REGULATING DISRUPTION AND DEVELOPMENT OF THE DISRUPTION CALCULUS

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Regulatory disruption is the process where new developments in technology, systems or practice disconnect regulators from either their supporting law framework or the objectives they set out to achieve. Once disconnection is achieved, regulators become more and more irrelevant to and distanced from the risks presented by the emerging disruptor. What does a regulator do when it becomes disconnected? This article sets out to answer that question. It challenges the presumption that disruption should not be regulated and identifies the shortfalls in existing regulatory theory when facing regulatory disruption. A potential framework for assessing and responding to regulatory disruption is also proposed to suggest new avenues of research and application.

I INTRODUCTION

Disruption has been a buzzword in academia for the last quarter of a century, a fact hardly surprising given the advent of new and more evolved forms of technology at an ever-increasing pace. This is particularly obvious in the field of criminal law enforcement.[1] The rise of the darkweb as a marketplace for drugs, child pornography and illegal weapons caught many authorities by surprise.[2] Cryptocurrencies (such as Bitcoin) caused difficulties for taxation authorities and those with anti-money laundering mandates.[3] Anonymous currencies can change hands without the traditional legal remedies of Police or common law actions.[4]

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[1] For the purposes of this article, a "criminal law regulator" is any organisation or agency empowered by the State to enforce some aspect of the criminal law, thus includes (for example) tax and Customs administrations, transport, health and safety, and animal welfare regulators.

[2] Felix Ralph, 'Anonymity and the Law: "The Darknet Rises"' (2013) 32 *Communications Law Bulletin*, 14.

[3] TD 2014/25 – *Income tax: is bitcoin a 'foreign currency' for the purposes of Division 775 of the Income Tax Assessment Act 1997?*; TD 2014/26 – *Income tax: is bitcoin a CGT asset for the purposes of subsection 108-5(1) of the Income Tax Assessment Act 1997 (ITAA 1997)?*; Internal Revenue Service, *Virtual Currency Guidance* (Notice N-2014-21, 25 March 2014); see also *Guidance on the Application of FinCEN's Regulations to Persons Administering, Exchanging, or Using Virtual Currencies* (FIN-2013-G001, 18 March 2013).

[4] Daniel Garrie, Maureen Duffy-Lewis, Daniel K. Gelb, 'Criminal Cases Gone Paperless: Hanging with the Wrong Crowd' (2010) *San Diego Law Review* 47, 521-527; Fergal Reid, Martin Harrigan, 'An analysis of anonymity in the bitcoin system' in *Privacy, Security, Risk and Trust (PASSAT) and 2011 IEEE Third Inernational Conference on Social Computing* (Institute of Electrical and Electronics Engineers, New Jersey, 2011), 1318-1326; Larry McIntyre, 'Cyber-Takings: The War on Crime Moves into the Cloud' (2014) 14 *Pittsburgh Journal of Technology Law and Policy*, 333-342.

In other work[5] I have dealt with the concept of regulatory disruption, where a disruptive technology, system or practice causes the displacement of a criminal law regulator either from its underlying legislative framework or from the policy objectives that regulator was created to achieve. I now propose to consider the obvious question posed by this concept – when such a regulator is disrupted, how does it get back on track? Regulatory theory would suggest that, regardless of what we call it or how it works, society should be subject to a single, flawless, and contiguous stream of regulation with roots in both social acceptance and legal structure that responds to change flexibly, promoting compliance whilst punishing deviance. This especially rings true in criminal law regulation where the proliferation of private security, technology firms, non-government agencies, outreach and advocacy programs has made the criminal law no longer just about 'cops, courts and corrections'.[6]

The purpose of this Article is three-fold. Firstly, I acknowledge and build upon Professor Lacey's work on criminalisation as regulation, by offering a critique of current regulatory theory through the lens of disruption. Whilst an in-depth analysis of every regulatory offering is out of scope, I nonetheless suggest that none of them quite fit the bill for criminal law regulators facing a disruptor. Secondly, I argue that at least some kind of regulatory framework is necessary. I do so by challenging the antithesis of regulation known as "permissionless innovation". Thirdly, I introduce the work of Lawrence Lessig, Andrew Murray and Colin Scott to propose a new approach.[7] I then extend these methodologies of to pose a possible answer to the research question: when a criminal law regulator is disrupted, how does it get back on track?

II PART I: WHY DO WE REGULATE

Part of the difficulties with discussing regulatory disruption is that the concept of regulation is far from settled. Some definitions describe regulation as a 'sustained and focused control by a public agency over activities that are valued by a community',[8] another as 'all types of state intervention in the economy or the private sphere designed to steer them and to realize public goals'.[9] If we were to

[5] Brendan Walker-Munro, 'Disruption, Regulatory Theory and China: What Surveillance and Profiling can teach the Modern Regulator' (2019) *Journal of Governance and Regulation*, in proof.
[6] Clifford Shearing, Jennifer Wood, 'Nodal Governance, Democracy, and the New "Denizens"' (2003) 30 *Journal of Law and Society* 3, 400-419.
[7] Roger Brownsword, Han Somsen, 'Law, innovation and technology: before we fast forward—a forum for debate' (2009) 1 *Law, Innovation and Technology* 1, 1-73, 3.
[8] Philip Selznick, 'Focusing Organizational Research on Regulation' in Roger Noll (ed.), *Regulatory Policy and the Social Sciences* (University of California Press, Berkeley, 1985).
[9] Tom Christensen, Per Laegreid, 'Agencification and regulatory reforms' (Paper presented to the SCANCOR/SOG Workshop Automization of the state: From integrated administrative models to single purpose organisations, Stanford, 1-2 April 2005).

summarise the various definitions, we might say that in pursuit of regulation the State provides both policy and operational control of the achievement of regulatory objectives through government departments or statutory agencies, or by defining the boundaries of third-party regulatory conduct by external corporations.[10] Whether by monitoring of self-regulation, contractual or tort enforcement, or legislated statutory compliance, these various bodies set rules and see they are obeyed, control behaviour and limit the damage caused by risk-taking.[11]

Part of the attraction of focusing on the criminal law is that the definition of regulation appears easier: Black defines criminal regulation as 'intentional activit[ies] of attempting to control, order or influence the behaviour of others'.[12] Perhaps this is because there appears to be little regulatory scholarship on the subject, despite the obvious comparisons that can be made between regulatory theories and combatting crime.[13] Within the criminal law framework, the State as an organiser and enabler still takes primacy – it not only 'reform[s] the manner in which public power over economy and society is exercised, but also draw[s] into the process areas of social and economic life in which controls were characterised'.[14] Nor is the idea of applying regulatory concepts to the criminal law environment treading new ground.[15] Thus in an environment where a disruptor has emerged, the actions of the State to regulate the criminal law become ever more important. This is because the criminal law influences community attitudes about the "price" of compliance in a static fashion even when technological breakthrough is dynamic and cumulative. Tranter calls this paradox 'an essential contradiction; an emphasis on the need for legal change yet a continual affirmation of law as it has been known'.[16]

Of course, the regulation of any market, technology or behaviour is inherently risky but this risk is increased if regulators proceed naively, recklessly or without reference to the context in which any given market, technology or behaviour is

[10] Peter Self, *Rolling Back the State. Economic Dogma & Political Choice* (St. Martin's Press, New York, 2000); Christopher Pollitt, Geert Bouckaert *Public Management Reform* (Oxford University Press, Oxford, 2004); Colin Scott, 'Regulation in the Age of Governance: The Rise of the Post-Regulatory State', in Jacint Jordana, David Levi-Faur (eds.) *The Politics of Regulation* (Edward Elgar, Cheltenham, 2004).
[11] Christopher Hood, Henry Rothstein, Robert Baldwin, *The Government of Risk: Understanding Risk Regulation Regimes* (Oxford Scholarship Online, Oxford, 2001).
[12] Julia Black, 'Decentring Regulation: Understanding the role of Regulation and Self-Regulation in a Post-Regulating World' (2001) 54 *Current Legal Problems* 103.
[13] Nicola Lacey, *Criminalization as Regulation: The Role of the Criminal Law* (Legal Research Paper Series No 50, University of Oxford, 2012)
[14] Colin Scott, 'Regulation in the age of governance: The rise of the post-regulatory state' in Jacint Jordana, David Levi-Faur (eds.) *The Politics of Regulation: Institutions and Regulatory Reforms for the Age of Governance* (Edward Elgar Publishing, Cheltenham, 2004).
[15] John Eck, Emily Eck, 'Crime place and pollution: Expanding crime reduction options through a regulatory approach' (2012) 11 *Criminology & Public Policy* 2, 281-316.
[16] Kieran Tranter, 'The Speculative Jurisdiction: The Science Fictionality of Law and Technology' (2011) *Griffith Law Review* 20.

deployed[17] (especially when the possible punishments are substantial fines or imprisonment). Tenner described this as the law of unintended consequences; an attempt to make a technology fit a proscriptive legal framework is more resource intensive to enforce, usually met with public disapproval, or results in the evolution of a social norm that overrides the threat of punishment.[18] Such concerns were articulated by Black when she said:

> …regulation to reduce risks can inadvertently lead to greater risks, for example safety regulation can create moral hazard, increasing risk-taking activity. Clean-ups can lead to greater environmental harm. Regulation to enhance disclosure can inhibit it. Warnings or bans on activities can produce the very conditions that they are designed to prevent: warnings about dangerous sports can make them more attractive to risk-seekers; conversely warnings that a particular bank is likely to fail can create a run on the bank, so precipitating its failure.[19]

Mandatory sentencing laws stand as one example of unintended consequences in practice, where increased sentencing makes no difference to actors that behave irrationally.[20] Another example of unintended consequences is where harsher criminal law enforcement promotes unlawful behaviour. Hosein et al. [21] called this result the "cockroach phenomenon", which has been observed in law enforcement approaches to drug markets.[22] Even well-intentioned regulatory responses, such data mining, semi-AI programs as well as "network investigative techniques" (a euphemism for legalised hacking), fall foul of the law of unintended consequences, resulting in legal challenges based on constitutionality and/or transnational interference with sovereignty of foreign states.[23]

[17] Malcolm Sparrow, *The Regulatory Craft: Controlling Risks, Solving Problems and Managing Compliance* (2009) 282-90.
[18] Edward Tenner, *Why Things Bite Back: Technology and Revenge of Unintended Consequences* (1997, Vintage Publishing, New York).
[19] Julia Black, 'Paradoxes and Failures: "New Governance" Techniques and the Financial Crisis' (2012) 75 *Modern Law Review* 6, 1039.
[20] Christopher Mascharka, 'Mandatory minimum sentences: Exemplifying the law of unintended consequences' (2000) *Florida State University Law Review* 28, 935-975.
[21] Ian Hosein, Prodromos Tsiavos, Edgar Whitley, 'Regulating Architecture and Architectures of Regulation: Contributions form Information Systems' (2003) 17 *International Review of the Law of Computers & Technology*, 90.
[22] Dan Werb, Greg Rowell, Gordon Guyatt, Thomas Kerr, Julio Montaner, Evan Wood, 'Effect of drug law enforcement on drug market violence: A systematic review' (2011) 22 *International Journal of Drug Policy* 2, 87-94.
[23] Danny Bradbury, 'Unveiling the dark web' (2014) 4 *Network Security*, 14-17; Agmed Ghappour, 'Searching places unknown: Law enforcement jurisdiction on the dark web' (2017) 69 *Stanford Law Review* 4, 1075-1136; Janis Dalins, Campbell Wilson, Mark Carman, 'Criminal motivation on the dark web: a categorisation model for law enforcement' (2018) 24 *Digital Investigation*, 62-71.

