How the World Learned to Stop Worrying and Love Failure: Big Data, Resilience and Emergent Causality

David Chandler
University of Westminster, UK

Abstract
In modernity, failure was the discourse of critique, today, it is increasingly the discourse of power: failure has changed its allegiances. Over the last two decades, failure has been enfolded into discourses of power, facilitating the development of new policy approaches. Foremost among governing approaches that seek to include and to govern through failure is that of resilience. This article seeks to reflect upon how the understanding of failure has become transformed in this process, particularly linking this transformation to the radical appreciation of contingency and of the limits to instrumental cause-and-effect approaches to rule. Whereas modernity was shaped by a contestation over failure as an epistemological boundary, under conditions of contingency and complexity there appears to be a new consensus on failure as an ontological necessity. This problematic ‘ontological turn’ is illustrated using examples of changing approaches to risks, especially anthropogenic understandings of environmental threats, formerly seen as ‘natural’.

Keywords
resilience, Big Data, emergent causality, Bruno Latour, Ulrich Beck

Introduction
Key to the politically disputed understanding of ‘failure’ under modernity was the shared assumption that governing authority rested on causal chains of interconnection: that governing powers bore responsibility for the outcomes of their policy interventions. Thus, the attribution of failure was of central concern to both the defenders of power and...
their critics. Could policy failure be directly or indirectly linked to ruling ideas and actions or were there other independent variables that needed to be taken into account? Causal chains and causal claims were the essence of modernist contestations and the stakes of failure were high in terms of political and ideological legitimacy. The key connection that this article seeks to explore is that between the decline of modernist or ‘linear’ framings of causality and the reintegration of failure into policy-making. Or, to put this another way, the emptying of the political significance of failure. Failure was a modernist concept, and as such, the rich and complex love-hate relationship that modernity had with failure seems to have finally ‘run out of steam’. In fact, in the conclusion I will argue that – through the process of reintegrating failure – the concept of failure itself now lacks any meaningful significance.

Failure no longer appears to demarcate the lines of critique and apologia; fought on the grounds of failure’s inclusion (the basis of systemic critiques of power) or its exclusion (in defence of dominant regimes of regulation and control). For modernist discourses of power – reliant on instrumental forms of legitimisation and presupposing the liberal, rational, calculating, self-conscious subject – failure was always problematic, a threat to the status quo: something to be tamed, managed, insured against, excluded, or made into the exception to the norm (an accident, an act of Nature or ‘Act of God’). Dominant discourses of failure were those of apologia, denying links between failure and the operations of power; failure was addressed through exclusion and ‘othering’.

Thus, on the one hand, failure was excluded: although understood to be unavoidable, it was to be ‘bracketed’ from the norm (in the terminology of Carl Schmitt) and treated differently, as an ‘exception’ or ‘accident’. Failure was to be governed but through its exclusion or separation. Risk insurance is a classic modernist form of the bracketing of failure: ensuring that failure is compartmentalised through a separate mode of calculus and regulation, dissipating responsibility for the securing of systems of production and exchange. On the other hand, for discourses of modernist critique, failure – from

5. There is a rich collection of Foucault-inspired work on insurance as a modernist attempt to compartmentalise, explain away and to exclude failure. As Francois Ewald argued: ‘Insurance, through the category of risk, objectifies every event as an accident’, ‘Insurance
economic crisis to social breakdown and international conflict – was to be included rather than excluded. These ‘failures’ were far from arbitrary or accidental but seen as revealing the inner contradictions of capitalist social relations. It was the interconnection of forms of failure with forms of rule that was crucial to critique, which sought to materially ground alternatives through bringing awareness of these connections to the surface. Thus the modernist construction of ‘failure’ was bifurcated through a struggle over exclusion and inclusion: the forms and practices of failure as boundary-making, demarcating knowable causal connections from unknowable or natural contingencies. In the sphere of international relations, in the 1990s, this modernist contestation over failure as boundary-making seemed to have a new lease of life. Globalisation was contested in ways that encouraged the exclusion and ‘othering’ of failure but also led to numerous attempts to radically include failure as part of a new, more interconnected and less linear modernity. With the vantage point of hindsight, it is easy to argue that liberal universalist attempts at governing through exclusion, were naïve and hubristic. In the globalised and interconnected world, boundaries have increasingly appeared to be hard to police or to legitimate. The struggle to exclude, separate and to ‘other’ failure rapidly waned in the 2000s and failure has since been transformed through its inclusion. Failure has increasingly come to be seen as enabling governance rather than as a barrier to it. In 2009, the UN renamed Natural Disaster Day (12 October) as Disaster Day to intentionally enforce the point that disasters were to be governed, rather than excluded as ‘natural’. Failure has now gone mainstream, even woven into the heart of policy-making itself. Policy-makers have come to live with ‘failure’ so much so that now discourses of

and Risk’, in Graham Burchell, Colin Gordon and Peter Miller (eds) The Foucault Effect: Studies in Governmentality (Chicago: University of Chicago Press, 1991), 197–210; especially 199. Thus, responsibility for failure (from workplace injuries to financial losses) is removed from social, political or economic agencies and becomes a blameless, ‘accidental’, statistical regularity that can be insured against. See further, Daniel Defert, ‘“Popular Life” and Insurance Technology’, in Burchell et al., (eds) The Foucault Effect, 211–33; Michael Dillon, ‘Underwriting Security’, Security Dialogue 39, no. 2–3 (2008): 309–32. For example, traffic incidents are not seen to be a matter of personal or collective responsibility for failure (unless there is criminal negligence) but as inevitable ‘accidents’: statistical regularities to be insured against. These social and technical mechanisms of statistical regulation enabled modernity to bracket off failure and thereby to ignore social and material interdependencies which would indicate alternative forms of social organisation, see, for example, Bruno Latour, Aramis or The Love of Technology (Cambridge: Harvard University Press, 1996), 70.


resilience – the science of turning failure into an asset enabling governing – are central to every international and domestic policy concern.

