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Control Societies & Platform Logic.

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New Formations: Control Society Special Issue.

ABSTRACT:
Deleuze's concept of the control society presciently sketches a world of power as 'universal modulation'. This article investigates the applicability of this understanding of control to today's socio-technical systems. It examines Deleuze's control society through the philosophy of cybernetics, situating a restrictive interpretation with reference to Norbert Weiner's theory of control systems in animals and machines. We argue that in maintaining a concept of control-as-homeostatic feedback modulation, cybernetic readings tend to ignore the constructive, enabling dimension of control. To remedy this, we analyse a recent concept developed in the field of business studies of information technology: the platform. Extrapolating beyond the existing literature of platform design, we develop a generalised theory of the platform as an alternative model of control, through the concept of generative entrenchment.

KEYWORDS: Deleuze, Control Society, Cybernetics, Complexity, Wiener, Platforms, Wimsatt, Generative Entrenchment.

Control Societies & Platform Logic.

To affirm the historicity of power is to distinguish its specifically material and temporally variant nature. It is to recognise that in each era power must be refashioned in the image of its age. The task of critical political thinkers being, in turn, to discover and hence unmask these mechanisms. How do the operations of power transform over time? Or, to put the question another way, how does power manifest historically unique operational modalities according to particular configurations of social, economic, technical, and environmental parameters? At stake in Gilles Deleuze's influential essay on the control society is precisely such an answer to these questions, a speculative outline of the still emergent dynamics of power in post-Fordist societies.[1] While lightly sketched, this was to suggest that alongside changes in the technical, material, and organisational basis of society under the new production systems of post-Fordism, there were increasing signs that the operations of power were likewise in flux.

Most fundamentally, Deleuze pointed towards the fact that contemporary power formations were moving beyond a mode of *discipline*, and towards one of *control*. One of the most influential ways in which power within mass industrial culture has been theorised is via Michel Foucault's notion of the disciplinary society.[2] The regulation of space and time in the form of enclosures and timetables, coupled with constant surveillance, he contended, generated a disciplinary apparatus suitable for ordering human behaviour in the era of mass production and industrialisation.[3] Yet as Deleuze observed in an interview from the early 1990s, the moment at which Foucault began to theorise the mechanisms of discipline was also the time of their surpassing.[4] From this notion of power-as-discipline, grounded in the technologies and techniques of confinement, pronounces Deleuze, we shift towards power-as-control, based upon information and communications technologies, and the social forms they intersect with.[5] Power mutates from a system of threatened punishment within the order of domination and coercion, to a system of continuous micro-scaled modulation. In this observation, Deleuze anticipates many of the features of the world today, from public sector targets to the techniques of neuromarketing, from social networks to Google analytics.

Deleuze's prescient coupling of ideas of modulation and feedback with decentralised mechanisms of production and governance demarcates a conception of power as 'universal modulation'.[6] But how might such an idea continue to capture the operations of contemporary power? This essay investigates the applicability of control to some of today's socio-technical systems. It proceeds in two parts.

The first part advances a symptomatic *restrictive* reading of control, interpreting Deleuze's concept by reference to the philosophy of cybernetics. This locates Deleuze's idea as being closely related to Norbert Weiner's first generation cybernetic theory of control in animals and machines.[7] This interpretation limits the idea of control to one based on flexibly applied *constriction* through negative feedback, in the sense of controlling individuals and collectives through the installation of homeostatic regulative dynamics. In doing so, such a reading arguably ignores the *generative* dimension of control, that dimension of power-to that exists alongside power-over, that form of modulation that puts to use relative constriction to enable, as well as disable.

The consequences of this are drawn out in the second section, which analyses a recent concept developed in the field of business studies of information technology: the platform – one of the key concepts which businesses such as Facebook, Google, and Twitter use to understand their own operations. Enterprises such as these operate

according to principles of a control beyond restriction, developing new products and services on a speculative basis to employ non-trivial contingency. What is crucial to such entities is a form of control which does not seek to preclude behaviour before it occurs, while still working to mould and sculpt action. We suggest that the concept of the platform is more extensive than the limited treatment it has received to date. Extrapolating beyond the existing literature of platform design in IT, we develop a generalised theory of the platform as alternative model of control-via-generative entrenchment, one which incorporates both constrictive and generative dimensions, (and which tracks a concomitant shift from the register of cybernetics to complexity).

Finally, this essay outlines some prospective implications of a more multifaceted notion of control, in creating avenues for emancipatory political strategy beyond the usually purported notions of evading control (whether through hacking ICT networks, blockading infrastructure nodes, or engaging in software piracy).

1. AT THE LIMITS OF CONTROL

Control as Social Self-Regulation

To understand how Deleuze's notion of power-as-control might be adapted to analyse contemporary power formations, we need first to set out what control means. In choosing the word "control", Deleuze explicitly references William S. Burroughs' essay "The Electronic Revolution".[8] Control for Burroughs had multiple (often highly paranoid) meanings, from the social control systems of Nixon's America, to the thought control imposed by Scientology, to the control made possible by electronic communications. Deleuze's own understanding of the term is equally diverse, but notably more precise.