The timing of criminal law intervention is also critical to how the law of unintended consequences plays out, particularly in the disruption space.[24] The more time society spends interacting with a given disruptor, the more its use becomes commonplace and effects begins to crystallise, the sooner a more stable and predictable target for regulatory intervention is created.[25] But on the other hand, the longer a regulator takes to step in the more opportunities for criminality are eventually identified and exploited. Here 3D printing gives an illustrative example – every household now has the potential to easily and relatively cheaply recreate three dimensional reproductions of nearly any object. Whilst scholars and policy-makers were quick to identify the potential for trademark and copyright infringement with such devices,[26] Australian criminal law has a very limited application to the existence of 3D printed firearms (which have already begun to enter the market).[27] Yet to impose a ban on 3D printers would limit the availability of a whole host of beneficial applications of the technology and eventually increase the costs to the end-user. In the words of Adam Therier, a key proponent of the deregulatory movement:

> When individuals and institutions apply anticipatory, precautionary thinking and policies in their own lives or business decisions, they bear the cost of those efforts. By contrast, when precautionary thinking is converted into pre-emptive policy prescriptions, the cost of those actions will be borne by a far greater universe of actors.[28]

Therefore, it seems important that we identify not only what is our regulatory target, but how regulators choose to target it. If it is the achievement of regulatory aims in a timely fashion that becomes the cornerstone for measurement of success – lives saved, crimes solved, offenders imprisoned – then those aims cannot be achieved without proper consideration of the environment of disruption.

III PART II: HOW WE REGULATE NOW, AND WHY IT DOESN'T WORK

[24] Margaret Howard, 'The Law of Unintended Consequences' (2007) 31 *Southern Illinois University Law Journal*, 451-462.
[25] W. Brian Arthur, *The Nature of Technology: What It Is and How It Evolves* (Penguin, London, 2009).
[26] Amanda Scardamaglia, 'Flashpoints in 3D Printing and Trade Mark Law' (2015) 23 *Journal of Law, Information and Science* 2, 30; Mitchell Adams, 'The Third Industrial Revolution: 3D Printing Technology and Australian Designs Law' (2015) 24 *Journal of Law, Information and Science* 1, 56.
[27] University of Queensland, '3D Printed Weapons Target Legal Loopholes' (Media Release, 9 March 2016) 1 <https://bel.uq.edu.au/article/2016/04/3d-printed-weapons-target-legal-loopholes>; ACIC, *Organised Crime in Australia 2017* (Report no 1, 2017).
[28] Adam D. Thierer, 'The Internet of Things and Wearable Technology: Addressing Privacy and Security Concerns Without Derailing Innovation' (2015) 21 *Richmond Journal of Law & Technology* 2, 46.

In response to disruption, many criminal law regulators return to their comfort zones, and thereby pursue agendas that variously deal with or treating the risk – often in terms of danger, hazard or damage to persons, politics or property – posed by the emergence of disruptors.[29] Assuming there is some detection mechanism in the market (and, I argue, this is not an assumption that should be accepted) the usual response of lawmakers and policy writers is to proscribe the emerging disruptor, citing that disruptors "risk" to established markets or to wider society.

Risk has had a curious evolution in criminal law regulation. Initially described as the adoption of "cost-benefit analysis" cultures that formalised standard setting in a regulatory environment,[30] risk has since expanded to be the sole target of many criminal law regulators response to disruption. Often the "risk" being targeted is poorly articulated, or is described so broadly – such as "risk" to both the achievement of the regulator's objectives and society at large – as to be meaningless.[31] Lacey describes the apparent contradiction, that we live in a world 'in which criminal law is used for almost any regulatory purpose, and in which techniques of "blame and punishment" are harnessed to regulatory purposes to a degree to which it makes sense to speak in the apparently oxymoronic terms of "punitive risk"'.[32] I would suggest that Lacey was perhaps being ironic, both by her own admission [33] but also when compared to Sparrow's observation that the theoretical criminal law regulator following this approach would start as if washing a dirty frying pan 'by aggressively attacking the burnt and blackest spots, followed progressively by the lesser evils, until "all the dirt had been properly dealt with".'[34]

Yet criminal law regulators continue to quixotically embrace various regulatory theories aligned against various forms of risk. As I argue below in Box 1, these theories are ineffective in responding to disruption:

[29] Fiona Haines, Adam Sutton, Chris Platania-Phung, 'It's all about risk, isn't it? Science, politics, public opinion and regulatory reform' (2008) 10 *Flinders Journal of Law Reform*, 451.
[30] Hood, Rothstein and Baldwin, above n 11.
[31] Bridget Hutter, *The Attractions of Risk-based Regulation: accounting for the emergence of risk ideas in regulation*, Discussion Paper no 33 (ESRC Centre for Analysis of Risk and Regulation, London School of Economics, March 2005) 3, 4.
[32] Lacey, above n 13, 29.
[33] Calling such an endeavour "heroic but probably Canute-like"; Lacey, above n 13, 29.
[34] Malcolm K. Sparrow, *The Character of Harms: Operational Challenges in Control* (Cambridge University Press, Cambridge, 2008) 2.

Zero tolerance [35] Also called broken window[36] or low policing[37]	A common feature of these types of enforcement involves "crackdowns" – highly visible, simultaneous and cumulative effort to enforce a particular prohibition by imposing massive fines or seeking large jail terms. Ostensibly zero tolerance approaches aim to achieve deterrence.[38] From an academic perspective zero tolerance has been generally discredited, but this does not stop it reappearing in new or evolved forms.[39] In a disrupted environment generally, zero tolerance approaches divert funding from other social programs into "boots on the street".[40] For disruptors who may already covered by a criminal law provision (such as selling drugs on the darkweb) zero tolerance is inappropriate as it removes the discretionary basis of what is considered "good" law enforcement and enhances the likelihood of Tenner's unintended consequences.[41] For those disruptors that are completely foreign to the existing criminal law framework (such as synthetic drugs), zero tolerance is likewise ill-advised as it is poorly aligned to both the use of technology as a tool and the solving of particular problems.[42] Lastly, zero tolerance fails the important public perception test in circumstances where disruptors have a substantial public following.[43] For example, whilst encrypted messaging apps can be used by terrorists, paedophiles and drug dealers to commit crimes, they are also used by large proportions of the law-abiding public.[44.]

[35] David Dixon, Phillip Coffin, 'Zero tolerance policing of illegal drug markets' (1999) *Drug and Alcohol Review* 18, 477-486.
[36] James Q. Wilson, George L. Kelling, 'Broken windows' (1982) 249 *Atlantic Monthly* 3, 29-38.
[37] David Bayley, David Weisburd, 'The Role of the Police in Counterterrorism', in David Weisburd, Lois Mock, Idit Hakimi, Thomas Feucht and Simon Perry (eds.), *To Protect and To Serve: Policing in an Age of Terrorism* (Springer Verlaag, New York, 2007).
[38] Laureen Snider, 'Accommodating Power: The Common Sense of Regulators' (2009) 18 *Social & Legal Studies,* 179.
[39] David Dixon, *Beyond Zero Tolerance* (Paper presented at the 3rd National Outlook Symposium on Crime in Australia, Canberra, 22-23 March 1999).
[40] Michael Smithson, Michael McFadden, Sue-Ellen Mwesigye, 'Impact of Federal drug law enforcement on the supply of heroin in Australia' (2005) 100 *Addiction*, 1110-1120; Dan Werb, Greg Rowell, Gordon Guyatt, Thomas Kerr, Julio Montaner, Evan Wood, 'Effect of drug law enforcement on drug market violence: A systematic review' (2011) 22 *International Journal of Drug Policy* 2, 87-94.
[41] Peter Grabosky, 'Unintended consequences of crime prevention' (1996) 5.1 *Crime prevention studies,* 25-56; Ngozi Kamaly, Emmanuel Onyeozili, 'A Critical Analysis of the 'Broken Windows' Policing in New York City and Its Impact: Implications for the Criminal Justice System and the African American Community' (2018) 11 *African Journal of Criminology and Justice Studies* 1, 71-94.
[42] Joshua A. Hendrix, Travis Taniguchi, Kevin J. Strom, Brian Aagaard, Nicole Johnson, 'Strategic policing philosophy and the acquisition of technology: findings from a nationally representative survey of law enforcement' (2017) *Policing and Society*, DOI:10.1080/10439463.2017.1322966, 11.
[43] Judith Greene, 'Zero tolerance: A case study of police policies and practices in New York City' (1999) 45 *Crime & Delinquency* 2, 171-187; cf. John Eterno, 'Zero tolerance policing in democracies: The dilemma of controlling crime without increasing police abuse of power', in Darren Palmer, Dilip Das, Michael Berlin (eds.), *Global Environment of Policing* (CRC Press, Boca Raton, 2016) 76-100.
[44] David Bennett, 'The Challenges Facing Computer Forensics Investigators in Obtaining Information from Mobile Devices for Use in Criminal Investigations' (2012) 21 *Information Security Journal: A Global Perspective* 3, 160.