This article seeks to analyse how failure ceased to be the contested subject of boundary-drawing and came to be central to governing. It makes the case that the mainstreaming of failure meant that the concept of failure inevitably morphed from being a pressing concern to a positive and enabling asset, and suggests that failure, having achieved this transformation, will become much less relevant to the political lexicon. The following section illustrates how rather than excluding failure, dominant policy understandings of resilience have sought, in diverse ways, to govern with and through failure, extending hegemonic frameworks of control and regulation. The next section considers radical approaches, which have included failure as a worry or a concern for policy-making, through emphasising risk and contingency in a world where traditional modernist binaries, particularly those between culture and nature, are no longer fixed and clear; focusing, in particular, on the work of Ulrich Beck and Bruno Latour. The article concludes with a consideration of how immanent perspectives have increasingly enabled failure to be positively incorporated into governance, analysing emergent understandings of disasters and the rise of real time Big Data approaches, which take on board post-epistemic assumptions and tend to lack the modernist causal framings that enabled failure to be key to political contestation.

Resilience: Governing through Failure

Discourses of failure in liberal modernity, particularly in the arena of international relations (where the inequalities of power are particularly transparent), have been well rehearsed. The existence of failure, and the struggle over its exclusion, from a Marxist perspective, was materially grounded in the disjunction between the fundamental structural inequalities of capitalism and liberal modernity’s legitimising discourses of rationality, progress, universal equality and governing autonomy.8 This material contradiction structured discourses of liberal universalism that attempted to explain away this aporia. International legal theorist Martti Koskenniemi nicely captures this through analysing modernist legal frameworks – that conditioned rights and articulated difference in terms of failure – as a continuum from apology to utopia. Here, ‘apology’ constitutes the denial of possibilities of ‘real’ equality (the ‘Realist’ tradition), entailing the acceptance of inevitable differences of power, while ‘utopia’ contrapositions a liberal imaginary of universal equality and reason to the actual, which is always found wanting (the ‘Liberal’ tradition).9 Both apology and utopia posit frameworks of failure as exclusion: failure is

8. For Marxists, capitalist social relations and the drive for profitability necessarily forced hegemonic powers to restrict or make conditional their self-proclaimed rights of freedom and equality, see, for example, Mark Cowling and James Martin (eds) Marx’s ‘Eighteenth Brumaire’: (Post)Modern Interpretations (London: Pluto Press, 2002); Vladimir Lenin, The Right of Nations to Self-Determination (Moscow: Progress Publishers, 1976).

always that of the ‘other’, the ‘non-modern’ or ‘non-liberal’, and the exclusion comes in the separations and externalisations which tend to either naturalise or to criminalise the ‘other’ on the basis of these inequalities.\(^{10}\)

Discourses of the exclusion of failure, in these hegemonic modernist forms, appeared to have renewed purchase as the end of the Cold War opened up international policy-making to debates around universal standards and procedures and increasingly legitimised international intervention in these terms. ‘Failure’ became a common trope of exclusion and ‘othering’ as earlier formal legal and political frameworks of sovereign equality became less relevant to new approaches to international and global governance. ‘Failing’ and ‘failed’ states, seen as the weak links in global security regimes, were central to both policy and academic concerns of international relations, international security and international law. The international denial of responsibilities and interconnections (excluding the history of colonial and post-colonial interference and the present of imposed neoliberal policy regimes and international trade, migration and lending legislation) that enabled the co-constitutive categorisations of the ‘failures’ of ‘other’ states need not be lingered upon here.\(^{11}\)

However, since the early 2000s, the collapse of liberal internationalist discourses of exclusion – counter-positioning Western universals to the ‘failure’ of the ‘other’ – has rapidly opened the floodgates to the inclusion of failure. The burgeoning critical genealogies of risk, statistics, accounting, and insurance, are testimony to the exhaustion of earlier approaches of exclusion. Louise Amoore’s excellent study of ‘The Politics of Possibility’ captures this retreat from the confidence of the certainties of probabilistic and predictive analytics to the speculative and possibilistic approaches of the 2000s, which seem increasingly irrational and problematic in their attempts to evade the implications of contingency.\(^{12}\) Instead of either probabilistic or possibilistic approaches of risk management, which presuppose regularities and reductionist understandings of causation, current policy approaches tend to emphasise how new technologies can be used to govern on the basis that failure cannot be compartmentalised, excluded, or externalised in a fluid and constantly changing world.

---


‘The rhetorical crisis for the humanist is such that one minute he’ll lay down the law of the jungle to you and the next minute he’ll be aghast when everything isn’t tastefulness, gentility, and rationality. The privilege of blindness to these contradictions is part of the arrogance of entrenched power; no doubt it will always be ready to sacrifice everything, beginning as usual with its subalterns, in order to go to the grave with the privilege of this blindness, with the delusion of its own disinterestedness or internal consistency, the proud fiction of its self-sacrificing fatherliness or motherliness’.