"Postscript on the Societies of Control" itself outlines a historical succession of three eras of organisational logics (following but extending Foucault): sovereign, disciplinary, and control.[9] Each of these socio-political logics roughly corresponds to a certain form of science, technology, and mode of production. As such, sovereign societies are associated with simple mechanical machines, such as levers, pulleys, and clocks, with economies based upon a productive mode of mercantilism or feudal-agrarianism. Disciplinary societies, by point of contrast, feature thermodynamic technology such as steam engines and mechanised production lines. They are associated with 'the eighteenth and nineteenth centuries [and] reach their apogee at the beginning of the twentieth century.'[10] Finally, control societies in turn operate on cybernetic machines, roughly but imperfectly aligned with post-Fordism and financialised capitalism (or as Deleuze puts it 'metaproduction').[11]

As Deleuze clarifies in a contemporaneous interview, the machines 'don't explain anything' in and of themselves, but rather socio-political logics require us to consider the role of technology as part of broader collective techno-social apparatuses.[12] What this means is that while particular technologies might enable certain modes of power to emerge, they do not exhaustively determine in a simple uni-directional fashion the organisational logic in any given era. Instead, the affordances of technology must be given expression across a broader apparatus (including the social, the political, the cultural and the aesthetic).[13] For example, the thermodynamic technologies of the eighteenth and nineteenth centuries might have made industrial capitalism much more likely, but knowledge of steam engines was also present in ancient Rome and China

without either initiating what we today recognise as capitalism. In each case, what was missing was the social and economic components of the socio-technical apparatus (such as particular religious norms valorising work and enabling capital accumulation). Conversely, we might examine the history of European capitalism beginning in the agricultural domain through enclosures – the techniques of discipline preceding the widespread adoption of thermodynamic technology in the sphere of production.[14] Only at the juncture of multiple interacting forces, operative across different domains, do new socio-political logics emerge.

The overriding dynamic of the control society is distinguished as being one of continually shifting modulation. Whereas disciplinary societies consisted of discrete *sites* of confinement (the school, the hospital, the factory, the prison) wherein the behaviour of those confined was moulded through the cutting up of space and time into discrete chunks, control operates via a more sophisticated form of decentralised modulation of behaviour. Disciplinary societies, Deleuze writes, are based on 'moldings, while controls are a *modulation*'.[15] We might think of the former as being semi-permanent moldings – human behaviour cast, as if in metal, with certain desired characteristics – while the latter corresponds to a continually transforming series of deformations and manipulations. In one place and time, we are modulated to be like *this*, in another place and time, modulated to be like *that*, power operating seamlessly across the social assemblage to comport us into the correct shapes. The relationship between control and discipline ought not, therefore, to be considered as a relation of opposites.[16] Rather, control is a deeper, more mobile, and hence ultimately more flexible form of discipline, a 'self-transmuting molding continually changing from one moment to the next, like a sieve whose mesh varies from one point to another'.[17] One form this takes in practice is diverse systems of monitoring which alter their responses in a flexible fashion – from continuous systems of assessment in education through to targets in the public sector, from the tracking of mobile phones to transport access cards. Such systems can be extended and re-enforced using recent technologies such as biometrics (for example facial recognition), or the 'internet of things' (enabling everyday objects to be tracked or otherwise sensed). In so doing, we move from closed centralised institutional sites with determinate rules to an open-ended system of relatively decentralised 'smart' control, where all systems are relatively interoperable and put into communication with one another.[18]

Control is a free-floating organisational logic, made possible by (but certainly not reducible to) digital information and communications technologies, the computer and the network.[19] A new form of power grounded in a particular kind of techno-social body, control sits at the intersection of neoliberal market deregulation on the one hand and digital technologies of information and communication on the other. Put in terms of Deleuze and Guattari's *Capitalism & Schizophrenia* project, this is a revolution internal to capitalism, in keeping with capitalism's drive towards unleashing previously heavily regulated flows of desire, matter, and value, by decoding and recoding inhibitive social structures and norms.[20] Hence, while industrial capitalism took apart the codes of sovereign societies, it quickly supplemented them with a new set of social inhibitions in the form of the disciplinary society's schedules and enclosures. The advent of post-Fordism implies the emergence of a new wave of decoding and recoding errant flows of desire, a new form of flexible social control capable of subverting libertarian impulses towards profitable ends.[21]

The deregulation of discipline's precisely delineated territories and time zones marks, therefore, the advent of a new form of social *self-regulation*. This much can be surmised from Deleuze's own writings on control. But given their suggestive yet sketch-like quality, a fuller understanding of control obliges considerable interpretation and elaboration. The remainder of this essay will focus on elaborating two such readings, the first restrictive in character, and the second more open-ended.

The Socio-Cybernetics of Homeostasis

To set out a restrictive or limited reading of control is to take the very term "at its word". This would be to read control as merely a closely evolved variant of discipline, in deploying modulation to limit and constrictively guide individual and collective behaviour. To think of it in such terms is not entirely out of keeping with Deleuze's own presentation of the control concept, which does loosely tend towards an emphasis on the restrictive dimensions of the emergent mechanisms of power he analyses.