Responsive[45] or Strategic[46] Regulation	Responsive regulation has dominated the regulatory theory literature for nearly three decades. Responsive regulation is typified by a well-known concept in criminal law regulation – the enforcement pyramid – under which regulators take increasingly more punitive and strident enforcement measures as non-compliance by an entity increases.[47.] Yet responsive regulation has difficulties in a disrupted environment. Firstly, it requires ongoing normative interactions between regulator and regulatee to enable "fit-for-tat" regulatory transactions. The sharing economy disrupts this approach by challenging not only the frequency of interactions (where regulatees will never have had to deal with that regulator before) but also the factual basis on which the regulatory transactions occur (such as difficulties over proof of ownership or possession).[48] Responsive regulation also features a somewhat restrictive escalation and de-escalation narrative that sits ill at ease with the highly cyclical nature of emergence of certain disruptors.[49] Regulation of crimes in the financial sector (including use of unregulated fintech and market/securities fraud) has been the subject of a degree of scholarly scepticism about the future of responsive regulation in this arena.[50]
Smart regulation[51]	The key premise of smart regulation is embracing the power of the non-State actor, seeking to foster co-regulation between these partners and incentivise compliant behaviour, and excluding those who do not meet the requirements of "government by gentlemen".[52] From a general perspective, smart regulation has limitations. For example, it can be undermined by the very principles of informality, insider statuses and autonomy from external scrutiny that make it attractive in the first place.[53] Empirical experience of scandals in various industries over the last twenty years show numerous examples of misconduct, despite supposedly stringent self-regulation and high ethics.[54.] When we consider the criminal law (as in

[45] Ian Ayres, John Braithwaite, *Responsive Regulation: Transcending the Deregulation Debate* (Oxford University Press, New York, 1992), 51.
[46] Vicky Comino, 'Towards better corporate regulation in Australia' (2011) 26 *Australian Journal of Corporate Law* 1, 7.
[47] Robert Whait, 'Power, Crime and the Development of Responsive Regulation' (Paper presented at the 9th Accounting History International Conference, 19-21 August 2015, Ballarat), 3.
[48] Mark Fenwick, Wulf Kaal, Erik Vermeulen, 'Regulation Tomorrow: what happens when Technology is Faster than the Law?' (2017) 6 *American University Business Law Review* 3, 561-594.
[49] Peter Mascini, 'Why was the enforcement pyramid so influential? And what price was paid?' (2013) *Regulation & Governance* 7, 48.
[50] Cristie Ford, 'Prospects for scalability: Relationships and uncertainty in responsive regulation' (2013) 7 *Regulation & Governance* 1, 14-29; Gregory Scopino, 'Preparing Financial Regulation for the Second Machine Age: The Need for Oversight of Digital Intermediaries in the Futures Markets' (2015) 439 Columbia Business Law Review, 439-519; Dirk Zetzsche; Ross Buckley; Janos Barberis, Douglas Arner, 'Regulating a Revolution: From Regulatory Sandboxes to Smart Regulation' (2017) 23 *Fordham Journal of Corporate & Financial Law*, 31-103; Anil Savio Kavuri, Alistair Milne, *FinTech and the future of financial services: What are the research gaps?* (CAMA Working Paper 18/2019, Canberra, 2019).
[51] Neil Gunningham, Peter Grabosky, Darren Sinclair, *Smart Regulation: Designing Environmental Policy* (Oxford, Clarendon Press, 1998).
[52] Michael Moran, *The British Regulatory State: High Modernism and Hyper-Innovation* (Oxford University Press, 2003) 7.
[53] Lucia Zedner, 'Liquid security: managing the market for crime control' (2006) 6 *Criminology & Criminal Justice* 3, 273-274.
[54] Victoria, The Esso Longford Gas Plant Accident: Report of the Longford Royal Commission, *Report* (1999); Eilis Ferran, 'Examining the United Kingdom's experience in adopting the single financial

	this article) States are generally reluctant to involve non-State agencies in engaging in criminal law enforcement activities.[55] In the environment of disruption, smart regulation suffers further difficulties. Because the theory requires in-depth, actuarial quantification of known risks about a given environment before enforcement tools are chosen this can make smart regulation of disruptors "dumb".[56] One of the best examples of this emerges in the criminalisation of conduct in the global E-waste industry. As we have increasingly used, misused and replaced smartphones and tablet technology, this has resulted in a massive spike in waste in the form of electronic componentry. This in turn has driven a global criminal industry in both disposal of waste and facilitation of other kinds of white-collar crime. Although considered helpful, smart regulation is simply not enough to achieve a crime reduction without support from other forms of regulation.[57]
Really Responsive Regulation[58]	Developed as an adjunct to responsive regulation, this theory requires that regulators consider the cultures and understandings of the regulated environment, as well as the logic of their chosen tools as part of the enforcement process.[59] General criticisms of the theory suggest it is useful only for large regulatee populations,[60] and that despite agency deploying really responsive regulation in theory, in practice there is wide divergence amongst the inspectors who investigate breaches and/or issue sanctions.[61] The effect of really responsive regulation on disruptors has not been comprehensively addressed either in Australia or elsewhere, and might be the subject of future research. For now, it could be assumed that (having been derived from responsive regulation) really responsive regulation will suffer

regulator model' (2002) 28 *Brooklyn Journal of International Law*, 257-308; Commonwealth of Australia, Royal Commission into HIH Insurance, *Report* (2003); Adair Turner, *The Turner Review: A Regulatory Response to the Banking Crisis* (Financial Services Authority, London, 3 March 2009); Commonwealth of Australia, Royal Commission into Misconduct in the Banking, Superannuation and Financial Services Industry, *Report* (2019).

[55] Lorraine Mazerolle, Janet Ransley, *Third party policing* (Cambridge University Press, Cambridge, 2006).

[56] Haines, Sutton and Platania-Phung, above n 29, 451; Zedner, above n 53, 277.

[57] Carole Gibbs, Edmund McGarrell, Mark Axelrod, 'Transnational white-collar crime and risk' (2010) 9 *Criminology & Public Policy* 3, 543-560; Judith van Erp; Wim Huisman, 'Smart Regulation and Enforcement of Illegal Disposal of Electronic Waste' (2010) 9 *Criminology & Public Policy* 3, 579-590; Rob White, 'NGO engagement in environmental law enforcement: Critical reflections' (2012) 4 *Australasian Policing* 1, 4; Lieselot Bisschop, Gudrun Vande Walle, 'Environmental victimisation and conflict resolution: A case study of e-waste', in Reece Walters, Diane Westerhuis, Tanya Wyatt (eds.), *Emerging Issues in Green Criminology* (Palgrave Macmillan, London, 2013), 34-54.

[58] Robert Baldwin, Julia Black, 'Really responsive regulation' (2008) 71 *The Modern Law Review* 1, 59-94.

[59] Baldwin & Black, above n 58, 71-72.

[60] Dimity Kingford Smith, 'A Harder Nut to Crack: Responsive Regulation in the Financial Services Sector' (2011) 44 *University of British Columbia Law Review*, 695; Judith Freedman, 'Responsive Regulation, Risk, and Rules: Applying the Theory to Tax Practice' (2011) 44 *University of British Columbia Law Review*, 627.

[61] Vebeke Nielsen, 'Are Regulators Responsive?' (2006) 28 *Law & Policy* 3, 411-413; Peter Mascini, Eelco van Wijk, 'Responsive regulation at the Dutch Food and Consumer Product Safety Authority: An empirical assessment of assumptions underlying the theory' (2009) 3 *Regulation & Governance*, 41-43.

	from the same limitations in relation to disruptors.[62] Really responsive regulation works best when there is an ongoing "regulatory relationship"[63] – something highly unlikely to occur in darkweb transactions[64] for example. In addition, as the principles of responsive regulation do not adequately import the lived experiences of regulatees, it is unsuited to certain types of criminal offending such as welfare fraud[65] or corporate crime[66] (for example by online claim systems[67] or digital markets).[68]
Risk-based regulation[69]	This form of regulation embeds decisions about inspections and sanctions in a risk assessment framework, to ensure regulatory resources are deployed in areas of greatest need. Yet despite widespread adoption in Commonwealth nations,[70] risk-based regulation suffers generally from having little actual empirical evidence of success.[71] Additionally, as the target of risk-based regulation is generally risk itself, regulators can disagree on definitions, leading to different regulators considering risk in different ways.[72] In the environment of disruption, risk-based regulation results generally in regulators that are slower to react because '…in the elusive quest to establish a risk-free existence, our autonomy, intelligence and capacity for change and enlightenment stand in danger of being compromised and diminished'.[73]Where the risks of deviance and non-compliance cannot be

[62] Jan Freigang, 'Scrutiny: Is Responsive Regulation Compatible with the Rule of Law?' (2002) 8 *European Public Law* 4, 463; Karen Yeung, *Securing Compliance: A Principled Approach* (Hart Publishing, Oxford, 2004), 248.
[63] Dimity Kingsford Smith, 'A harder nut to crack-Responsive regulation in the financial services sector' (2011) 44 *University of British Columbia Law Review*, 695-741.
[64] Clive Williams, *A walk on the dark side of the Internet* (News article, Australian National University, 15 March 2016) available at <https://law.anu.edu.au/news-and-events/news/walk-dark-side-internet>.
[65] Morag McDermont, 'Alternative Imaginings of Regulation: An Experiment in Co-Production' (2018) 45 *Journal of Law and Society* 1, 156-175.
[66] Angus Young, 'Conceptualizing a Hybrid Approach in Enforcement and Compliance in China: Adapting Responsive Regulation and Confucian Doctrines to Regulate Commerce' (2013) *SSRN Electronic journal*, DOI: 10.2139/ssrn.2308447.
[67] For a corollary example involving the Australian self-assessment system for income tax, see Neil Warren, 'E-Filing and Compliance Risk: Evidence from Australian Personal Income Tax Deductions' (2016) 31 *Australian Tax Forum*, 577-602.
[68] Chris Brummer, 'Disruptive Technology and Securities Regulation' (2015) 84 *Fordham Law Review* 3, 977.
[69] Black & Baldwin, above n 58, 181; Comino, above n 46, 9.
[70] Hutter, above n 31, 7; Black & Baldwin, above n 58, 184.
[71] Therapeutic Goods Administration, *Regulatory compliance framework* (Australian Government Printer, Canberra, June 2013); Australian Pesticides and Veterinary Medicines Authority, *APVMA Compliance – Our Risk-based Approach* (Australian Government Printer, Canberra, July 2014); Australian Skills Quality Authority, *ASQA's response to systemic risk priorities in the vocational education and training (VET) domestic and international education sectors*, Report (May 2017); Eleanor Stoney, 'Comparing the implementation of risk based regulation in Australia', paper presented at the *National Environmental Law Association (WA) State Conference*, Parmelia Hilton, Perth, 1 September 2017.
[72] Andrew Nicholls, 'The Challenges and Benefits of Risk-Based Regulation in Achieving Scheme Outcomes', paper presented to the *Actuaries Institute Injury Schemes Seminar*, Adelaide, 8-10 November 2015; Anne-Laure Beaussier, David Demeritt, Alex Griffiths, Henry Rothstein, *Why Risk-based Regulation of Healthcare Quality in the NHS Cannot Succeed* (HowSAFE Working Paper no 5, King's College London, 5 August 2015); Gregory Conko, Drew Kershen, Henry Miller, Wayne Parrott, 'A risk-based approach to the regulation of genetically engineered organisms' (2016) 34 Nature biotechnology 5, 493.
[73] Adam Burgess, *Cellular Phones, Public Fears and a Culture of Precaution* (Cambridge University Press, Cambridge, 2004) 281.

	adequately calculated – such as the development of genetically modified organisms or smart materials – an epistemic challenge also arises.[74] The more effort that is put into a precise description of the regulatory target, the greater the chance that the "enforcement arrow" will miss it.[75] Black calls this the "politics of accountability", where by choosing what failures to accept, regulators also choose the parameters of blame when something goes wrong.[76]
Management-based regulation[77]	Often considered a counterpoint to risk-based regulation, this model suggests that regulators should audit whether a regulatee's internal controls are sufficient to produce the outcomes the regulator wishes. Failures to meet standards are therefore the result of planning defects by the regulatee.[78] From a criminal law perspective, management-based regulation seems antithetical – it would be a highly inappropriate method for dealing with indictable crimes of such as fraud, theft or drug trafficking. Hector Sants, former chair of the UK's Financial Services Authority, said it best when he said 'principles-based regulation is not possible for people who have no principles'.[79] Even in industries where management-based regulation has been implemented, it promotes a "race for the bottom" – regulatees constantly looking for a way to barely scrape by on compliance.[80] In the disruptor space, management-based regulation is even more prone to failure given the lack of easily quantifiable risks and measurable non-compliance thresholds for new technologies.[81] Where new crimes can be founded on new technology (such as financial crimes enabled by online home loan applications[82] or cybercrime based on phishing of details from law

[74] Timothy Malloy, Benjamin D. Trump, Igor Linkov, 'Risk-based and prevention-based governance for emerging materials' (2016) *Environmental Science & Technology*, 6822-6824, DOI: 10.1021/acs.est.6b02550; Gregory Conko, Drew L. Kershen, Henry Miller, Wayne A. Parrott, 'A risk-based approach to the regulation of genetically engineered organisms' (2016) 34 *Nature Biotechnology* 5, 493-503; Igor Linkov, Benjamin D. Trump, Elke Anklam, David Berube, Patrick Boisseasu, Christopher Cummings, Scott Ferson, 'Comparative, collaborative, and integrative risk governance for emerging technologies' (2018) 38 *Environment Systems and Decisions* 2, 170-176.