The conceptualisations that best reflect the rapid rise of failure are those of resilience approaches, which seek to include unintentional feedbacks and unexpected changes of context. As Mark Duffield notes, resilience conceptions demarcate a break:

with modernist conceptions of social protection that are based upon knowing and protecting against the future through statistically derived forms of insurance, resilience positively embraces uncertainty and the ultimate unknowability of the future. An organism, an individual, an eco-system, a social institution, an engineered infrastructure, even a city – in fact, anything that is networked, evolving or “life-like” in some way – is now said to be resilient in so far as it is able to absorb shocks and uncertainty, or reconfigure itself in relation to such shocks while still retaining its essential functionality.  

Resilience approaches seek to govern through failure, through including as many possibilities of failure as possible, to enable a constant process of monitoring, adaptation and improvement. The more ways in which failure can be conceived the more efficient and responsive new forms of governance are held to be. To illustrate this, I will take three, quite different, representative examples, which were published in September 2015. Each example, does not seek to govern through excluding or separating failure, or submitting it to a different calculus. The dynamic is the opposite, to include failure as an enabling resource through making it integral to governance, welcoming failure rather than excluding it. Perhaps one could say that rather than seeking to govern failure through developing mechanisms and techniques of exclusion there is now a desire to let failure govern policy-making through developing mechanisms and techniques for its inclusion.

The first example is a news report on civil engineering for climate extremes, which highlights how failure has become key to thinking about the management of hazards and risks. The starting assumption, as stated by Mari Tye, a scientist based at the National Centre for Atmospheric Research (NCAR), is that: ‘Failure isn’t if but when and how badly’. The ‘solution’ or way of responding to the inevitability of failure was to intentionally design systems for ‘graceful failure’. The scientist argues that failure has to be built into design rather than excluded: ‘Resilient systems account for a range of scenarios and are designed to recover in a controlled way from hazards, with an acceptable level of impact’. Not building in failure would only lead to the increased exposure to negative impacts according to senior scientist Greg Holland, who co-leads the Engineering for Climate Extremes Partnership (ECEP). The understanding that good governance is about

14. While I was collating material for this article in advance of the Millennium conference.
the inevitability of failure rather than attempts to manage and reduce risks is increasingly

dominant within resilience thinking.16
The second example comes from The Guardian newspaper, the headline is ‘Can Open Data Prevent a Global Food Shortage?’17 Here, focusing on unknown and unpredictable risks and contingencies – from extreme weather to water shortages and pest infestations – can help farmers ‘be more efficient and get the biggest yields possible and use the least amount of agrochemicals’. How is it that the inclusion of failure into governance is now held to increase possibilities, open up alternatives and even achieve a ‘revolution in agriculture’? The answer is precisely through focusing less on the ‘success’ of what already is seen to work or be efficient and instead opening up management to embrace rather than to exclude failure. Here, new forms of technological and analytical capacities are deployed to see failure as an emergent process, which can be seen and responded to through the analysis of open data culled from a plurality of sources and from the development of alternative forms of management. Tim Holmes, Head of Technical Solutions at CABI (Centre for Agriculture and Biosciences International)’s Plantwise Knowledge Bank, suggests that organising around failure promises more than sticking to success. He states: ‘The service offers a traffic light warning system with advice on what farmers can do for each different threat level, starting with good farming practice – such as pruning trees and bushes and keeping the farm clean – right up to the last resort of applying a particular insecticide’. The promise of open data is that failure, risk and contingencies, can be constantly adapted to in their real time emergence.

Key is that these resilience approaches do not organise upon traditional binary understandings of failure and success where failure is an inevitable outlier on the margins, but through a new framework, which includes failure at the centre of its calculations. Failure is thus not something that can be minimised as if it could be treated as distinct or separate to the normal operations of governing; this would be seen as hubristic. Still less can failure be seen as a problem in need of preventive measures. In fact, the Stockholm Resilience Centre, a leading policy influencer in this area, has popularised the concept of ‘coercive resilience’ to problematise attempts to govern out failure through preventive means rather than seeking to accept and organise around it.18 As highlighted in the first example, excluding failure is understood to undermine adaptive capacities and to result in more disastrous long-term consequences. Similarly, resilience approaches increasingly

16. See, for example, Yossi Sheffi, The Power of Resilience: How the Best Companies Manage the Unexpected (Cambridge: MIT Press, 2015), who argues that supply chain failures are inevitable, meaning that risk reduction needs to be supplemented by resilience mechanisms for coping with failures.
do not seek to merely respond reactively to failure: to ‘bounce back’ afterwards.19 This would not address the problems, still attempting to deny rather than welcome failure and therefore mean being unable to respond through real time adaptive measures.20 Welcoming failure and enfolding failure into governance is counter-intuitively seen to be a way of minimising negative impacts.21 The message is that failure may be inevitable but its consequences are highly contingent on the levels of adaptability and resilience that a society possesses.

The third example is the Government of Rwanda’s launch of its National Risk Atlas. This was widely billed ‘as the first-ever comprehensive risk profile developed in Africa’.22 In collaboration with the United Nations Development Programme, the World Bank and the European Union, the National Risk Atlas was developed through a comprehensive risk assessment to provide guidance in national planning and policy-making on disaster risk. In the language of the risk planners, failure was to be mainstreamed into development planning so that ‘evidence-based’ and ‘risk informed’ policy-making would ensure that the awareness of contingency shaped governance strategy. UNDP Assistant Administrator and Director of the Bureau for Policy and Programme Support, Magdy Martínez Solimán, argued that responding to failure had to be kept at the forefront: ‘We will never successfully eradicate poverty or achieve sustainable development so long as we continue to marginalize disaster risk reduction’.23 Here, the goals that would have been instrumentalised and used to shape governance in the past – ending poverty and furthering development – become secondary by-products of focusing upon the world as it is: the real time adaptation to the world in its becoming.