One way to produce such a reading is to consider control as being an example of the deployment of cybernetics. This operates both at the level of technology (the use of computers and ICT networks enables control systems to proliferate with relative ease), and in the more technical sense of cybernetic understandings of control systems as feedback modulators. A cybernetic path to developing Deleuze's ideas has often been taken in existing literature on this topic. An emphasis on the cybernetic dimensions of Deleuze's thought was central to Anglophone cybercultural appropriations of his work in the 1990s.[22] More recent protocological approaches to understanding control have also taken up a cybernetic framework, noting the convergence between the control society concept and the theories of leading cyberneticist Norbert Wiener.[23] Even more explicitly, Faucher positively identifies Deleuze's control society precisely with the expansion of cybernetic control mechanisms, even while holding that Deleuze's own thought maintains the resources from which to critique such developments.[24]

First emerging in the 1940s, cybernetics is a trans-disciplinary research programme to understand the mechanisms of self-regulation apparently present in a wide variety of distinct systems, from the social to the biological and the mechanical. Cybernetics emerged under the auspices of militarised research, evolving out of and eventually superseding many of the concerns of thermodynamics.[25] Much of this work began as leading European and American mathematicians and physicists were corralled into large scale interdisciplinary scientific research during World War II, in particular associated with developing self-targeting anti-aircraft weaponry, the quantum physics at the heart of the Manhattan atomic bomb project, and early work on electronic computational systems.[26] This work continued after 1945, frequently still in alliance with the American military in the era of the cold war, with cybernetics itself emerging from a sequence of meetings hosted by the Josiah Macy Jr. Foundation from 1944 to 1953, with Wiener a keen participant.[27]

Wiener's *Cybernetics: Or Control and Communication in the Animal and Machine* elaborated a vision of cybernetic science as a general theory of organisational control systems.[28] Named cybernetics to invoke the Greek term for steersman (or pilot) *kybernetes*, the focus of Wiener's investigations was on understanding the mechanisms behind purposiveness, (in other words, goal-orientedness).[29] In particular this considered the ways in which the basic mechanisms supporting purposiveness could be explained through a common set of resources, no matter the nature of the actual system that was exhibiting such behaviour. Cybernetics therefore works to abstract from the concrete systems it analyses

in favour of trying to understand behaviour in terms of the relations between parts within the system, particularly focusing on flows of information and feedback. The simplest definition of "control" from the perspective of cybernetics is as the 'maintenance of a goal by active compensation of perturbations.'[30] In other words, control systems are goal-directed functions which intervene in systems to maintain a target state. The chief method by which systems operate this is through negative feedback.

At its most fundamental, feedback is simply a form of circular or recursive causality, where the effect of a process is literally "fed back" into itself.[31] There are two major forms of feedback: positive and negative. Positive feedback works to reinforce a process occurring in a system (by adding more of it), while negative feedback operates to dampen a given process (by inputting an opposing process into the system). Positive feedback will tend towards "run away" dynamics, with negative feedback instead tending towards minor shifts around a stable centre. One example of a relatively simplistic feedback modulator is a thermostat: an electronic system which compares the present temperature in a given location with a target temperature, and deploys negative feedback to match as closely as possible that target. All a thermostat needs to "know" about its environment is to be able to detect an external temperature and contrast that to a target temperature, with the ability to either trigger or cease a heating or cooling system to reach the given target.

Negative feedback systems like thermostats are said to be *homeostatic* – controlling internal conditions so as to closely match a target state. Wiener himself described the formal theorisation of the concept of the homeostat as 'one of the great philosophical contributions of the present day' in its ability to alert us to the ubiquity of goal-oriented negative-feedback process.[32] Biological organisms, amongst many other phenomena are notably homeostatic in nature (for example in regulating body temperatures or controlling the relative balance of acidity and alkalinity in the digestive tract). While the basic examples of homeostasis imply cybernetic control to be essentially conservative in nature – preserving an existing state – this need not necessarily be the case. Take for example the targeting system of a heat-seeking missile locking onto a moving object. If the target state to be controlled by negative feedback is a static rate of change (say, a steady rate of change in distance from a target) then the end result can be highly dynamic in nature.[33] Homeostatic feedback processes can also be a crucial force in enabling systems to organise themselves, and therefore to increase in their relative complexity of organisation. Examples of this include phenomena like autocatalysis in organic chemistry and self-reinforcement in non-linear weather dynamics.[34]

From the standpoint of Wiener's all-encompassing monistic cybernetic vision, everything is effectively some kind of feedback machine, whether electronic, mechanical, or organic in nature.[35] More or less any kind of system which is goal-oriented and has systems of communication or feedback operating between its parts and the outside environment is capable of operating as a control system. Even human social behaviour can be described at a certain level of abstraction by reference to negative feedback. Wiener was far from alone amongst cyberneticians in viewing the social world as an intricately articulated system of homeostats. The management cyberneticist, Stafford Beer, for example, explored corporate management as a form of directed homeostasis.[36] Corporations have goals (survival, increasing profits) and a series of feedback loops installed at various levels of organisation – between the company and its shareholders, suppliers, workers, and management.[37] Beer's management cybernetics developed a set of

techniques to manipulate and transform the feedback relations within a firm to optimise its performance. These techniques were even later put to work by Beer to develop cybernetic governance and control systems for the socialist government of Salvador Allende in Chile in the early 1970s.[38]