[75] Brownsword & Somsen, above n 7, 3.

[76] Julia Black, 'Regulation: Learning from Paradoxes and Failures', presentation to the Australian & New Zealand School of Governance (ANZSOG), Melbourne, 25 March 2014; see also Julia Black, 'Paradoxes and Failures: "New Governance" Techniques and the Financial Crisis' (2012) 75 *Modern Law Review* 6, 1039.

[77] Cary Coglianese, David Lazer, 'Management-based regulation: Prescribing private management to achieve public goals' (2003) 37 *Law & Society Review* 4, 691-730.

[78] Peter May, 'Regulatory regimes and accountability' (2007) 1 *Regulation & Governance,* 10.

[79] Former Chairman of the Financial Services Authority (UK); Hector Sants, 'Delivering intensive supervision and credible deterrence' (Speech delivered to *The Reuters Newsmakers Event*, London, 12 March 2009) available at <http://www.fsa.gov.uk/library/communication/speeches/2009/0312_hs.shtml>.

[80] Julia Black, *Forms and Paradoxes of Principles Based Regulation* (LSE Law, Society and Economy Working Papers 13/2008, London School Economics and Political Science) 3.

[81] Cary Coglianese, Jennifer Nash, Todd Olmstead, 'Performance-Based Regulation: Prospects and Limitations in Health, Safety, and Environmental Protection' (2003) 55 *Administrative Law Review* 4, 705-729; cf. Lori Snyder Bennear, 'Evaluating Management-Based Regulation: A Valuable Tool in the Regulatory Toolbox?' in Cary Coglianese, Jennifer Nash (eds.) *Leveraging the Private Sector: Management-Based Strategies for Improving Environmental Performance* (Routledge, Washington DC, 2007) 67-102; Jaime Bonnín Roca, Parth Vaishnav, M. Granger Morgan, Joana Mendonça, Erica Fuchs, 'When risks cannot be seen: Regulating uncertainty in emerging technologies' (2017) 46 *Research Policy* 7, 1215-1233.

[82] John Braithwaite, "Responsive Excellence" (Paper presented to the Penn Program on Regulation's Best-in-Class Regulator Initiative, June 2015).

	firms)[83] management-based regulation struggles to establish a proper framework for limiting the effects of these crime types.

BOX 1: Command and control methodologies unsuited for regulating disruptors

[83] Annie Simkus, 'Preventing Data Breaches at Law Firms: Adapting Proactive, Management-Based Regulation to Law-Firm Technology' (2017) 59 *Arizona Law Review*, 1111-1138.

Tombs calls each of the criminal regulatory methodologies out, naming them as unsustainable in the face of new changes in both technology and practice.[84] Tombs' criticisms of these various methodologies appear well-founded. The regulatory theories all fail with respect to disruption because they share a common set of assumptions. They assume that the State does not (and will never have) the resources to fully and adequately regulate a given environment and will need to leverage the capabilities of other actors in the space. They assume that the regulated environment is populated by people who are rational, compliance-minded entities that simply need "assistance" to meet their legal and/or moral obligations. They assume that, in circumstances where entities refuse to comply, it is motivated by the regulator's misunderstanding of their behavioural motivators (rather than a genuine ideology to subvert the law). And finally, these theories all assume that the risks of a particular outcome materialising are easily identifiable, readily quantifiable, simply targeted and a solution thereby is architecturally achievable. Yet none of these assumptions is currently based on empirical evidence, especially when a disruptor is 'big, sometimes fast and always unruly'.[85]

IV PART III: PERMISSIONLESS INNOVATION AND WHY WE SHOULD REGULATE DISRUPTION

By critiquing these regulatory theories, an antecedent question arises: do we bother regulating disruption at all? In 2012 Vinton Cerf argued that the success of the Internet and many of its subsidiary technologies was due to the lack of control around who could post what and who could connect with who.[86] He described the notion of permissionless innovation by reference to some of the major players in Internet technology:

> So, I think this has led to what we have been calling "permissionless innovation" because if you want to try something out, you just do it. The Yahoo! guys and the Google guys and the Skype guys didn't ask permission to build their products and services; they just put them up on the Internet and let people come and use them. If they were successful, more people would use them; and, if they weren't, we would never hear of them at all.[87]

[84] Steve Tombs, 'Crisis, what crisis? Regulation and the academic orthodoxy' (2015) 54 *The Howard Journal of Crime and Justice* 1, 57-72, 58.
[85] Productivity Commission, *Digital Disruption: What do governments need to do?* (Research Paper, June 2016), 17.
[86] Vinton Cerf, 'Dynamics of Disruptive Innovations' (2012) *Journal on Telecommunications and High Technology Law* 10, 28.
[87] Cerf, above n 86, 30.

Therier's work furthered Cerf's concept. He argued that disruptors ought be allowed to develop in society without restriction 'unless a compelling case can be made that a new invention or business model will bring serious harm to individuals'.[88] Therier embraced a policy position that 'switches the burden of proof to those who favour pre-emptive regulation and asks them to explain why ongoing trial-and-error experimentation with new technologies or business models should be disallowed'.[89] His argument was that the counter-policy to permissionless innovation (which he termed the "precautionary principle")[90] rested on a flawed assumption that innovations present theoretical risks that must be treated. His view was this encouraged an environment where 'technological innovation is impossible because of fear of the unknown; hypothetical worst-case scenarios trump most other considerations'.[91]

Perhaps unsurprisingly Therier published a 10-point blueprint for policymakers to consider when designing regulatory responses.[92] He proposed the adoption of permissionless innovation as a default policy position, removal of barriers to market entry and relying on the existing legal frameworks as much as possible. He also suggests letting the market regulate itself by reference to insurance and competition, and permits targeted legal measures only for truly hard problems – but makes it clear that this regulatory response is only for where 'the potential for clear, catastrophic, immediate and irreversible harm exists'.[93]

Not embracing permissionless innovation is fraught with dangers, and Therier is likewise keen to point them out: 'ex ante (pre-emptive and precautionary) regulation is often highly inefficient, even dangerous…likely to come at the expense of innovation and growth opportunities'.[94] Other scholars support the view that regulatory intervention frequently ignores the dynamic nature of markets and the exploitative attitudes of many participants to new challenges and opportunities.[95] Sandefur suggests that having to ask a government for permission is 'antithetical to the fundamental tenets of a competitive marketplace',[96] especially

[88] Adam Thierer, *Permissionless Innovation: The Continuing Case for Comprehensive Technological Freedom* (Mercatus Center at George Mason University, Arlington, 2014).
[89] Adam Thierer, 'Embracing a culture of permissionless innovation' (2014) 4 *Cato Online Forum*.
[90] Haines, Sutton, Platania-Phung, above n 29, 436.
[91] Adam Thierer, 'Technopanics, Threat Inflation, and the Danger of an Information Technology Precautionary Principle' (2013) 14 *Minnesota Journal of Law, Science & Technology* 309, 353.
[92] Adam Therier, *Permissionless Innovation and Public Policy: A 10-Point Blueprint* (Mercatus Center at George Mason University, Arlington, 2016).
[93] Therier, above n 89, 18.
[94] Therier, above n 89, 75.
[95] Mark Steckbeck, Peter J. Boettke, 'Turning Lemons into Lemonade: Entrepreneurial Solutions in Adverse Selection Problems in E-Commerce' in Jack Bimer (ed.) *Markets, Information and Communication: Austrian Perspectives on the Internet Economy* (2004, Routledge, New York) 221.
[96] Timothy Sandefur, *The Permission Society: How the Ruling Class Turns Our Freedoms into Privileges and What We Can Do About It* (Encounter Books, New York, 2016).

given that government actors are 'notoriously inept' at selecting disruptors from a pool of possible candidates and are generally unable to match private sector resources in identification of new commercial opportunities.[97] Koopman et al. agree with a deregulatory approach, suggesting when a new market entrant is detected there should be a reduction in red tape to incumbent market participants to maximise innovative flexibility.[98] Maureen Ohlhausen, former Commissioner for the US Federal Trade Commission (FTC), might disagree with being characterised as "inept", having championed permissionless innovation in the US government for almost her entire term. She encouraged regulators to accept complexity, properly assess consumer harm, and be conscious of the limits of both the regulator and its underlying legal framework.[99]

So could permissionless innovation avoid the drawbacks of regulatory disruption by removing or "sidelining" the regulator? This hypothesis has some attraction. There are some good real-world examples of where permissionless innovation has been used to promote innovation and a light regulatory touch. The success of the Apple and Google app stores has been attributed not to the tech giants themselves, but the armies of developers (from multinationals to single teenagers in basements) who created and listed their programs for sale on a global marketplace.[100] Goldcorp, a mining company in Canada, publicly listed their geological data in an effort to find new seams of gold in a supposedly tapped mine at Red Lake – in only a year, Internet contributors had found 110 new sites for exploration.[101] The economic position of the United States on internet-based trade in the late 1990s and early 2000s is widely attributed to the policies of President Clinton that embraced competition and limited State regulation of e-commerce.[102]

[97] Daniel Spulber, 'Unlocking Technology: Antitrust and Innovation' (2008) 4 *Journal of Competition Law & Economics* 915, 965.
[98] Christopher Koopman, Matthew Mitchell, Adam Thierer, 'The Sharing Economy and Consumer Protection Regulation: The Case for Policy Change' (2014 Working Paper, Mercatus Center at George Mason University, Virginia), 19.
[99] Maureen Ohlhausen, 'The Internet of Things and the FTC: Does Innovation Require Intervention?' (US Chamber of Commerce, Washington DC, 18 October 2013) available at <https://www.ftc.gov/sites/default/files/documents/public_statements/internet-things-ftc-does-innovation-require-intervention/131008internetthingsremarks.pdf>; Maureen Ohlhausen, 'The Procrustean Problem with Prescriptive Regulation' (2014) *CommLaw Conspectus* 23, 1.
[100] Douglas MacMillan, Peter Burrows, Spencer E. Ante, 'Inside the app economy' (2009) 22 *Business Week* 1; Joel West, Michael Mace, 'Browsing as the killer app: Explaining the rapid success of Apple's iPhone' (2010) 34.5-6 *Telecommunications Policy*, 270-286.
[101] Henry Chesbrough, Marshall Van Alstyne, 'Permissionless innovation' (2015) 58 *Communications of the ACM* 8, 24-26.
[102] Adam Thierer, '15 Years On, President Clinton's 5 Principles for Internet Policy Remain the Perfect Paradigm' (*Forbes*, Washington, 12 February 2012) available at <http://www.forbes.com/sites/adamthierer/2012/02/12/15-years-on-president-clintons-5-principles-for-internet-policy-remain-the-perfect-paradigm>.