Risk profiling and mapping measures, often using new technologies, are thereby crucial to organising around failure. The Government of Rwanda’s National Risk Atlas makes for interesting reading in terms of the methodologies and assumptions deployed by the leading international institutions.24 Failure is understood as an emergent property:
the project maps five main hazards impacting Rwanda, namely: droughts, floods, landslides, earthquakes and windstorms. This approach follows the 2005 UN endorsed Hyogo Framework for Action to mainstream disaster risk in government policy-making and thus seeks to ‘identify and prioritize hazard prone areas during planning and programming for development activities in various sectors, such as transport, health and education, essential service, as well as in urban and rural land use planning and in the development of building codes’. National government planners should thereby assume failure as the starting point and work with it, taking into account the nature and risk of numerous emergent hazards as well as the exposure and vulnerabilities of the population and national infrastructure, facilities and resources. This is a dynamic process, where the awareness of changing risks, exposure and vulnerability are recognised, so the governance of failure is not seen as a static, or as a once-and-for-all set of measures but as an ongoing process of governance as adaptation:

Risks are dynamic owing to rapid changes in the country’s demographic, social and economic processes. Therefore, risk assessment should also be dynamic so as to keep up with these changes. In order for the National Risk Atlas to remain relevant, useful and sustained, it is recommended that it be updated every 5 years. This aligns with Rwanda’s strategic plans… This will enable the use and integration of the assessment findings in the analysis and planning.

Increasingly, the process of continually adapting to failure as it emerges seems to be displacing other frameworks for seeing how governance and urban planning could be managed or legitimised. Noticeable here, of course, is how it is failure that drives innovation and new accounting technologies, not views of governments as initiators of projects of change and transformation. It seems clear that the integration or enfolding of failure into the heart of governance constructs a new discourse of internationally managed programmes of good governance as resilience, understood as the efficient and non-disruptive adaptation to changing relationships, flows and interactions. It is little surprise therefore, that bringing failure into hegemonic discourses of power seems only to intensify the levels of international regulative intervention and control. If failure does open up possibilities for new ways of thinking it would appear that these definitely do not stretch to challenging the dominant concerns of the maintenance and strengthening of the system that currently exists.

The Ontologisation of Failure

The opening up of the globalising and interconnected world in the 1990s enabled the process of radically transforming failure from a contested approach to the limits of causal knowledge to a new form of knowing with less emphasis on linear causal connections.

25. Ibid., vi.
26. Ibid., 166.
27. Deborah Cowen excellently highlights how resilience has become the new guide to security, life and logistics, The Deadly Life of Logistics: Mapping Violence in Global Trade (Minneapolis: University of Minnesota Press, 2014).
Particularly in the field of international relations, with the failure of liberal internationalist approaches to humanitarian intervention and state building and the rise of concerns of environmental degradation and global warming, critical discourses took what could be called a ‘complexity’ turn. These radical approaches, sought to include failure, indeterminacy and risk as inherent in the postmodern, complex and interdependent world with the end of the politics of Left and Right and the Cold War divide. In this framing, failure – while still problematic – became linked less to capitalism as a social system of production than to what were now seen as narrow or reductionist liberal or modernist modes of understanding. Failure was not a product of capitalism per se but the by-product of technological developments, which were held to have constituted the world in new and interconnected ways. Thus failure was the ontological product of complex feedback loops and systemic interactions that could not be predicted or foreseen in advance. Failure, through becoming ontological, thereby called for new ways of thinking and governing: ways that went beyond modernist linear, cause-and-effect assumptions and that could cope with unexpected, unknown and unintended effects.

As ‘failure’ became included and reworked, ‘success’ was problematised for affirming current ways of thinking, rather than contemplating the potential unintended consequences of seeing issues in narrow ‘problem-solving’ terms. Success seemed to deny our entangled responsibilities and commitments while greater sensitivity to failure enabled us to become increasingly aware of them. Probably the leading theorist of these 1990s’ approaches was Ulrich Beck, who argued that the risk of failure could no longer be bracketed-off, compartmentalised or excluded in the Second Modernity. Beck built failure into policy-making as a result of globalisation and interconnectivity, suggesting that the boundaries of liberal modernity – between the state and society and between culture and nature – were increasingly blurring. Failure could no longer be treated as an exception, to be quantified and insured against.

The radical inclusion of failure into policy-making, articulated by Beck, was as a problem to be addressed, and potentially minimised, through governing under the ‘precautionary principle’. The inclusion of failure began to integrate contingency into modernist


31. He argued: ‘If we anticipate catastrophes whose destructive potential threatens everybody, then the risk calculation based on experience and rationality breaks down. Now all possible, to a greater or lesser degree improbable, scenarios must be taken into consideration; to knowledge drawn from experience and science we must add imagination, suspicion, fiction and fear’, Ulrich Beck, *World at Risk* (Cambridge: Polity Press, 2009), 53.
forms of governance, as despite the world lacking its cause-and-effect linearity, the human subject still stood external to the world and able to contemplate the potential outcomes of this interconnectedness. The precautionary principle of Beck’s still posited a knowing and controlling subject, but, as the assumptions of modernity ebbed away, this subject had to act more humbly and cautiously, testing and experimenting rather than assuming cause and effect modalities. Problematically, Beck focused on the prevention of failure through ways of predicting or imagining the consequences of human actions, which seemed logically impossible to foresee. For example, even if scientists reached a consensus on the safety of a new procedure or initiative, before its application, scientific experimentation in the laboratory could not produce the same results in real, differentiated and complex life. This led critics, like Bruno Latour, to convincingly argue that, once included, ‘failure’ could not be prevented or minimised through precautions but instead had to be followed through ‘all the way’ (Latour’s thesis will be considered in greater detail below).