The control society, viewed through the lens of the first-wave cybernetics of Wiener, is a social system that has developed forms of omnipresent decentralised power by installing complex networks of negative feedback-driven homeostats. At its simplest (and perhaps most familiar) level, this might involve transforming a public sector job by shifting from an ethos of "public service" and disciplinary direct management towards detailed performance review statistics and targets. Such a system works as a feedback mechanism, targeting a goal (a certain level of achievement, or rate of improvement) and imposing modulatory stimuli so as to counteract perturbations (punishing failure to achieve the target, rewarding achievement of the target). The behaviour of workers can be modulated through a relatively depersonalised apparatus, without the need for direct management authority (i.e. there is some degree of autonomy for workers and mid-level managers to interpret how, precisely, to meet these targets). Within post-Fordist societies, such mechanisms are manifold, operating in everything from the fiduciary duties on corporate boards to maximise "shareholder value" to the role of inflation targeting in central bank monetary policy, from the ability of student debt to quell risk taking behaviour amongst the young to the new style of post-1990s management based on "inspirational leadership".[39]

Homeostatic control systems are, in-themselves, a "natural" phenomenon, observable wherever negative feedback is possible in a wide array of different kinds of systems, many of which are evolved rather than being human-designed. Homeostats are only able to be operationalised as a ubiquitous social management tool (or technology of power) through a convergence of two phenomena: the spread of ICT networks, and the rise of neoliberal thinking. Networks of computers enable a rapid, flexible, and fluid employment of homeostats throughout society as a whole. They reduce the costs and hence increase the ease of using control mechanisms. And while computational networks are the means, the motivation arrives with neoliberal ideals of the market as decentralised "information processor".[40] Such goals have entailed the widespread use of control homeostats as a way to instil decentralised dynamics in market and non-market entities. Even where market behaviour is impossible to replicate fully (as is often the case in public sector operations) homeostatic control functions can mimic some of the desired dynamics, particularly in creating an environment of individualistic competition which breaks down pre-existing forms of social solidarity, and in allowing forms of ownership which evade democratic reach.[41] While relatively decentralised in nature when compared to disciplinary management, it is important to note that the parameters of control systems may still be set by centralised authorities (especially by governments, civil servants, or senior corporate management). This combination of decentralised management with relatively centralised control settings accords well with contemporary accounts of the political economy of neoliberalism. These tend to emphasise that, whatever its ideological projections of itself as being against "big government", neoliberalism relies on a strong state in order to establish a rapid expansion of market relations.[42]

The Cybernetic Limit

Having established how a restrictive cybernetic vision of control might operate, we are now in a position to mount a critique to point towards what such a picture of

contemporary power ignores. In cleaving to an understanding of power as basically restrictive, cybernetic control is largely focused on the ways in which decentralised systems contain and limit behaviour. From this perspective, at least, the control society operates as a system of complexly articulated homeostats, modulating and constraining behaviours towards accepted goals. The relatively primitive forms of feedback offered by disciplinary panopticons have become vastly more sophisticated, dynamic, mobile, omnipresent, and operative on a personal or even sub-personal level. Yet these remain primarily negative in nature (even if targeting goals which are themselves dynamic, as when the goal is a set rate of change). What this leaves out is the dimension of decentralised power which is not merely restrictive, (or goal-oriented) but which is also constructive. On the one hand, this constructive aspect refers to the ways in which control systems positively construct as well as negatively constrict action – they make things possible that would otherwise be impossible. On the other hand, it is also to point towards the fact that cybernetic visions of control have a tendency to ignore the ground of such decentralised power, the very means by which it might be constituted, and hence also modified. For example, we might ask why it is that certain kinds of control systems predominate over others.

To put this another way: there may well be a more interesting relationship between constraint and enablement, and hence between necessity and contingency, than control is often taken to indicate. As we argue below, the immense power of control rests not just in its ability to modulate behaviour via homeostatic dynamics, to target goals which are known in advance, but also in its ability to relatively constrain an open-ended range of contingent behaviours, which cannot be identified in advance. These contingent behaviours, enabled and constrained by the control systems within which they operate, work also to reinforce the power of the control systems themselves, in a conspiracy between closedness and openness, constriction and construction. It is this relationship, and its increasing operationalisation by business and governmental organisations, that constitutes the real power of control, a power we will describe under the name of *the platform*.

More than an issue of mere theoretical dispute, there are important practical implications for how we are to consider possible resistance to the operations of cotemporary power. For if we misunderstand the nature of control's power, then we will also be likely to misapprehend the correct measures necessary to oppose, transform or supplant it. This also goes some way to explaining why it is that the strategic responses often offered in response to the control society have been relatively paltry (and largely focused on hacking, spreading viruses, or otherwise disrupting or evading existing control systems).[43]

2. THEORY OF THE PLATFORM

Infrastructures, Stacks & Protocols

As we have argued, a restrictive understanding of the functioning of the control society can be effectively framed in terms of the first wave of cybernetics, and the homeostatic regulation of systems through negative feedback. While such an idea has its limitations, the broader notion of contemporary power as being primarily modulatory in character has proven to be a framework which is surprisingly powerful. With this in mind, we must now consider the ways in which the modulatory politics of the control society has expanded beyond homeostasis and negative feedback. How might we understand new

forms of modulatory power which have evolved since the development of the theory of the control society?