Yet permissionless innovation must be approached with a high degree of caution for four reasons. The first is the apparent observation by Therier that individuals and society purport to play a far greater role in technological regulation, as they adapt and adjust to new environments in an 'evolutionary, resilient fashion, just as they adjusted to earlier disruptive technologies'.[103] This statement provokes a dangerous sense of optimism – the concept that humanity will simply "roll on" and adopt disruption irrespective of its effects on society – that borders on wilful blindness. Langdon Winner wrote of future technologies that would cause 'the adjustment of human ends to match the character of the available mean', a phenomenon he referred to as "reverse adaptation".[104] Writing only three decades later Winner observed that reverse adaptation was continuing apace in the 21st century: '[t]he construction of a technical system that involves human beings as operating parts brings a reconstruction of social roles and relationships'.[105] Separate to Winner's other views about the nature of technology, there is a concomitant sense of strong scholarly caution in a society that builds values around the technologies it develops, rather than developing technologies to support those values that are already established.[106]

The second ground of criticism takes in this scholarly concern. The research suggests that outside of the world of the Internet, regulatory models built on permissionless innovation appear to have less traction. It is suggested that this is perhaps because all examples given by Therier are data-centric and lack a physical dimension.[107] The applicability of such deregulated thinking in industries where lives are literally at stake (such as in health care or pharmaceutical regulation) can be difficult to reconcile.[108] As Pantella points out, where a disruptor has a dimension capable of afflicting physical safety, lawmakers are not only compelled

[103] Adam Therier, 'The Internet of Things and Wearable Technology: Addressing Privacy and Security Concerns without Derailing Innovation' (2015) 21 *Richmond Journal of Law and Technology* 2, 4.
[104] Langdon Winner, *Autonomous Technology* (MIT Press, Cambridge, 1977), 227.
[105] Landgon Winner, *The Whale and the Reactor: A Search for Limits in an Age of High Technology* (University of Chicago Press, Chicago, 2010), 11.
[106] Steven Goldman, 'No Innovation without Representation', in Stephen Cutcliffe, Steven Goldman, Jose San Martin (eds.) *New Worlds, New Technologies, New Issues* (Associated University Press, Cranbury, 1992), 148-160; Richard Sclove, *Democracy and Technology* (Guilford Press, New York, 1995); Hubert Dreyfus, 'Heidegger on Gaining a Free Relation to Technology', in Kristin Schrader-Frechette, Laura Westra (eds.), *Technology and Values* (Rowman & Littlefield Publishers, New York 1997), 107-14; Marine Umaschi Bers, 'Identity construction environments: Developing personal and moral values through the design of a virtual city' (2001) 10 *The Journal of the Learning Sciences* 4, 365-415; Bjorn Hofmann, ' Technological medicine and the autonomy of man' (2002) 5 *Medicine, Health Care & Philosophy* 2, 157-167; Bjorn Hoffman, 'When Means become Ends: Technology Producing Values' (2006) 2 *International Journal of Media, Technology and Lifelong Learning* 2, 1-12
[107] Therier, above n 89.
[108] Walter Valdivia, David Guston, *Responsible innovation: A primer for policymakers* (The Brookings Institute, Washington DC, 2015); Chesbrough and Van Alstyne, above n 101.

to act, but are often the only ones who can do so.[109] Schaefer argues that application of Therier's "do what thou wilt" regulatory approach to disruptive industries such as the commercialisation of space is ill-suited based on different extrinsic factors, being a.) international law obligations, b.) implications for national security and c.) the regulatory expectations for investors given the extremely high capital injections required, and risks on return.[110] Mannix highlights the difficulties of Therier's approach in the realm of synthetic biology, by suggesting that the possible annihilation of disease-carrying mosquitoes as a public health measure is a legal and moral quandary. Far from being a decision susceptible to permissionless innovation, such a choice is beyond the average decision maker as they are 'relatively ignorant of all the considerations that one would reasonably want to work through before deciding to do something so drastic as to effect extinction of a species. And that presents a problem…for any methodology that might be used to make consequential decisions on behalf of us all'.[111]

The third ground of challenge is that Therier's view of innovation is overwhelmingly optimistic – the apparently "life-enriching changes" spoken of by Therier and others are really only realised by 'affluent consumers and owners of tech-firms'.[112] Therier's approach to deregulation appears premised on the concept that existing forms of regulations are driven only by the need to protect the interests of the disrupted – but on the other side of that those same '[r]egulations serving to benefit these populations…are often barriers to tech firms' profit maximization'.[113] Dotson argues that Therier's proposal actually derives from an ignorant understanding of Wildavsky's work[114] who suggested that rather than have no regulation, innovation should be regulated incrementally:

> The depiction of precaution within permissionless innovation is rooted in a weak understanding of the literature on technological risk…those championing permissionless innovation forget that Wildavsky argued not for the absence of intervention but rather incrementalist trial and error learning: ensuring that the potential errors from new technologies are as small and few enough in number as possible so that citizens would have

[109] Joseph Pantella, 'Ready, Print, Fire! Regulating the 3D-Printing Revolution' (2017) *Journal of Law, Technology & the Internet* 8, 1-25.
[110] Matthew Schaefer, 'The Contours of Permissionless Innovation in the Outer Space Domain' (2017) *University of Pennsylvania Journal of International Law* 39, 103-184.
[111] Brian Mannix, 'Benefit-Cost Analysis and Emerging Technologies' (2018) *Governance of Emerging Technologies: Aligning Policy Analysis with the Public's Values* (Special report no. 48, Hastings Center), S20.
[112] Taylor Dotson, 'Technological Determinism and Permissionless Innovation as Technocratic Governing Mentalities: Psychocultural Barriers to the Democratization of Technology' (2015) *Engaging Science, Technology, and Society* 1, 98-120.
[113] Dotson, above n 112, 105.
[114] Aaron Wildavsky, 'Trial and Error Versus Trial Without Error', in Julian Morris (ed.) *Rethinking Risk and the Precautionary Principle* (Butterworth-Heinemann, Woburn, 2000), 22-45.

> the capacity to learn from them and, at the same time, making reasonable efforts to avoid foreseeable harms…[115]

There is evidence in the literature to support Dotson's views. Wildavsky and others suggest that the greatest risk disruptors pose comes from regulators which refuse to change and are highly susceptible to "calcification" or "ossification" – a regulatory stance that is taken and maintained that neglects both the market and the policy objectives it was erected to achieve.[116] Similarly, Abramovicz suggests that a critical requirement of regulating disruptive innovation is a continuous analysis of market and social conditions, like how insurance and actuarial companies price risk.[117] Cortez argues that regulators can (and indeed should) 'experiment with binding approaches that can be more finely calibrated to the novel technology or business practice'.[118] Koopman et al. also agree that regulators should engage in an ongoing analysis of objectives to ensure that maintenance of regulation is warranted.[119]

The fourth ground of challenge to permissionless innovation is one of pragmatics. In his policy blueprint Therier is quick to argue that only the most threatening, most dangerous, most exceptional risks need treating.[120] But Therier's suggestion ignores the fact that the fundamental aspect of the precautionary principle is not to prevent innovation or protect incumbents – it is to control risk. There are still compelling grounds for retaining regulation, especially in areas to 'reduce information asymmetries, limit abuse of market power, address externalities or achieve social goals'.[121] The control of risk in a disruptive environment where not all of the variables have materialised or are easily quantifiable presents some challenges, but the mere lack of absolute certainty that a risk will not materialise (or will materialise with a different level of likelihood or consequence) is not a sufficient barrier to the making of regulatory decisions.[122]

[115] Dotson, above n 112, 106.
[116] Nathan Cortez, 'Regulating disruptive innovation' (2014) 29 *Berkeley Technology & Law Journal* 175, 202 and 207.
[117] Michael Abramowicz, 'Cryptoinsurance' (2015) 50 *Wake Forest Law Review,* 671.
[118] Cortez, above n 116, 179.
[119] Koopman, above n 98.
[120] Therier, above n 89.
[121] Productivity Commission, above n 85, 98.
[122] Elizabeth Fisher, Judith Jones, Rene von Schomberg, 'Implementing the Precautionary Principles', in Elizabeth Fisher, Judith Jones, Rene von Schomberg (eds.) *Implementing the Precautionary Principles: Perspectives and Prospects* (Edward Elgar, Northampton, 2006), 19-41; Nassim Taleb, Rupert Read, Raphael Douady, Joseph Norman, Yaneer Bar-Yam, *The precautionary principle (with application to the genetic modification of organisms)* (Extreme Risk Initiative Working Paper Series, New York University, 2014), available at <https://arxiv.org/pdf/1410.5787.pdf%C2%A0>.

Nor is Therier's approach to the regulation of risk sufficiently broad. Professor Sparrow's work in regulatory practice has developed six classes of risk:[123]

1. Catastrophic risk – a risk not usually represented in daily workload
2. Emerging risk – a novel or unfamiliar risk not previously identified
3. Invisible risk – a risk that does not rise above the detection threshold of the regulator
4. Adversaries / conscious opponents – the risk that existing regulatory controls may be circumvented, undermined or ignored by a willing agent
5. Boundary spanning – risks that cut across geographic or functional boundaries, and
6. Persistent risk – risks not ordinarily responsive to traditional methods of control.

Excepting "catastrophic risk", which according to Therier is the only one that needs to be dealt with, permissionless innovation would permit five extant classes of risk that would go wholly untreated. Even if none of them resulted in the kinds of extreme "threats" or "dangers" Therier envisages, public and societal sentiment is unlikely to side with a Government or State actor willing to permit the existence of such widespread uncertainty.