Towards the end of his life, Beck (in line with the times) shifted the presentation of his approach, articulating the appreciation of failure as enabling governance rather than as merely constraining it. There were positive side effects of the entanglements of culture and nature, which were exposed through failures, indicating the need to adapt to and to adequately understand the new anthropogenic manufacture of risks – such as global climate change. Thus the awareness of catastrophic failures in dealing with climate change and other risks could be seen to be potentially positive. For Beck:

Anthropological shocks provide a new way of being in the world, seeing the world and doing politics. The anthropological shock of Hurricane Katrina is a useful example… Until Hurricane Katrina, flooding had not been positioned as an issue of environmental justice – despite the existence of a substantial body of research documenting inequalities and vulnerability to flooding. It took the reflection both in the publics and in academia on the devastating but highly uneven ‘racial floods’ of Hurricane Katrina to bring back the strong “Anthropocene” of slavery, institutionalized racism, and connect it to vulnerability and floods. This kind of connecting the disconnected is the way the cosmopolitan side effects of bads are real, e.g. the invisibility of side effects is made visible.

The flooding of New Orleans was a failure that had the side-effect of enabling us to know the connection between risks we thought were natural or external with racial, social and economic inequalities which we thought were purely social. The side-effect of this failure was held to be the bringing together of the world in its realisation that the natural and

35. Ibid., 76.
36. Ibid., 80.
the social were intermingled and that the politics of race was not disconnected from the politics of ecology.\textsuperscript{37} In the same way, the natural and the social sciences needed to be brought together in rethinking how to engage with the world beyond this posited culture/nature divide. For Beck, this ‘Metamorphosis is not social change [it]... is a mode of changing the mode of change. It signifies the age of side effects. It challenges the way of being in the world, thinking about the world and imagining and doing politics’.\textsuperscript{38} A new form of governance thus emerges from the inclusion of failure: the understanding of crises and disasters as no longer natural but as social products:

Verwandlung or metamorphosis then also means that the past is reproblematised through the imagination of a threatening future. Norms and imperatives that guided decisions in the past are re-evaluated and questioned through the imagination of a threatening future. From that follow alternative ideas for capitalism, law, consumerism, science (e.g. the IPCC), etc.\textsuperscript{39}

‘The age of side effects’ nicely encapsulates how failure has been captured and incorporated into governance under discourses of resilience. This approach has also been applied to re-examine the past, as Beck advocated. In fact, Kathleen Tierney argues that disasters throughout history have had social roots, being products of human decision-making and non-linear path dependencies.\textsuperscript{40} International organisations such as the UN, the World Bank and the IMF have been central to the process of bringing disaster into good governance regulations.\textsuperscript{41} In 2005, the Hygo Agreement was signed encouraging all states to take disaster risk measures. In 2015, the Sendai Agreement was much clearer in terms of bringing disasters into mainstream governmental planning processes, very much along the lines of Beck’s precautionary principle. Bringing disasters into everyday governmental planning thus allowed disasters to be included rather than excluded on the basis of the need to think less linearly about planning, development and construction, education, social welfare and other measures, which previously had not taken into account the unintended consequences of their approaches.

One of the most interesting aspects of the Sendai preparations was the argument that disaster risk reduction was itself problematic and that instead of risk reduction

\textsuperscript{37} See also the analysis of Hurricane Katrina in John Protevi, \textit{Political Affect: Connecting the Social and the Somatic} (Minneapolis: University of Minnesota Press, 2009), 163–83.
\textsuperscript{38} Beck, ‘Emancipatory Catastrophism’, 78.
\textsuperscript{39} Ibid., 83.
\textsuperscript{40} For Tierney, Beck is mistaken in linking the social production of failure to late modernity. ‘In contrast, the position taken here is that the consequences of all types of disasters, both historical and contemporary, arise from decision making by organisations, political groups, and other powerful actors’, \textit{The Social Roots of Risk}, 36. She makes the point that as early as the 1775 Lisbon earthquake and tsunami, Marquis de Pombal sought to rebuild through instituting new earthquake resistant urban design and building practices and that civil engineering works to mitigate natural perils can be dated much earlier to ancient and premodern societies.
policy-thinking should shift to the proper recognition and integration of disaster: the paradigm of disaster risk management. Instead, these frameworks assumed that governance could work through re-evaluating what had been done in the past on the basis of the experience of the present, and could not deal so well with problems that were unexpected. Beck had not much more to offer than that the ‘imagination of a threatening future’ would focus attention on the ways in which governance and failure interacted.

