since relative independence from foreign suppliers has always been an important logistic consideration for the military, particularly in an age of intense international trade rivalry, it is not surprising that the military often played an important role in the establishment of this sector in the economy. (DeLanda, 1991: 110)

This means that “the process by which the civilian manufacturing economy acquires its direction and its technological momentum, and its mass basis, receives its catalytic stimulus from the original defence-related efforts of the State to create the group of strategic industries.” In other words, many of the sectors that make up today's economy – including the automotive sector – have emerged in the context of military spending.

However, though key innovations are often of a military origin, we tend not to recognise them as such.

> A large body of literature exists about economic growth and industrial development in the United States, but it reveals little about the military's participation. Why? One reason is the persistence of a deeply rooted tradition that sanctions free enterprise and decries government interference in the economy. […] By linking national defense with national welfare, [the military] has sponsored all types of research and development and has served as an important disseminator of new technologies. (Smith, 1985: 36-37)

For instance, the 'Fordist' production methods sketched above were emerged as a continuation of techniques developed by gun-makers in New England. Interchangeability, mentioned above as a key to Fordism, was in fact pioneered by people such as Samuel Colt. Thus, Ford's

> insistence on interchangeable parts continued in a long tradition reaching back early in the nineteenth century in the United States to manufacturing at army arsenals. (Hughes, 2004: 204)

However, this is just one example of how military innovations are post-rationalised as civilian ones, supposedly driven by 'market' forces. Beyond the example of military armouries "playing an innovative role producing the modern proletariat" (DeLanda, 1991: 111), there is also the example of

> the pioneering efforts of military engineers in the administration of railroads [that] deeply affected the future of modern management methods. The military stress on strict accountability and hierarchical operational procedures, the division of labor between staff and line manager, and the experience of projecting control over networks at scales unknown even to the largest private entrepreneurs of the time, profoundly affected the evolution of the American business community in the nineteenth century.

So, the management of railroads, mentioned by Alfred Chandler as crucial for the emergence of modern management, was also piggybacking on military innovations. In other words, looking at the management innovations sketched above (in the depiction of the birth of the factory and the rise of the modern corporation), both were instigated by military action. The Fordist mode of production, and the modern modes of managing big single-entity operations, rested upon military innovation – the emergence of interchangeable parts in production, and the emergence of military control-and-command structures.

As the 20th century unfolded, this military influence did not subside. Rather, it increased, as

> the military ceased to be simply a supplier of protection and consumer of wealth, and became an "institutional entrepreneur" in its own right. […]
>
> The naval build-up of this period [the first and second world wars] put together the final pieces of the military-industrial complex which, as we have seen, had been long in assembly. […] by the time of World War II, distinctions between a purely civilian sector and a military area of the economy were impossible to draw […] perhaps what signalled the merging of the two sectors was the mathematical procedures used by the military to organize the mobilization of a nation's resources, the discipline of OR [Operations Research], becoming an integral part of large civilian undertakings under the name "management science". (111)

This form of management science was indeed embraced by Ford, after WWII, as Henry Ford II invited a group of US Navy logisticians to refashion Ford. These Harvard-trained Whiz Kids, featuring among others Robert McNamara, further elaborated upon the numerical controls and financial management that were introduced in GM by Alfred Sloan. This was then the beginnings of the 'transformation of corporate control', through which modern corporations have been increasingly dominated by financial economists. (Fligstein, 1993)

From this perspective, DeLanda argues that we need to re-connect the analysis of the economy with the analysis of military efforts. (Here, he is close to J.K. Galbraith's analysis of the new industrial state.) All too often, we attribute the economy with a life of its own, detached from the actions of the state. This is evident if we consider the fact that

> business and economic historians generally are reluctant to assign it credit for managerial innovation. Instead they attribute the rise of modern management to the play of market forces. (Smith, 1985: 11)

It is important to note that this critique of 'military-ignorant', market law-obsessed economics and political economy cuts both ways. DeLanda's criticisms are not only directed towards neoclassical economists, but more directly towards the Marx-inspired writers who have taken to calling the mid-20th economy a 'Fordist' one. With regards to the rise of a mass production economy,

> the most important insight which goes beyond economics is due to people like Michel Foucault. The basic idea is that several of the key elements of mass production are not of bourgeois origin but of military origin. […] As Foucault says, discipline increases the powers of the body in economic terms of utility but decreases them in political terms of obedience. How are we to change this oppressive system if we are not even aware of its origins? […] As long as we call this system "Fordism" are we not concealing its real sources? Marxists at this point like to mention Adam Smith's pin factory as example of a civilian use of discipline prior to rifle manufacturing, but for every example they use I can find an earlier military one […] (DeLanda, Protevi & Thanem, 2005)

Hence, the mass production economy of the 20th century should be dubbed 'Coltist', emphasising that it was the innovations of gun-maker Samuel Colt who set out on the endeavour of producing interchangeability, uniformity, and new modes of discipline. In other words, the power structures at hand – the strata – are better understood as military structures, rather than market law-guided, 'capitalist' ones.