The final ground of criticism for permissionless innovation in the disruption space is one of economics. Permissionless innovation might flourish in the digital, where a lack of regulatory control leads to a wealth of competitors with equal bargaining power and equal knowledge of the market, all vying for consumer's investment. In a cut-throat economic sense, Cerf might be right: if the competitors are not successful, they disappear.[124] But Cerf and Therier's view of the market is widely ignorant of a whole slew of rationales for regulation where competitors are not on an equal footing: monopolies and predatory pricing, externalities and information inadequacy, moral hazards, discrepancies in bargaining power and social policy to name a few.[125]

Cerf and Therier's proposal for permissionless innovation might sound good in the online world, where opportunities abound and everyone has the same capacity to embrace the same idyllic dream of development and progression. But it falters when it seeks to impose a sense of order on the reality of technological

[123] Malcolm Sparrow, 'What is a Risk Based Regulator?', Presentation given to the *Australian Competition & Consumer Commission*, Canberra, 15 May 2018 (notes on file with author).
[124] Cerf, above n 86, 30.
[125] Robert Baldwin, Martin Cave, Martin Lodge, *Understanding Regulation: Theory, Strategy and Practice* (Oxford University Press, Oxford, 2011).

development, a reality populated with diverse and economically irrational agents, and a series of risks to life, property and the social order.

V PART IV: HOW DISRUPTION CAN AFFECT REGULATION

I have suggested above why disruption should be regulated, but before I suggest how it could be regulated, I believe it appropriate to reflect on Tombs' observations on regulatory literature:

> …the academic literature on regulation is a small industry, a torrent of self-referential banality from which considerations of power, capital, class and even crime are notable for their absences. Therein, regulation is viewed largely as a technical issue, a search for mechanisms to empower anthropomorphised, essentially responsible firms to comply with law, in a world of stakeholders and conversations, where those who might suggest resort to criminal law are simplistic, anachronistic embarrassments, a world where power is never concentrated but dispersed, where sources of influence are polycentric, and where the state is certainly decentred, relatively and increasingly impotent, just one amongst a range of actors, not least those which inhabit the private sector itself. So regulation might be responsive, better, smart, twin-tracked and risk-based – but it is always so 'realistic' that it is never about controlling pathological, calculating, profit-maximising entities as one element of a broader struggle for social justice…[126] (emphasis in the original)

When we consider regulating disruption in the future, we must therefore heed Tombs' warnings and ensure that our regulatory models must recognise regulation as 'an object of struggle, power and social forces' by 'eschewing narrow reform and daring to engage in radical intellectual work'.[127] This includes a willingness to adapt or develop new tools and identify the blockages to utilising existing ones.[128]

At its core, regulation of the criminal law is an exercise in incentives. Moral, upright or compliant behaviour is rewarded (even if the reward is simply a lack of attention by law enforcement), and non-compliant, illicit and damaging behaviour is punished. This is most evidenced by the compliance calculus explained in Scholz seminal work by reference to environmental pollution. A company in that industry can undertake an actuarial analysis of the likelihood of detection and severity of fines if their polluting is detected and prosecuted, weighed against the costs of complying conduct.[129] Thus, compliance with the criminal law becomes a risk-reward calculation involving costs of compliance on one side versus benefits of

[126] Tombs, above n 84, 57-72.
[127] Tombs, above n 84, 69.
[128] See for example National Audit Office (NAO), *Fisheries Enforcement in England* (HC 563, April 2003) 19-20; cited in Baldwin & Black, above n 58, 84.
[129] John Scholz, 'Voluntary compliance and regulatory enforcement' (1984) 6 *Law & Policy* 4, 385-404.

non-compliance and risks of detection and punishment on the other.[130] Recent work in the field of behavioural economics suggests that this calculation results in many different crime types becoming economically rational activities.[131] Criminal law regulators thus establish an environment that 'define[s] the choice set and therefore determine[s] transaction and production costs and hence the profitability and feasibility of engaging in economic activity'.[132]

If crime becomes an actuarial calculation and the decision itself is economically rational (and I make the assumption based on the above that it can be), then law enforcement becomes equally utilitarian – how does one prevent decisions to engage in crime, or limit the choices of those who do decided to engage? By affecting the decision to engage in criminal conduct, law enforcement under an economically rational model becomes one about identifying and enacting barriers to entry to that criminal market. Barriers to entry can be calculated based on the interaction of the likely cost of sanction[133] (i.e. the cost of fines, but also terms of imprisonment, public exposure or censure),[134] the cost of engagement and ongoing pursuit of the behaviour (i.e. expense of capital to engage in or support ongoing conduct), and the timing of entry to the market. It also includes the relative costs of defeating or subverting law enforcement or ripening the conditions for market entry (such as by antecedent offending). By referring to barriers to entry, I also recognise that the regulator itself is a barrier to criminal markets. The deployment of regulatory responses influences the behaviours of those opportunists seeking to make an entry into the criminal market, resulting in either positive or negative outcomes.[135] The motivational posture of the regulated community is extremely important in cases of regulatory disruption, because a given disruptor can shift regulatee's posture from game-playing or resistance to authority into outright non-compliance.[136]

[130] Soren Winter, Peter May, 'Motivation for Compliance with Environmental Regulations' (2001) *Journal of Policy Analysis & Management* 20, 675–698; Peter May, Robert Wood, 'At the Regulatory Front Lines: Inspectors' Enforcement Styles and Regulatory Compliance' (2003) *Journal of Public Administration Research and Theory* 13, 117–139.

[131] Mirko Dracha, Stephen Machin, 'Crime and Economic Incentives' (2015) 7 *Annual Review of Economics*, 389-408; Greg Pogarsky, Sean P. Roche, Justin T. Pickett, 'Offender Decision-Making in Criminology: Contributions from Behavioral Economics' (2018) *Annual Review of Criminology* 1, 379-400.

[132] Douglass North, 'Institutions' (1991) 5 *Journal of Economic Perspectives* 1, 97.

[133] John Scholz, 'Enforcement Policy and Corporate Misconduct: The Changing Perspectives of Deterrence Theory' (1997) *Law & Contemporary Problems* 60, 253; Sally Simpson, *Corporate Crime, Law and Social Control* (Cambridge University Press, Cambridge, 2002), 22–44.

[134] Neil Gunningham, Joseph Rees, 'Industry self-regulation: an institutional perspective' (1997) 19 *Law & Policy* 4, 363-414; Neil Gunningham, Robert A. Kagan, Dorothy Thornton, *Shades of green: business, regulation, and environment* (Stanford University Press, Stanford, 2003).

[135] Sparrow, above n 17*,* 282-90.

[136] Frank Pearce, Steve Tombs, 'Ideology, hegemony, and empiricism: Compliance theories of regulation' (1990) *British Journal of Criminology* 30, 423-443: Frank Pearce, Steve Tombs, 'Policing corporate "skid

On the other hand, we must identify how to limit the capabilities of those in the market who have already made the choice to engage in criminal conduct. After all, as Lessig contended: 'Between [a] norm and the behaviour sought is a human being, mediating whether to conform or not. Lots of times, for lots of laws, the choice is not to conform. Regardless of what the law says, it is an individual who decides whether to conform…' [137] Ekblom proposed a model he called the Conjunction of Criminal Opportunity involving the interplay of four components: a sufficiently motivated offender, a vulnerable and attractive target of crime, absence of crime preventers and presence of crime promoters. [138] If we apply economic concepts to such a model we identify that the nature of the offender (both in an individual and societal sense), the attractiveness of the target viz its financial desirability, and the absence of deterrence / promotion of non-compliance, are elements of a kind of "criminal entrepreneurship", a modification of Shane's theory on the interaction between individual and opportunity.[139]

Chance of detection plays a key role here. [140] The unique structure of punishments under the criminal law (which usually focus on the traditional duality of punishments of fines or imprisonment) make calculation of compliance costs a fairly simple endeavour. Criminal behaviour also engenders further offending, as the more successful an offender is in pursuing their illicit agenda, the lower they perceive the capability of law enforcement to address their behaviour. [141] This concept (the perceived capability of law enforcement to detect and sanction) is known as 'salience' and can be defined as an offender's interpretation of the chance that their behaviour will be detected together with their subjective assessment of their likely punishment (quite separate from the objective assessment undertaken in the compliance calculus).[142] These assessments can be influenced regulatee's intellect, diversity and past experience as they operate in the "real world", a fundamentally more complicated, open-ended system.[143]

rows"' (1991) *British Journal of Criminology* 31, 415-426; Frank Pearce, Steve Tombs, 'Hazards, law and class: Contextualising the regulation of corporate crime' (1997) *Social & Legal Studies* 6, 79-107.

[137] Lawrence Lessig, *Code and Other Laws of Cyberspace* (Basic Books, Washington DC, 1999), 1408.

[138] Paul Ekblom, 'Gearing up against crime: A dynamic framework to help designers keep up with the adaptive criminal in changing world' (1997) *International Journal of Risk Security and Crime Prevention* 2, 249-266.

[139] Scott Shane, *A general theory of entrepreneurship: The individual-opportunity nexus* (Edward Elgar Publishing, New York, 2003).

[140] As a variable in the Becker/Ehrlich crime utility model; Draca and Machin, above n 131, 391.

[141] Malcolm Sparrow, 'Joining the Regulatory Fold' (2012) 11 *Criminology & Public Policy* 2, 347.

[142] Gerlinde Fellner, Rupert Sausgruber, Christian Traxler, 'Testing enforcement strategies in the field: Threat, moral appeal and social information' (2013) 11 *Journal of the European Economic Association* 3, 634-660; Robert Dur, Ben Vollaard, 'Salience of law enforcement: A field experiment' (2019) 93 *Journal of Environmental Economics and Management*, 208-220.

[143] Cynthia Kurtz, David Snowden, 'The New Dynamics of Strategy: Sense-making in a Complex-Complicated World' (2003) 42 *IBM Systems Journal* 3, 462–483; Harold Nelson, Eric Stolterman, The Design Way: Intentional Change in an Unpredictable World (MIT Press, Cambridge, 2012).

From an economic perspective, we must also assess the regulated environment's inherent information asymmetries, both endogenous between firms and exogenous between firms and the regulator.[144] If a regulator is more nimble and agile than its regulatees, only the most callous and experienced of amoral calculators will "chance their arm" on illegal activity. If on the other hand, a regulatee outweighs the regulator in responsiveness, the regulated firm will be able to outrun the regulator's detection capability and enforcement activities whilst also "cashing in" on their asymmetry with other firms. I therefore term an assessment of all these factors by a criminal law regulator as behavioural adaptation, and in this sense adopt the hypothesis of Geroski:

> …the growth and survival prospects of new firms will depend on their ability to learn about their environment, and to link changes in their strategy choices to the changing configuration of that environment... (t)he more turbulent is the market environment, the more likely it is that firms will fail to cope. If the process of entry continually throws up new aspirants for market places, then slow learning coupled with a turbulent environment means that high entry rates will be observed jointly with high failure rates.[145]

A diagrammatic representation of the intersection of these concepts is at Figure 1.