Bruno Latour has sought to go beyond the limits of Beck’s work in this area, seeking to trace the effects of human actions in real time feedback loops; requiring less of the imagination and more of science and technology. Latour has deployed the radical discourse of failure as inclusion to great effect, having long waged war on modernist binary understandings, particularly that of the separation of culture and nature. For Latour, just as humanity has become more entangled with nature than ever before, ecologists have sought to emphasise the need for separation to protect ‘nature’ and modernist science aspires to know the world/‘nature’ as somehow a separate and fixed reality. Therefore, along similar lines to Beck’s later work, global warming is not so much a sign of the failure of modernity but an enabler of new forms of governing. The unknown and unintended consequences of humanity’s historical footprint on the planet could only be construed as ‘failure’ in modernist terms if people still bought into modernity’s linear fantasy of ‘progress’. Instead, the inclusion of ‘failure’ reveals the entanglements of humanity and the environment and is a critical wake up call to radically reorganise the governance of the planet on the basis of a more inclusive understanding that ‘nature’ cannot just be left alone, but must be ‘even more managed, taken up, cared for, stewarded, in brief, integrated and internalized into the very fabric of policy’.

Perhaps, Latour, despite his claims, may come to be seen as one of the last modernists. Crucial for Latour’s project of enfolding failure into the everyday of governance is the ability of the human subject to follow the unintended consequences of their actions ‘all the way’. This ability to govern reflexively on the basis of an understanding of causal chains of interaction, presupposes that modernist forms of governing are still possible, that in fact, the enfolding of failure into governance adds to the existing knowledge of a knowing and governing humanity acting as a controlling and directing force. Latour thus enthuses:

the principle of precaution, properly understood, is exactly the change of zeitgeist needed: not a principle of abstention – as many have come to see it – but a change in the way any action is

45. Ibid.
considered, a deep tidal change in the linkage modernism established between science and politics. From now on, thanks to this principle, unexpected consequences are attached to their initiators and have to be followed through all the way.46

Latour’s subject is the initiator of actions and thereby responsible for the interactive consequences of this initiation.47 For Latour, and for other thinkers, seeking to integrate failure, the consequences of human actions are capable of forming the basis of governing better, through feedback loops which impact upon human understanding.48 This sense of acquiring knowledge and governing power through recognising feedbacks and interconnections also drives the debates on the Anthropocene as enabling new more progressive processes of governance and the calls for greater sensitivity to the everyday feedbacks that enable a recalibration of thinking.49 For some authors, extreme weather events or blight and pestilence are seen to be feedback loops warning of the linkages between industrialisation and global warming or the plantationocene and the global spread of viruses and microbial mutations and the undermining of the human immune system.50

Failure becomes more enabling, the more feedbacks as reverse causal connections can be established or imagined and the more ‘radical’ or ‘political’ these authors become in their normative advocacy. These complex and intricate feedback loops also call for greater technological insights, such as those described in the resilience policy prescriptions discussed above, a technical task that, according to Latour:

46. Ibid., 27.
47. Exemplified in the example of Frankenstein’s failure to care for his creation, which then turned into a tragic monster, Latour, ‘Love Your Monsters’.
48. See, for example, Nigel Clark, Inhuman Nature: Sociable Life on a Dynamic Planet (London: Sage, 2011); or Melanie Klein’s This Changes Everything: Capitalism vs. the Climate (New York: Simon & Schuster, 2014), 1–3, which opens with the ironies of anthropogenic feedback loops, for example, when extreme hot weather, caused by the profligate burning of fossil fuels, melted the tarmac and grounded aircraft at Washington DC in the summer of 2012.
49. Latour, Facing Gaia, Six Lectures on the Political Theology of Nature: Being the Gifford Lectures on Natural Religion, Edinburgh, 18th–28th of February 2013 (draft version 1-3-13), 94–5; see also, William E. Connolly, The Fragility of Things: Self-Organizing Processes, Neoliberal Fantasies, and Democratic Activism (London: Duke University Press, 2013); Jane Bennett, Vital Matter: A Political Ecology of Things (London: Duke University Press, 2010). Latour echoes Connolly and Bennett on the cultivation of sensitivity: ‘To become sensitive, that is to feel responsible, and thus to make the loops feedback on our own action, we need, by a set of totally artificial operations, to place ourselves as if we were at the End of Time’, Facing Gaia, 112.
can only be accomplished by crisscrossing their [the loops’] potential paths with as many instruments as possible to have a chance of detecting in what ways they are connected… laying down the networks of equipment that render the consequences of action visible to all the various agencies that do the acting… “[S]ensitivity” is a term that applies to all the agencies able to spread their loops further and to feel the consequences of what they do back to haunt them… but only as long and as far that it [humanity] is fully equipped with enough sensors to feel the feedbacks.51

Latour’s framework seems to be a highly modernist one,52 involving the interventionist technology and regulatory mechanisms necessary to ‘trace and ceaselessly retrace again the lines made by all those loops’ with a ‘strong injunction: keep the loop traceable and publically visible’ so that ‘whatever is reacting to your actions, loop after loop… weighs on you as a force to be taken into account’.53 Highly regulatory forms of governance are given a material political form as a new set of political competencies and responsibilities are established: ‘Such an accumulation of responses requires a responsible agency to which you, yourself, have to become in turn responsible’.54 This sounds very much like a technocratic modernist nightmare where, with the reintroduction of reductionist understandings of feedbacks and responsibilities, radical perspectives of including failure seem to chime perfectly with policy shifts to govern through failure. Despite the claims of the end of the ‘Modernist Constitution’ and of the dispersion of agency through a myriad forms of complex life, the traditional modernist framing of governance as regulatory control seems alive and well in Latour’s world.