In this way, DeLanda's Deleuze-inspired description of the modern economy does encompass a strong element of social critique. As such, it is a form of 'political economy'. However, as we shall see, it is a political economy that – contrary to other 'new' strands of political economy – avoids placing overdue emphasis on the role that economic theories play in stabilising the economy.

Performativity and molarity

Readers of Callon will be familiar with the concept of performativity, and the idea that economics 'performates' the market. Like any other science, economics not only describes the reality it purports to study – it also forms a constitutive part of that reality. Thus, as many authors related to Callon's 'performativity program' (Callon, 2005), economic theories can become self-fulfilling prophesies. This approach, of course, places the onus on economists, and – Callon is careful to point out – 'lay economists' (such as marketers, managers and others) as the ones that uphold economic structures. A similar idea is put forward by James Carrier and Daniel Miller, through their theory of 'virtualism' (1998).

To some degree, DeLanda does agree that our theories can become self-fulfilling prophesies, especially in relation to how modern science has based its worldview on linear theories of equilibrium (mentioned above). Towards the end of *A Thousand Years of Nonlinear History*, he writes that

> as our industrial, medical, and educational systems became routinized, as they grew and began to profit from economies of scale, linear equations accumulated in the physical sciences and equilibrium theories flourished in the social sciences. […] even though the world is inherently nonlinear and far from equilibrium, its homogenization meant that those areas that had been made uniform began behaving objectively as linear equilibrium structures, with predictable and controllable properties. […] Western societies transformed the objective world (or some areas of it) into the type of structure that would "correspond" to these

> theories, so that the latter became, in a sense, self-fulfilling prophesies. (DeLanda, 1997: 273)

However, as also mentioned above, DeLanda stresses that linguistic elements are but one type of components that come into the stabilisation of assemblages. Instead, his project has been to reintroduce the role of material forms in accounting for the world, and provide a way out from the 'language-obsession' that has plagued the humanities and social sciences during the past decades. Thus, a DeLandian political economy cannot focus on how to engage in deconstruction of the economists' language games. Or, as John Protevi put it,

> the idea that a reading that shuffles signs about, that assigns new signs to old objects without any body work, would count as a political intervention, is silly academic self-flattery. (DeLanda, Protevi & Thanem, 2005)

Nevertheless, one Deleuzian idea that does have some similarities with performativity is the distinction between the 'molecular' and the 'molar'. Brian Massumi explains that this

> distinction is not one of scale, but of mode of composition: it is qualitative, not quantitative. In a molecular population (mass) there are only local connections between discrete particles. In the case of a molar population (superindividual or person) locally connected discrete particles have become correlated at a distance. […] Molarity implies the creation or prior existence of a well-defined boundary enabling the population to be grasped as a whole. (Massumi, 1992: 54-55)

Using the terminology from before, molarity is achieved when elements of content – such as prisoners, soldiers, pupils, workers or professionals – are joined together in highly coded stratum, through elements playing an expressive role. Massumi continues:

> A molar individual is the dominated term in a relation of power (a content for an overpowering form of expression). A contained population is called a "subjected group". The unity of a molarized individual is transcendent (exists only from the

> point of view of the forms of expression to which the individual is subjected, and on their level) […] A molarized individual is a "person" to the extent that a category (cultural image of unity) has been imposed on it, and insofar as its subsequent actions are made to conform to those prescribed by its assigned category. (55)

Relating this concept back to political economy, one could argue that the notion of 'the corporation' can at times be treated as a molar structure. The contents – workers and professionals – can be more or less subsumed under "overpowering" expressive elements (ideas, theories etc.), that assume that only certain modes of action can exist within the corporation. Corporations can thus be expected to conform to a "cultural image of unity", based upon transcendent essences that supposedly define their identities. For instance, the identity of 'the corporation' can be defined as a structure where all action is rational and profit maximising, as supposed by both neoclassical economics (the firm as a production function) as well as by Marxist political economy. Another such cultural image – or, if you will, myth – is the view of 'the professional' as a dehumanised automaton who objectively manages shareholders' assets, separating his or her professional life from his or her personal, leisure-time life. These images of unity, of course, only exist from the perspective of the economists who assume that these transcendent essences exist. Nevertheless, they can have molarising effects.