Three recent interrelated areas of investigation appear promising as empirical specifications, theoretical expansions, and conceptual clarifications of the control mode of power. The first of these is the infrastructural turn in geography and political theory, which analyses the hidden power dynamics exerted by built *infrastructures* on global politics (from logistics to telecommunications).[44] While not always explicitly articulated in terms of Deleuzean control, such analyses tend towards the exploration of the ways in which infrastructure imposes modulatory framings on the individuals and collectives operating within them. The second emerges from the field of critical media studies of networks, working to understand the nature of control in decentralised communication systems, such as the internet, through the central concept of *protocol*.[45] Protocological approaches have been situated directly in terms of exploring the instantiation of control in the Deleuzean sense. One final area of study emerges from the field of business studies of technology: the *platform*, the current leading image through which technology businesses such as Google, Facebook, and Twitter conceptualise their operations.[46] Whether explicitly framed in reference to Deleuze's work or not, each of these overlapping theoretical approaches can be identified as in a certain sense clarifying the operations of control under present day techno-social conditions.

Two influential accounts of infrastructural power have been elaborated by Keller Easterling and Benjamin Bratton. Both focus on the ways in which infrastructures constitute a new kind of spatiality of power in competition or tension with that of the traditional Westphalian nation state. As Easterling sets out, infrastructure operates as a kind of 'spatial software […] like an operating system, [it] makes certain things possible and other things impossible.'[47] In other words, infrastructures from large-scale engineered objects like rail networks and communication cables, to mobile telephony systems, engineering and product design standards and free production zones, contour and modulate the behaviour of those entities operating within them.[48] Crucially here there is a distinction drawn between the expressed intentions for these infrastructures (what they are "intended to do") and what they actually do (the ways in which they practically serve to transform individual and collective behaviours). Easterling uses the term *disposition* to describe the tendencies imposed by infrastructural technologies, or rather as an emergent property of the interactions between individual and collective actors and the infrastructures they use.[49] There is therefore a degree of cunning or dissimulation in infrastructural power – in that, akin to ideology, its real effects are often disavowed. This leads Easterling towards the (accurate) conclusion that many forms of political activism, aiming at confronting power, are often left 'shaking [their] fists at an effigy'.[50] The hidden modulatory power of infrastructures resist (sometimes accidentally, and sometimes deliberately) traditional forms of counter-power.

Bratton's key concept by which he understands the power of infrastructure space is *the stack* – modelled on stacked hierarchical computational infrastructures. Akin to Easterling, Bratton investigates the ways in which new kinds of infrastructure escape from or contest the sovereignty of the nation state.[51] Bratton sets out a kind of laminated, layered political ontology of stacked political geographies, scaling up from users, through interfaces, via addresses and cities, all the way up to 'the cloud' and the entire planet earth. Each of these layers operates according to its own logic, though Bratton is keen to distinguish key layers within the stack (for example, cloud computing platforms) from simply replacing existing political geographies, such as the state. While

Easterling emphasises predominantly negative resistive practices to evade the clutches of infrastructural power, (through tactics such as spreading rumours, generating dissensus, exagerrated compliance and comedy),[52] Bratton is more interested in the construction of a new form of power, which he terms "the black stack"[53] This positive vision for modulatory power is certainly refreshing, and points towards some of the ideas we will explore in the following sections under the rubric of a theory of the platform.

If infrapolitical thinkers like Easterling and Bratton are focused on the spatiality of control systems, on the deformations control has imposed on the geography of global politics, protocological writers such as Alexander Galloway and Eugene Thacker are much more interested in the rules that govern these system. In particular, protocological thinking centres on the ways in which specific protocols generate certain kinds of emergent order and impose a decentralised control as a result. Particular protocols used to configure the internet, for example, include such standards as TCP/IP, HTTP, and FTP.[54] 'Protocol' as Galloway puts it, 'is a language that regulates flow, directs netspace, codes relationships, and connects life-forms.'[55] In other words, protocol operates as the code of control at the level of ICT systems, enabling technical networks to operate, and governing behaviour within the networks they construct.[56]

Protocol-based approaches to control systems enable some idea of the mechanics of control systems as generative, rather than simply restrictive. By focusing on the rules that enable networks to operate *as* networks, (i.e. on what enables connectivity itself), protocol points towards the way in which control systems install and perpetuate themselves. In other words, they partially answer the question as to why control systems have been able to replicate themselves throughout the techno-social infrastructure – in that they make possible what would otherwise be impossible. The cost of networked computation is a consistent set of rules that contain political and restrictive implications. Restriction is but the flipside of enablement. Cybernetic control the obverse of the platform.

The Business of Platforms

Recent thinking on the politics of infrastructure and protocol has given us some inchoate ideas as to how we might expand our notion of control into a more multifaceted one. Each pushes towards a conception of control apparatuses as necessarily enabling, as well as constricting. Yet a formalised theory of this relationship remains to be elaborated. It is embedded today, in faint outline, in the theory of the platform. The term *platform* has gained increasing attention in business studies literature since the early 1990s. The evolution of the concept in this context began with the notion of product development platforms, moving quickly into considerations of technological platform design with the increasing dominance of a relatively few technology companies (paradigmatically Microsoft in the mid 1990s) and more recently has been extended to transaction systems.[57]

Simply put, platforms, especially in terms of IT technologies, have emerged as an immensely powerful way to do business. Annabelle Gawer, a leading proponent of platforms in the context of IT business strategy, describes them as being relatively ubiquitous, with examples stretching from:

> 'Google, […] social networking sites such as Facebook, operating systems in cellular telephony, videogame consoles, but also payment cards, fuel-cell automotive technologies and some genomic technologies.'[58]

At a relatively general level of description, a platform operates as a *foundation* for other entities, artefacts, and processes to be built upon. As a foundational element, platforms therefore enable a degree of *control* over what is constructed upon them, while simultaneously relying upon the unknown and relatively unpredictable things assembled atop them.