**Beyond Failure: Big Data, Immanence as a Form of Governance**

Beck and Latour today can appear to be a little behind the times in their integration of failure as enabling through the cause-and-effect tracing of feedback loops, which still rely on reductionist approaches. Their framing ontologises failure but does not follow through on the consequences of positing failure in terms of system complexity and interaction. More consistent, immanent or emergent approaches to failure management have begun to gain ground – without the transcendental legacies of policy goals or claims to causal knowledge, networked connections and predictive capacities55 – as real time reflexive forms of management increasingly focus on the ‘what is’ of the world in its

54. Ibid.
55. Deleuze nicely captures the difference between transcendent and immanent approaches in his suggestion that transcendent approaches introduce a ‘dimension supplementary to the dimensions of the given’; i.e. ideas of goals, direction and causal connections, which separate the human subject from the object of governance. Whereas, on the plane of immanence: ‘There is no longer a subject, but only individuating affective states of an anonymous force. Here [governance] is concerned only with motions and rests, with dynamic affective charges. It will
complex and plural emergence. High level international collaborative initiatives – like the United Nations’ Global Pulse, established by the UN Secretary-General to research and coordinate the use of Big Data for development,56 the World Bank’s Open Data for Resilience initiative (OpenDRI), seeking to see the emergence of natural hazards and the impacts of climate change in real time,57 and the PopTech and Rockefeller Foundation initiatives on Big Data and community resilience, highlight that data-led understandings of adaptation are overtaking understandings of causal feedback loops.58

Latour, in fact, points towards a more consistent perspective of immanence when, in the ‘Facing Gaia’ lectures, he suggests that Nature has to be understood in ‘post-epistemological’ terms.59 By this he means that modernist forms of representation, reduction, abstraction and exclusion cannot know a world that is plural, lively and interactive. This is post-epistemological because knowledge can no longer be extracted from its concrete context of interaction in time and space. In this framing, knowledge, to be ‘objective’ – to be real – has to be plural, fluid and concrete.60 This is very similar to Donna Haraway’s understanding of ‘situated epistemology’, which rejects modernist drives to extract knowledge, i.e. to turn knowing into abstractions from real emergent processes through methods of scaling up, generalising and universalising, fixing knowledge apart from its plural, changing and overlapping context of meaning.61 In this way of rethinking knowledge, the modernist divisions between subjective and objective and qualitative and quantitative are dissolved.62 The multiple concrete of emergence articulates a very different ontology to that examined above. Here, there can be no feedback loops circling the globe, allocating responsibilities and instantiating new ethical forms of governance based on extensive self-reflexivities. There is no room for an ethics of the good and the bad, for failure and success. As Latour implies, in a world of unknowable contingencies ‘it is the what is that obstinately requests its due’.63

The post-epistemological implications of frameworks of immanence seem to underlie the fascination with Big Data approaches as a way of generating increasingly sensitive real-time responses to failure as emergence. Failure, in discourses of emergent causality, no longer implies causal chains of personal or structural responsibility and therefore can

---

56. United Nations Global Pulse initiative website can be found at: http://www.unglobalpulse.org/.
57. The World Bank’s OpenDRI webpages can be found at: https://www.gfdrr.org/opendri.
60. Ibid., 49.
63. Latour, Facing Gaia, 126.
no longer be the basis for previous forms of political contestation over failure as demar-
cating knowable causal connections from unknowable or natural contingencies. Here,
modernist forms of knowledge, involving chains of causal understanding, and the mod-
ernist binaries and separations involved in governance as decision-making from above,
appear outmoded: problems, from environmental degradation to humanitarian crises, are
increasingly reinterpreted as emergent processes which need to be sensed and responded
to through ongoing forms of localised knowing and agency.64

Big Data, as a methodology for governing problems in their emergence, has become
central to policy and academic discussion of both domestic and international governance
and relies upon discourses of the enfolding of failure which presuppose no goals or
claims ‘supplementary to the dimensions of the given’. The view of Big Data as empow-
ering and capacity-building relies upon the reconstruction of the world in terms of self-
governing, self-reproducing or autopoietic processes.65 This approach to self-government
is ontologically distinct from modernist approaches of feedback process-tracing, based
on cause-and-effect understandings of policy interventions. Governance becomes the
enablement of the capabilities necessary for resilience: developing adaptive capacities in
individuals and populations. In these discourses, new information technology is increas-
ingly seen as essential to real time adaptation to the world:

More diverse, integrated, timely and trustworthy information can lead to better decision-making
and real-time citizen feedback. This in turn enables individuals, public and private institutions,
and companies to make choices that are good for them and for the world they live in.66

The United Nations has called for ‘a data revolution for sustainable development’ argu-
ing that ‘improving data is a development agenda in its own right’67 and that the divides
between rich and poor can be mitigated through the provision of more data enabling
more efficient adaptation to the emergence of problems at all levels of society. It is
increasingly held that it is the ‘data gap’ (enabling real time responsiveness to changes)
that is the cause of growing inequalities.68 Here, failures – recast as gaps in information

---

64. See, for example, Viktor Mayer-Schönberger and Kenneth Cukier, Big Data: A Revolution that
Will Transform How We Live, Work and Think (London: John Murray, 2013); Rob Kitchin,
The Data Revolution: Big Data, Open Data, Data Infrastructures & their Consequences

65. See David Chandler, ‘A World without Causation: Big Data and the Coming of Age of

Development, A World That Counts: Mobilising the Data Revolution for Sustainable
Development: Report Prepared at the Request of the United Nations Secretary-General

67. Ibid., 3.

68. Elizabeth Stuart, Emma Samman, William Avis and Tom Berliner, The Data Revolution:
Finding the Missing Millions (London: Overseas Development Institute, 2015); OECD
Development Assistance Committee, States of Fragility 2015: Meeting Posts–2015 Ambitions
Increasingly, it is sensitivity and responsivity to emerging threats that matters rather than causation. Extreme weather preparedness is a good example as it matters little whether the cause is global warming, regular events such as El Niño, or entirely unexpected weather occurrences, ‘January Hurricane Forms in Atlantic for First Time since 1938’, The Guardian, 15 January 2016. Available at: http://www.theguardian.com/world/2016/jan/15/january-hurricane-forms-in-atlantic-for-first-time-since-1938.