Barriers to entry

	Low	**High**
High	*Unchecked criminality*	*Specialist non-compliance*

[144] Susan Shapiro, Susan, 'Collaring the crime, not the criminal: Reconsidering the concept of white-collar crime' (1990) 55 *American sociological review* 3, 346-365; Julia Black, 'Critical reflections on regulation', in Fiona Haines (ed.), *Crime and Regulation* (Routledge, London, 2017) 15-49.
[145] Paul Geroski, 'What do we know about entry?' (1995) 13 *International Journal of Industrial Organization,* 421.

Behavioural adaptation	**Low**	*Criminal entrepreneurialism*	*General compliance*

Figure 1: Mapping disruption on economically rational crime

In summary then, where barriers to a criminal market are high – whether at the micro level (such as a single house) or at the macro level (such as an entire financial system) – and adaptation by the regulated community is low, salience is high and non-compliance is generally low. Where such non-compliance can be observed, it is usually accompanied by substantial maintenance of working capital, so concentrated enforcement activity can discourage the usual justification of economic opportunity and profit.[146]

When a disruptor emerges and reduces the barriers to entry to that criminal market or sub-market, it encourages those who perhaps might previously have shied away from engaging in amoral behaviour. The disruptor has fuelled or driven a change from general compliance to opportunistic criminality. If the regulator reacts with a traditional response (i.e. top-down, command and control, investigation and heavy sanction), the regulator fails to achieve sufficient deterrence because the pool of regulatees has grown and resulted in decreased salience, whether the regulator acknowledges it or not. Norris and Wilson explain it this way:

> …there will inevitably be those who seek to exploit such [technological] apparatus for less legitimate purposes. The increases in electronic crime, from counterfeit credit cards to terrorists using the internet are an example of how illegal activities are changing in line with the new opportunities this technology creates…[147]

A contemporary example can be seen with the emergence of ride-sharing in Australia. When Uber first emerged in Sydney in 2014, it facilitated a criminal offering (providing a taxi service without a licence). This forced regulators of the taxi and limousine industries to make difficult choices about enforcement in an environment where the players were 'locked in an existential struggle over regulatory legitimacy with incumbent firms'.[148]

Similarly, if a disruptor offers a greater opportunity for behavioural adaptation – that is, for the regulatees to learn faster about their environment and address the information asymmetries compared to with other firms, or to avoid detection systems by increasing asymmetry with the regulator – it permits specialist firms who are able to outmanoeuvre the regulator to consistently game the system and avoid both the detection of wrongdoing and the sanctioning of that behaviour. Synthetic drugs (also called "synthetic highs" or "legal highs") are an instructive

[146] Michael Levi, 'Serious tax fraud and noncompliance' (2010) 9 *Criminology & Public Policy* 3, 493-513.
[147] Gareth Norris, Paul Wilson, 'Crime Prevention and New Technologies: The Special Case of CCTV', in Duncan Chappell, Paul Wilson (eds.) *Issues in Australian Crime and Criminal Justice* (Butterworths, Chatswood, 205) 409.
[148] Alice Witt, Nicolas Suzor, Patrik Wikstrom, 'Regulating ride-sharing in the peer economy' (2015) 1 *Communication Research & Practice* 2, 176.

example given Australia's apparent drug appetite.[149] Under the Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) and various State and Territory legislation, the possession, manufacture, prescription and control of medicines and poisons is tightly controlled.[150] However synthetic drugs pose a behavioural adaptation challenge to criminal law regulators, because possession and manufacture of synthetic drugs or their precursors may be legal, or may have legitimate medicinal uses. In addition whilst listing a particular chemical compound in the SUSMP may make it illegal, this can be easily subverted by tweaking its molecular structure to bring it outside the proscription – as long as the user gets high, legal definitions are moot. Detection of synthetic drugs is also tricky, given that both electronic and chemical sensors rely on specifically reacting to the molecular structure of the drug in question (both to establish its existence beyond reasonable doubt but also to avoid false positives).

Applying Figure 1 to emerging technologies or practices might seem artificial, because regulators still lack a capability for dealing with the disruptor in practice. However, by using Figure 1 we can identify which of the axes have been affected, and also what kinds of changes are likely to be adopted in the motivational postures of the regulatees. This distinction is extremely important because it leads on to a more informed and nuanced determination of the regulatory tools that can employed by the savvy regulator.

VI PART V: THE PROMISE OF NON-LAW MODALITIES AND THE DISRUPTION CALCULUS

We can now turn to consider how a criminal law regulator might choose appropriate tools when they are affected by disruption and look to propose the "disruption calculus" as a method of choosing a regulatory response. In considering the scope of regulatory responses, one of the fundamental observations I must make is that sole reliance on law to achieve any form of regulatory agility is doomed to fail. This is because law is simply too slow, too formal and too expensive to adapt to increasingly complex systems of regulatory control.[151] When considering disruption as either new technologies or practices facilitated by the development of new technologies, I suggest that law should never be the sole source of regulatory control. There is no doubt that the law is a powerful tool for circumscribing conduct – but it is not something that on its own can achieve regulation in a disrupted environment. Other sources of behavioural modification such consumer choice, market behaviour and the physical limitations of the regulated environment play a

[149] See for example Australian Criminal Intelligence Commission, *Illicit Drug Data Report 2016-17* (ACIC, Canberra, 5 July 2018), 103-105.
[150] Most recently, the *Poisons Standard October 2018* (Cth), SUSMP No. 22.
[151] Viktor Mayer-Schonberger, 'Demystifying Lessig' (2008) *Wisconsin Law Review* 713-746, 717.

major role in what behaviour is or is not condoned.[152] The regulatory scholar Lawrence Lessig himself came to a similar conclusion when he said that 'policymaking cannot function focused on legal code alone'.[153]

On this basis, Lessig argued his thesis of four modalities through which he envisioned regulation could be initiated and maintained: law, social norms, the market and architecture (even though his work centred on the digital world and the influence of code over the other three).[154] Lessig explains this using the example of automotive safety:

> The government may want citizens to wear seatbelts more often. It could pass a law to require the wearing of seatbelts (law regulating behavior directly). Or it could fund public education campaigns to create a stigma against those who do not wear seatbelts (law regulating social norms as a means to regulating behavior). Or it could subsidize insurance companies to offer reduced rates to seatbelt wearers (law regulating the market as a way of regulating behavior). Finally, the law could mandate automatic seatbelts, or ignition-locking systems (changing the code of the automobile as a means of regulating belting behavior).[155]

Some years later, Murray and Scott then extended Lessig's modalities, relabelling them hierarchy, community, competition and design.[156] Murray and Scott's work was more than just a work of changing nomenclature. They sought to embed Lessig's conceptual schema in the institutional "regime" popularised by Hood, Rothstein and Baldwin involving elements of information-gathering, assessment and sanctioning.[157] This proposal has some distinct merit, and is one I am keen to develop further. The modalities Lessig, Murray and Scott propose have some work to do in the disruption space, as they can affect movement on the axes of Figure 1 by shaping behaviour in a manner that is more reflexive and responsive than law alone.[158] Although presented through the lens of regulating the new media, Murray and Scott argue that a 'tendency to privilege one basis for regulation over others appears to us to be consistent neither with empirical observation nor with the normative considerations of institutional design for good regulation'.[159] Since these

[152] Joel Reidenber, 'Lex Informatica: The Formulation of Information Policy Rules Through Technology' (1998) 76 *Texas Law Review* 3, 553-593.
[153] Lawrence Lessig, 'Law Regulating Code Regulating Law' (2003) 35 *Loyola University Chicago Law Journal* 1, 1-14.
[154] Lawrence Lessig, 'The Law of the Horse: What Cyberlaw Might Teach' (1999) 113 *Harvard Law Review* 501, 507-514.
[155] Lessig, above n 137, 93-94.
[156] Andrew Murray, Colin Scott, 'Controlling the new media: Hybrid responses to new forms of power' (2002) 65 *The Modern Law Review* 4, 491-516.
[157] Hood, Rothstein & Baldwin, above n 11, 21-27.
[158] Daniel Gervais, 'The Regulation of Inchoate Technologies' (2010) 47 *Houston Law Review,* 665; Tim Wu, 'Agency Threats' (2011) 60 *Duke Law Journal* 1841.
[159] Murray and Scott, above n 156, 492.

statements were made, the regulatory literature has undertaken further exploration of ways in which hierarchy, community, competition and design can be utilised in criminal regulation.[160]

If we recall North's comments earlier in this article we remember that criminal law regulators predominantly engage with crime by limiting the rational choices and set the transactional costs for engaging in illicit activity.[161] I would argue that each of the regulatory modalities discussed by Murray and Scott fits neatly with this theory by restricting choice:

Hierarchy: this modality imposes control through traditional "top-down" regulatory strictures which do include law but also include non-State regulatory hierarchies as well as non-binding or quasi-legal instruments, i.e. Wu's description of "agency threats"[162] or Leene's discussion of the techno-regulation of child pornography sites.[163] Hierarchy restricts choice by imposing economic sanctions (whether in the form of fines, imprisonment, or some other kind of financial limit) on illicit behaviour that makes engaging in offending conduct more costly.

Competition: the modality of competition restricts choices through fluctuations in price, demand, or consumer sentiment. Competition restricts choice by making certain options more expensive than others by reference to an observable market. There is empirical evidence for this contention in crime control – where there are more firms competing for custom in a tight marketplace, they are less likely to resort to criminal or illicit methods to widen their profit margins.[164] It is also important to note that competition can occur as a modality between regulators, resulting in criminals migrating from one jurisdiction to another (especially where criminal law regulators in the receiving jurisdiction are considered more lax or lenient, i.e. their salience is lower).[165]

Community: this modality sets normative requirements by reference to both internal and external influences of a given community grouping, and so this modality restricts choice sets for offenders in an exogenous manner, i.e. by influencing parties with whom the offender chooses to deal, rather than the offender themselves. At a basic level, the concepts articulated in the smart regulation theory

[160] Nicola Lacey, above n 13; Roger Brownsword, 'Code, control, and choice: why East is East and West is West' (2005) 25 *Legal Studies* 1, 1-21; Ronald Leenes, 'Framing techno-regulation: An exploration of state and non-state regulation by technology' (2011) 5 *Legisprudence* 2, 143-169; Karen Yeung, 'Algorithmic regulation: A critical interrogation' (2018) 12 *Regulation & Governance* 4, 505-523.
[161] Douglass North, 'Institutions' (1991) 5 *Journal of Economic Perspectives* 1, 97.
[162] Wu, above n 158.
[163] Leenes, above n 160, 156-158.
[164] Florian Baumann, Tim Friehe, 'Competitive pressure and corporate crime' (2016) 16 *The BE Journal of Economic Analysis & Policy* 2, 647-687.
[165] Doron Teichman, 'The market for criminal justice: Federalism, crime control, and jurisdictional competition' (2004) 103 *Michigan Law Review*, 1831-1876.