The most readily apparent way platforms like Facebook or Google work is in creating an environment for user-generated content. This was the core advance of so-called web 2.0 systems over their precursors: rather than writing content themselves, companies developed the spaces within which users could create their own offerings, from social interactions and blog posts to multimedia content and product reviews. Already we can identify some interesting features of platforms of this kind, in terms of the relationship between openness and closedness, constriction and enablement. Content is constricted in the sense that it must be possible within the system's constraints (from legal user agreements through to the capacities of particular configurations of code and the technical capabilities of physical substrates like server spaces and communications infrastructures) but within this constraint there is a considerable degree of openness to contingency – to a vast range of unexpected behaviours that may be conducted upon them. In this fashion, web-based platforms for user-generated content have proven to be an immensely profitable form of extracting value from an extensive diversity of human behaviours, while simultaneously operating to transform those very behaviours in turn.[59] The control function of social networking sites arises precisely at this intersection of the open and the closed, the necessary and the contingent.[60] Openness to the contingency of possible human behaviours creates highly customisable networking sites, which can then explore the range of human behaviours which prove popular to devise further services or refinements to existing ones. Simultaneously, behaviour is modulated in the sense of being conducted according to the relative affordances of the platform in question. As foundations for an ecosystem of human interactions, social networking platforms have a tendency to function as invisible ground, their particular modulations and framings of what is possible receding into the background. This is so even while the peculiar architecture they impose on human interaction shapes and conducts behaviours into new forms. Consider for example the dynamics of outrage fostered by Twitter's 140 character word limit and inflexible system of message threading for an example of the emergent properties of such technical systems.[61]

Platforms need to be considered in a more expansive sense than just user-generated content systems, however. The central focus of business strategists, for example, has been on their business-to-business applications. By building a system which acts as a foundation for other systems to be constructed upon, platforms are capable of generating extraordinarily powerful business dynamics. For Gawer, the power of corporations like Microsoft and Google is best explained by reference to the network effects made possible by relationships of reliance, and the control over other players in their industry these relationships confer.[62] The ubiquity of certain software platforms creates a kind of positive feedback loop which reinforces the platform, as software developers increasingly decide to opt for one over another. This is akin to the emergent network hierarchies outlined by theorists Barabási and Albert, where processes of preferential attachment (nodes in networks with more links will be more likely to attract further links than those with low numbers) lead to a relatively small number of highly connected entities and a large number of poorly connected entities.[63] The appearance of relatively few predominant technology platforms indicates something of the power of

platformisation as a business strategy, and indeed, may be a key causal mechanism behind the emergence of power law scaling in such systems.

On a strategic level, two key generic approaches suggested within the literature on platforms in a business context are known as "tipping" and "coring".[64] Coring describes the process of building new platforms, (or converting an existing product or service into one), while tipping refers to how to conduct inter-platform competition (how to "tip" the balance of power in your own favour). To create a new platform, businesses are exhorted to create products which solve key systemic problems, capable of facilitating as wide a variety of services as possible, to make it costly to shift platforms, along with ensuring that core intellectual property being carefully protected.[65] Coring generates a new 'core' element upon which others will build businesses, products, and other behaviours. What is also crucial is to maintain, as far as is possible, a reputation as a neutral broker, the constructor of smoothly operating, apparently impartial space. Again, just as with social networks, the more invisible the platform, the more powerful its ability to shape the behaviour of those operating within it.[66]

When two or more platforms enter competition for dominance (think of Apple's iOS versus Google's Android, Blue-Ray versus HD-DVD, or Betamax versus VHS), tipping provides some basic strategies to predominate. Crucial here is the ability to develop market momentum, the process of attracting more users which when pushed beyond a certain point becomes irreversible. Reducing prices for users or offering greater functionality than competitors are the basic tools here, combined with seeking alliances with competitors who are not yet attached to a platform (as Google did with Android in their fight against Apple in mobile operating systems) as well as tipping across markets to absorb additional technical features. Those who control the leadership of an industry platform will be able to help shape the process of innovation which takes place within it, while simultaneously capturing the majority of the available profits.[67]

More broadly than just IT systems, the operations of platforms have been theorised by reference to their architecture: a mixture of *stable* primary components and *variable* secondary parts.[68] This combination of stability and variety is rendered coherent through interfaces, (network protocols, industry standards, laws and regulations) and enables the creation of innovative functions without having to build from the bottom up for each variety. In this fashion, note Baldwin and Woodard, platforms might even be used to describe elements of biological evolution, where core cellular metabolic processes are preserved across highly varied external forms.[69] Within the architecture of platforms, change and variation is supported by relative fixity, flux dependant on certain unchanging components. The core, relatively stable elements of a system which are used to support a wide variety novel complementary components are what constitutes a platform. Platforms may take the form of physical architecture or pieces of code, from supply chain platforms, (common in the current automotive industry) which reduce the range of basic components necessary to manufacture different products, through to the industry platforms predominant in the technology sphere.[70]

The role of platforms in recent business studies literature ought to be of interest even (and perhaps especially) to those of us coming from a "critical" background with a normative emphasis on left wing or otherwise emancipatory politics. More than merely ideological documents, expressive of a certain "spirit of capitalism"[71] these represent strategic ideas which are becoming central to the way that the leading edges of capitalist businesses operate. Emblematic here was the founding in the early 1990s of Microsoft's

Platforms Group, which put platformisation at the heart of its strategy (and which in turn led to interminable disputes with anti-trust lawyers, particularly in Europe, as well as vast profits).[72] It ought to come as little surprise, therefore, to find that even state bureaucracies are now advocating patterning themselves on ideas from platform design. [73] While promoted largely by reference to 'collaboration', 'participation', and 'transparency'[74], such calls characteristically are less forthcoming on the matter of the control dimension inherent in any platformisation strategy.