Meier, ‘How to Create Resilience Through Big Data’.
Rather than engaging in external understandings of causality in the world, Big Data and other data enabling techniques work on changing social behaviour by enabling greater adaptive reflexivity. This ‘empirical’ displacement of causal understandings can also be intimated from Beck’s later work. He imagined the development of real time empirics as able to evade both the dangers of critical immanent approaches, which tended to reproduce the knowledge scepticism of postmodernism, and the hubristic knowledge claims of transcendental frameworks of cause-and-effect. Thus, the world could be governed in its complex emergence, enabling failure to be the dynamic for adaptation:

Seen this way, climate change risk is far more than a problem of measures of carbon dioxide and the production of pollution. It does not even only signal a crisis of human self-understanding. More than that, global climate risk creates new ways of being, looking, hearing and acting in the world – highly conflictual and ambivalent, open-ended, without any foreseeable outcome. As a result, a compass for the 21st century arises. This compass is different from the postmodern “everything goes” and different from false universalism. This is a new variant of critical theory, which does not set the normative horizon itself but takes it from empirical analyses. Hence, it is an empirical analysis of the normative horizon of the self-critical world risk society.75

The focus on empirical analysis as enabling real time responsiveness enables immanent understandings to discursively frame governance without an external subject ‘setting the normative horizon’. This new ‘normative horizon’ is one imagined as set by the world itself – and accessed through the development of new mechanisms and techniques sensitised and responsive to the world in its emergence. Thus, to refer back to the three examples given at the top of the article, governance can increasingly be rationalised and legitimated without a ‘dimension supplementary to the dimensions of the given’, enabling the ‘what is’-ness of the world to be finally given its due. Discourses of resilience thus enable generalised understandings of emerging and changing risks to inform governance – from architectural engineering to developments in agricultural productivity right up to national development plans – on the basis that the tasks of governing, as a continuous process of adaptation, are always and already given through the capacity to sense and respond to the emerging nature of life itself. Big Data approaches with their focus on the importance of ‘molecular’ interfaces and mediations rather than grand schemas of causal knowledge and ‘molar’ forms of representation76 usefully illustrate how failure, through its full enfolding into governance can articulate immanent understandings of life as the interactive flow of adaptation.

Conclusion

In the 1990s, as the discipline of international relations opened itself to political and sociological theories previously excluded by the ‘realpolitik’ of the Cold War, failure went through its own particular forms of late modernist articulation. As analysed above,

the 1990s briefly saw reworked political discourses of failure as apologia or exclusion – in the projection of a new ‘mission civilisatrice’ of liberal internationalists77 – and then the sustained rise and impact of radical global sociological critiques of the modernist paradigm, focusing upon the manufactured or anthropogenic nature of recursive risk, suggesting that failure could no longer be excluded or ‘othered’. Failure’s integration into governing practices can hardly be disputed and has been reflected in the rapid rise of resilience approaches, which increasingly emphasise the inevitability of failure in practically all areas of policy concern.

The integration of failure into policy-making, on the basis of the acceptance of contingency and unknowability, has reflected the decline of transcendental approaches, setting the human up as separate to the world, able to know, direct and increasingly to transform its circumstances. Many commentators in the field (as can be seen from this special issue) celebrate the embrace of failure and the rejection of the imposed goals and understandings of the transcendental human subject. Today, it seems that the world – understood as the vitality of matter, the agency of Gaia, the flat ontology of assemblage theory, the immanent power of emergence or the feedback loops of complexity – is emancipating humanity from its modernist aspirations. However, there is a real danger than this ‘emancipation’ will be even more problematic than those that have gone before. The posthuman world of contingency sets no ‘normative horizons’ beyond obedience to the external appearances of the world: the necessity of continuous adaptation to the world in its emergence. The success of ‘failure’ should thus be a cause for concern rather than celebration.

Acknowledgements
I would like to thank the Millennium editors and reviewers for their useful comments and a number of colleagues for their feedback on earlier drafts, including Philip Hammond, Paulina Tambakaki, Pol Bargues-Pedreny and Peter Finkenbusch.

Conflict of interest
The author declares that there is no conflict of interest.

Funding
Support was gratefully received from the University of Westminster Strategic Support Fund for sabbatical research leave during the 2015–16 academic year.

Author Biography
David Chandler is Professor of International Relations, Department of Politics and International Relations, University of Westminster, London. He is the founding editor of the journal Resilience: International Policies, Practices and Discourses; his latest books are Resilience: The Governance of Complexity (Routledge, 2014) and (co-authored with Julian Reid) The Neoliberal Subject: Resilience, Adaptation and Vulnerability (Rowman & Littlefield, 2016).

---