While the above may read like simply another version of the postmodern claim of performativity, its important to note that in the DeLandian/Deleuzian framework, these "cultural images of unity" are never powerful enough to be treated as essences. Again, just like genes, they are always in a relation of exteriority to the structure at hand. Massumi writes:

> A structure is at best metastable: stable on the whole (statistically) or as a whole (from the regularized view of its molarity). Stability is not fixity. It is variation within limits […] A structure is defined by what escapes it. (57)

This property of molar structures can be explained in terms of complexity theory.

> A structure is defined by its thresholds – the relative limits within which it selects, perceives, and captures, more or less consistently (its margin of deviation); and the absolute limits beyond which it breaks down (chance, chaos). […] The closest thing there is to order is the approximate, and always temporary, prevention of disorder. The closest thing there is to determinacy is the relative containment of chance. The opposite of chance is not determinacy. It is habit. (57-58)

In other words, linguistic expressive elements (such as theories or culture) can only serve to somewhat – on the general, statistical level – contain the creation of disorder (the breakup of the molar entity into a population of molecular entities). The theories of an economist can only temporarily, and on a statistical level, maintain the unity of a monolithic profit-maximising corporation, or an army of objective, rational professionals. Sometimes, these molarising effects strike back on individual variations inside the structure – say on professionals acting 'unprofessionally' in a corporation – sometimes they don't. Thus:

> Stability is […] variation within limits […] A structure is defined by what escapes it. (57)

So, where does this approach lead the social activist or the critic?

The space for change

As hinted above, the Deleuzian story about the rise of the modern society, in terms of strata and assemblages, is that the unfolding of history has implied a vast stratification of the world. The economy is no exception to this general development: Indeed, as we have seen in this text, the rise of the modern economy is based upon stratification – the emergence of a mass production society based on economies of scale, and rise of modern corporations. Hence, the politics represented by this worldview concern the issue of how to dissolve some of those structures. Or, as DeLanda writes:

> The last three or four centuries have witnessed an intense homogenization of the world (biologically, linguistically, economically), a fact that in itself would seem to recommend the injection of a healthy dose of heterogeneity into the mix. (DeLanda, 1997: 272)

However, citing Deleuze and Guattari, he cautions us that strata cannot simply be 'blown up'. First of all, we have to recognise the fact that some strata have proved beneficial, and that rhizomatic self-consistent aggregates also imply a form of discipline. Secondly, when dissolving a stratum, activists need to be sure that some other form of organising – some other abstract machine – can take its place. Therefore, he suggests that activists and critics assume an experimental, rather than deconstructivist, approach to changing the world.

> All these precautions are necessary in a world that does not possess a ladder of progress, or a drive towards perfection, or a promised land, or even a socialist pot of gold at the end of the rainbow. […] Thus the call for a more experimental attitude toward reality and the potential for self-organisation inherent in even the humblest forms of matter-energy. (273)

This resonates with Protevi and Bonta's claim that human subjects can indeed 'change the world' but "only under far-from-equilibrium, 'crisis' situations". Anyone interested in instigating change needs to be able to recognise such crisis situations, and need to know how to exploit the opportunities these situations offer.

Interestingly, Callon (2005) approaches the issue of change and critique in a similar way, encouraging experimentation instead of striving to reach that utopia 'at the end of the rainbow'. According to him, a scholar "that claims to be critical should study [the] devices intended for all Davids dreaming of ousting Goliaths", and supporting them in "establishing a right to experimentation". Thus, the critical, progressive scholar who wants to change the world

> can only participate, along with the actors, or rather with certain actors in a position to produce small differences, in showing that other worlds are possible

> and that humans in society (in markets) have multiple and uncertain forms that emerge through trials. It is up to social scientists to recognize the moment when, still fragile and enigmatic, they appear.

In line with the STS tradition, Callon does place his emphasis on the role that social scientists play in describing and shaping the world. DeLanda, on the other hand, is more interested in understanding the abstract machines as such, an in prompting non-scientists to instigate change by getting complex systems into spinning in new ways (i.e. by getting them to actualise a different abstract machine). Nevertheless – though their focus is on different sources of change, and they choose to describe these windows of opportunity for change – their view of how social assemblages can change is indeed quite similar.

In this way, both strands of theory using the assemblage as a key concept – the Deleuzian/DeLandian theory and ANT – construe social structures as dynamic, open-ended, heterogeneous and malleable. As such, they both represent exciting routes forward for economic sociologists interested in political economy.

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