Platform Logic

Much attention has been paid recently to developing relatively mechanism independent accountants of what platforms are (i.e. what makes radically different kinds of things platforms) and how they function within a business context.[75] Even within literature focused on business strategy, it remains clear that platform logic is a much more extensive phenomenon than one merely exploited by leading technology firms (even if they remain perhaps the most obvious example of its contemporary importance). What is necessary is a generalised understanding of how it is that platforms operate, and the particular relationship between constriction and enablement that they imply. Baldwin and Woodard's architectural conception of platforms as flexibly complemented fixed components gives us a starting position from which to begin such considerations.

What is it that gives platforms their unique power? Very simply, it is their ability to operate as a relatively unperturbed basis for other phenomena. In this sense, platforms might be considered as materialised transcendentals – they act as conditions of possibility for other processes and entities to exist. In other words, what confers the power, and yet openness of platforms, is their relative *generative entrenchment*.[76] This is a term originating in the works of philosopher of complexity, William C. Wimsatt. Akin to many of the analysts of business platforms, Wimsatt is interested in how adaptive design is structured, and hence how the contingent becomes necessary.[77] How is it that seemingly arbitrary structures (whether intentionally designed like computer code or evolved through natural selection like biological systems) become increasingly necessary as quasi-universal building blocks for other forms? In an attempt to answer such questions, generative entrenchment is defined by Wimsatt as a 'feature of a structure […] that has many other things depending on it because it has played a role in generating them.'[78]

Take for example a computer operating system. In the case of Windows, its role in generating (acting as the basis for) multiple computer programmes means that they depend, to some extent, on the continued existence of the operating system. Windows is generatively entrenched because it has *generated* an entire ecosystem of programmes, products, and services which use the operating system as their basis. In turn, this panoply of dependent entities has served to *entrench* Windows. For example, in a business context, competition between complementary elements (say, between PC manufacturers or application developers) will reduce costs of complements and increase the likelihood of uptake of the platform by end users.[79] This is all in the nature of operating systems – their success depends on their use by other programmes. It is also in the nature of platforms more generally - the more generative the platform, the more entrenched it will become.

To take another example, consider the design of suburbs in America in the twentieth century. An entire ecosystem of relations has been developed on top of the basic infrastructure of roads and dispersed housing that constitute suburban living arrangements. Yet these in turn are dependent on a more fundamental platform: the car. It is only with the invention and mass-uptake of automobile transportation that suburban

sprawl becomes feasible.[80] The relatively contingent (cars as invention, initially treated as little more than a toy for the rich) quickly becomes taken up and treated as a necessary component of a broader set of relations (suburban living and working arrangements). The two are mutually re-enforcing: just as a population of drivers can live in more diffuse housing arrangements, so too does the suburban infrastructure reinforce car use (to get around suburbia you need to own a car).

Generative entrenchment captures the Janus-faced nature of platforms: that they both constrain and enable, with the ability of platforms to enable directly related to their ability to constrain, and vice versa. The more elements built upon a platform, the more generatively entrenched it will be. Initially mutable structures can become relatively fixed over time, enabling comparatively arbitrary contingencies to become indispensable.'[81] The real power of platforms rests not just in their ability to shape the behaviour of systems erected upon their foundation, but also in the resistance to altering deeply entrenched, widely adopted foundational elements. The greater the degree of entrenchment (i.e. the more entities, processes, or structures which depend on a platform) the greater the associated cost or effort of changing or removing it. As Wimsatt summarises:

> 'Generativity is an extremely efficient way of building complex adaptive structures, while at the same time locking in their generators. *Since these are two sides of the same coin, their association is a deep fact of nature*.'[82]

The more generative a structure, the more dependence will be fostered, and hence relative stability ensured. The converse is also true, as the more stable a structure is the more likely it will be that a variety of other entities, processes, and elements will base themselves upon it. Such processes entail positive feedback loops, for as long as the platform retains its position of relative generative entrenchment.[83]

Considered at such a high degree of generality, platforms as generatively entrenched structures can be located throughout the natural and human world, from the body plans of land animals and core cellular metabolisms, to TCP/IP protocols in internet connectivity and silicon chip architectures. One might even consider, thinking more broadly, of market norms, money as physical unit of exchange, or human language use as immensely powerful platforms. Each works as an infrastructure for human social interaction, operating under particular rules or protocols to govern that behaviour. Each is generative: they enable a broad array of different behaviours, practices, and organisations to be erected upon them. Coupled with this generativity is a simultaneous deep entrenchment: because so much depends upon them, they are incredibly difficult to alter.