fit neatly within the entire community methodology, by enabling and encouraging "club government" and imposing limits by reference to shaming, ostracizing or disapproving.[166] Bankruptcy gives an illustrative example. Whilst a declaration of bankruptcy is prima facie not an offence, the act itself carries with it a substantial history of stigma that can be traced back to Elizabethan concepts of debtors' prison.[167] There is also empirical evidence to demonstrate that despite some agencies unwillingness to engage in the practice, "regulatory shaming" has been a substantial tool in the arsenal of many criminal regulators (especially in the US).[168]

Design: the last modality seeks to interpose a physical barrier beyond which non-compliance cannot go, and is inclusive of both systems over which a regulatee has some influence or control (Lessig's architecture) as well as those they do not (Murray & Scott's design). Sparrow describes in his work how chicanes at US Customs truck inspection facilities achieved reductions in instance of running blockades that drug sniffer dogs, tyre spikes and armed officers could not.[169] Murray and Scott themselves describe a key element of many tax audits being an element of 'contrived randomness', used to 'reduce the scope of…[exploiting] a wholly predictable system of opportunities and pay-offs'.[170]

It is important to recognise that none of these modalities is designed to work in a vacuum. Murray and Scott make a critical point that supports this contention – that the strength of Lessig's (and therefore their own) work is not its focus on any one regulatory methodology, but instead in their conjoined deployment in the regulation of complex systems and promoting a system that captures the widest possible set of regulatory responses:

> The importance of Lessig's analysis is to draw attention to the variety of bases for control which can be deployed in the face of anxiety that technological change (such as the Internet) and economic change (such as globalisation) tends to make a variety of different forms of conduct unregulatable…Recent scholarship on the limits to control has emphasised the problems of trying to regulate social and economic activity. This work has emphasised the importance of developing regulatory regimes which seek to steer or stimulate activities within the target system indirectly as an alternative to external command and control. Lessig's work has the potential to support efforts to reconceive regulation in a sense that is both more modest in its claims and ambitions and more useful in providing mechanisms not only, or perhaps mainly, of direct control but also of

[166] Moran, above n 52, 7.
[167] Paul Ali, Lucina O'Brien, Ian Ramsay, '"Short a Few Quid": Bankruptcy Stigma in Contemporary Australia' (2015) 38 *University of New South Wales Law Journal* 4, 1575.
[168] Sharon Yadin, 'Regulatory Shaming' (2019) 49 *Environmental Law* 2, 1-52.
[169] Sparrow, above n 17, 158.
[170] Murray & Scott, above n 156, 508; citing Hood, Rothstein and Baldwin, above n 11, 211-214.

> indirect control. A key method of this new approach…is to identify effective regulation in whatever form it takes and to seek to support it, develop it or extend it by analogy to other domains in which there are problems of regulation… (footnotes omitted and emphasis added)[171]

The deployment of multiple regulatory options across the modalities is also important for several other reasons. Firstly, the imposition of a single control mechanism, i.e. amendments to law, is unlikely to yield sufficient attitudes to compliance because a proscriptive "thou shalt not"-style attempt of control can be sidestepped by simple amendments to offending behaviour (such as the case with synthetic drugs). Ekblom terms this concept "displacement", where 'criminals, blocked in their first choice of target, will try different methods of attack, seek similar target at other times and places, or change to another type of target altogether'.[172] Secondly, imposing a single control mechanism may also lead to Hosein's "cockroaching", where illicit activity by one regulatee is reduced only to be replaced by innumerable copycats. Thirdly, both Lessig's and Murray and Scott's approaches to regulation acknowledge that command-and-control style regulation is almost always insufficient because the net regulatory effect is always the 'sum of the regulatory effects of the four modalities together'.[173] Fourthly, borrowing from the precepts of cybernetics, the law of requisite variety requires that to control or regulate a given complex system experiencing turbulence (i.e. disruption), then any controlling or regulating body must be capable of producing 'as many different counteractions as there are significant ways in which variations in the environment can impact on the system'.[174] Fifthly, a more varied response offers more opportunities to stave off calcification of regulatory responses and eventual obsolescence, which is a certainty rather than a possibility in any regulatory system.[175] Sixthly, a more varied and nuanced regulatory response is of more utility against active adversaries, where the battle must be fought on multiple fronts.[176] Bringing all of these ideas together, I formulate the "disruption calculus", presented as Figure 2.

[171] Murray & Scott, above n 156, 501.
[172] Ekblom, above n 138, 258.
[173] Lessig, above n 154, 508.
[174] W. Ross Ashby, *Introduction to Cybernetics* (Chapman and Hall, London, 1956); W. Ross Ashby, 'Requisite variety and its implications for the control of complex systems' in George Klir (ed.), *Facets of systems science* (Springer, New York, 1991) 405-417.
[175] Ekblom, above n 138, 250.
[176] Paul Ekblom, 'Can We Make Crime Prevention Adaptive by Learning from Other Evolutionary Struggles?' (1999) *Studies on Crime and Crime Prevention* 8, 27-51.

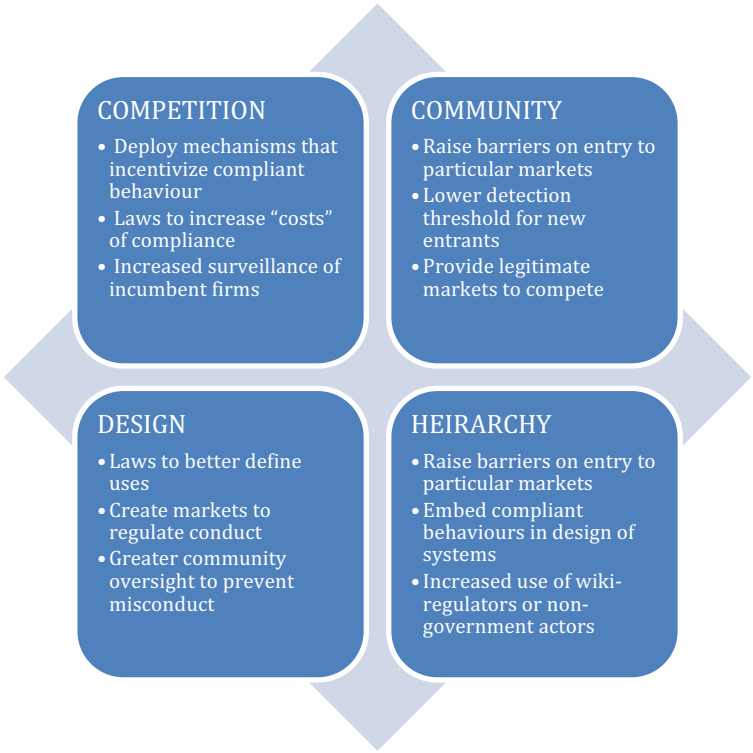

Figure 2: The Disruption Calculus

Only when used in an intelligent manner and in appropriate combinations (by reference to the regulated environment) will the relevant modalities be sufficient to shift entities back towards general compliance on Figure 1. I propose that it is this approach that must be engendered in the responses of our criminal law regulators when confronted by disruption. I consider this concept to require "innovation intelligence" and intend to develop this in further work. For that, I consider we need the works of social scholars such as Michel Foucault[177] and Gilles Deleuze,[178] who have much to offer regulators in terms of social models of regulatory control. I have dealt with these in depth elsewhere[179] but in summary, the archetypal criminal law regulator should:

Focus on the regulated population directly rather than focusing on the appearance or size of risk they pose – which may be correctly or incorrectly assessed, larger or smaller than it first appears, hidden or visible – they acknowledge that crime and criminal behaviour is always a valid (but not always rational) choice set for the regulated population;

Observe its regulated population but be capable of rapidly and accurately assessing, categorising, ranking and profiling its various constituents to more substantially detect non-compliance, even if such non-compliance is not ultimately targeted for correction;

Be willing to devolve power to the market and community, especially when supported by surveillance to achieve a distributed network of control; and

Undertake a shift in thinking so that systems of analysis are acting as systems of control by assessing, ranking and (where appropriate) determining the compliance tool for a given situation, seeking to prevent or interrupt a crime before it is committed.

Innovation intelligence also squarely confronts many of the criticisms Cert and Therier level against the precautionary principle. It not only permits, but encourages, a regulatory response including market regulation by reference to insurance and competition,[180] and addresses the dynamic nature of markets and the exploitative attitudes of regulatees.[181] Some of the regulatory responsibility can effectively be "delegated" to the marketplace to choose which firms succeed and which ones fail according to their compliance with not just law but also social

[177] Michel Foucault, *Discipline and punish: The birth of the prison*. (Harmondsworth, Penguin, 1977).
[178] Gilles Deleuze, 'Postscript on the Societies of Control' (1992) 59 *October,* 3-7.
[179] Adapted from Brendan Walker-Munro, above n 5.
[180] Therier, above n 89, 18.
[181] Steckbeck and Boettke, above n 95, 221.

expectations.[182] Examples of the deployment of "innovation intelligence" can also already be found in contemporary approaches to criminal regulation:

Use of private consumers as "wiki-regulators" that fill the gaps where traditional investigative and enforcement agencies do not or cannot tread, such as the regulation of the private security sector;[183]

The use of algorithms to identify and determine instances of non-compliance in tax administration by reference to the architecture or design of tax lodgments;[184]

Implementation of technological countermeasures in addition to law reform and market incentives to protect copyright designs in the realm of 3D printing.[185]

Disruption is a very real and very challenging concept for regulators, who increasingly appear to suffer from "regulatory disruption" and disconnection from their legal and policy objectives by the effects of new technology, systems and practices. As it is clear that regulating disruption is not only possible, but preferable, the question remains as how to best achieve the delicate balancing of permitting innovation to flourish and protecting public health, safety and the primacy of law.

VII CONCLUSION

This article proposes a contextual lens through which a regulator can view potential disruption to its legal and policy objectives and determine a new mix of control mechanisms to re-establish both its connection to those objectives as well as its legitimacy to society at large. By embracing "innovation intelligence" and deploying a suitably variable mix of hierarchical, community- and competition-based, and design solutions to disruption, criminal law regulators can continue to meet the requirements of contemporary society across a variety of challenging, volatile and fluctuating environments.

[182] Sandefur, above n 96; Spulber, above n 97.
[183] Julia Black, 'What is Regulatory Innovation?' in Julia Black, Martin Lodge, Mark Thatcher, *Regulatory Innovation* (Edward Elgar, Cheltenham, 2005); Peter Grabosky, 'Beyond *Responsive Regulation:* The expanding role of non-state actors in the regulatory process' (2012) *Regulation & Governance*, 1.
[184] Yeung, above n 160.
[185] Benoît Macq, Patrice Alface, Mireia Montanola. 'Applicability of watermarking for intellectual property rights protection in a 3D printing scenario' (Paper presented to the 20th International Conference on 3D Web Technology, Heraklion, 18-21 June 2015) 89-95.