To summarise: platforms are a relatively ubiquitous phenomena throughout complex adaptive structures – from the social, to the technical, and the natural. Platforms gain their power by operating as relatively unperturbed bases for other phenomena, by being generatively entrenched. Generative entrenchment captures the relationship between constriction and enablement at the core of platforms. They are constrictive, in the sense of imposing limits, but open-ended in the sense of relying upon not exhaustively determining in advance the full range of phenomena which might be constructed atop them. They are self-reinforcing, in the that the broader the ecology of behaviours and structures they support, the greater the costs associated with their transformation, and hence the greater the likelihood of their remaining unchanged. They are themselves

relatively contingent developments that due to generative entrenchment processes become relatively necessary over time.

It is the increasing awareness of platforms as a fundamental mechanism of power that enables their *deliberate* exploitation. Just as cybernetic control systems pre-exist the control society, so too do platforms. Like other mechanisms of power, platforms are quasi-natural phenomena which when reflected upon, and given the appropriate socio-technical resources, can be effectively operationalised, and hence can emerge as a political technology (which we can observe in the development of platform design as a discipline). In this sense, an increasing understanding of the formal logic of platforms dovetails with their increasing omnipresence. Though the basic principle precedes its naming, by understanding how platforms work it is possible to construct them with deliberate intent, and hence to strategise around them.

CONCLUSION: PLATFORMS, CONTROL, & STRATEGY

What is it that distinguishes platforms from cybernetic control systems? In the simplest terms, cybernetic control systems are homeostats which rely upon determinate goals, and their power exists as a result of the ability of the homeostat to resist perturbations in pursuit of that goal. While control mechanisms exist in evolved (i.e. non-human designed) systems, where goals will emerge as a byproduct of evolutionary processes, within the control society, such systems are operationalised as a result of deliberate human endeavour. Largely associated with neoliberal governance techniques, control homeostats are relatively open-ended, (they don't tend to prescribe which behaviour is necessary to hit the appropriate targets) yet they remain reliant upon a management epistemology of knowable goals.

By contrast, platforms, while still contouring and modulating behaviour, do not necessarily require specific goals or target states to be established in advance. This is why the objectives of platforms such as Facebook or Twitter in relation to their users is so diffuse and difficult to pin down. In a certain sense, the "goal" of designed platforms is nothing more than power itself (and, when in a business context, the associated profits). This does not necessarily prescribe in advance the kind of behaviours and entities which might be built on top of them. Many technology platforms, for example, are established without even a clear idea of how to generate income beyond the notion of achieving ubiquity. Yet this is not the error it is sometime held to be. Because platforms are generatively entrenched entities, their power arises from their relative openness to contingency, on their ability to generate many different forms of behaviour or structure, many of which will be unknowable in advance. To design a platform in this sense is to design for the unknown.

Platforms necessarily modulate behaviour: they make certain actions easier than others (while rendering others impossible). In this fashion, platforms are an example of a form of control-beyond-control, expressive of a shift from the homeostasis of *cybernetics* to the intricate relations of emergence and self-organisation of *complexity*. Akin to cybernetic control functions, platforms employ a modulatory mode of power, yet it is one which relies simultaneously on both constraint and enablement, a tightly woven braid of necessity and contingency. By sculpting the actions and entities conducted within, platforms act as a kind of possibility space or fitness landscape, setting the conditions for autonomous self-organisation. Yet this setting of conditions does not rely on a pre-set ensemble of goals or targets. Indeed, the broader and more complex the forms of

emergent activity within a platform, the greater its fundamental or quasi-transcendental status. Beyond a certain point, it becomes difficult to *not* use a successful platform. In other words, platforms metabolise contingency into power itself.

In terms of a critical or emancipatory politics, where does this leave us? If we are to take control in the cybernetic sense as our basic understanding of the technology of power today, we would be left groping for essentially resistant political practices. Hacking, the spreading of viruses, the disruption of logistical infrastructures, the creation of temporary autonomous zones: all these would be central to our thinking. Though subversive, the marginality of such practices effectively cede the ground of power to neoliberal capitalism in advance.[84] This is, however, a somewhat one sided picture of contemporary techno-social power. If we supplement our understanding of cybernetic control with the figuration of the platform, it is possible to identify the basic mechanisms by which the present technologies of power propagate themselves: their ability not simply to repress, but also to construct, with their self-perpetuation directly related to their ability to enable. Aligned with this, we might observe the similarities between platform design and Steven Lukes' "three dimensional power" (the ability to decide what is decided), and especially with Gramsci's idea of hegemonic power.[85]

To take up the Gramscian flavour of the platform would also be to employ Gramsci's double faceted understanding of hegemony: as a theory of power both as it exists in the hands of capitalist states, and as it might be held by the forces which oppose them. In this sense, the task of an emancipatory politics today would be to build its own platforms, and to oppose those wielded in the name of profit. Such a constructive politics would begin on the basis of understanding the most sophisticated forms of contemporary power within the control society, the platform, and proceed by understanding how its underlying principles might be translated into the repertoires of left politics. This might include such potentially valuable avenues as the question of organisation – how do we move from parties and unions structured around outdated principles of structural unity towards designing platforms for political action capable of hosting an unknowable range of contingent political actions? It might touch upon the problems of planning in the critique of socialist calculation – how could an understanding of the platform enable a transition from thinking in terms of economic plans which exhaustively determine action in advance towards relatively open-ended platforms able to respond flexibly to changes within the economy? Finally, we might consider modern states and markets as platforms, and the particular ways in which they are generatively entrenched within the broader social milieus which they help organise.

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