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International Institutions and Information Technologies: Transformations for a Higher Order System

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Abstract

This contribution focuses on the interoperation of analogue and digital information technologies (and techniques associated with them), to ask how their interoperation has determined (and changed) what is made legible in practices associated with international institutions. It traces how the interoperation of digital and analogue technologies has supported the intensification of efficiency-maximizing institutional routines, now expressed in the so-called optimization function associated with neural networks and artificial intelligence. As a result, the terrain of contestation has shifted in significant ways from arguments over rules to pattern-recognition processes that determine efficient solutions according to optimal outcomes. Institutional practice on this new terrain aspires to a sort of immediacy, a direct engagement in the becoming of the thing(s) to which the institutional mandate may apply. This immediacy defies the reflective character associated with traditional legal practice, and assumes power by defining problems and engendering governance issues in the very act of addressing them.

Keywords

institutions – practice – information – cybernetics – analogue – digital – rule of law

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1 Introduction

For my contribution to this special issue on transformations in international legal practice associated with AI-supported decision-making, I focus on the interoperation of analogue and digital information technologies (and techniques associated with them). I ask how, over time, their interoperation has determined (and changed) what is made legible in practices associated with international institutions. I suggest that the contemporary legal stakes of this inquiry have to do with a peculiar temporal condition, characterized by immediacy and simultaneity, whereby institutional practices define problems and engender governance issues in the very act of addressing them. I will explain this condition and make the argument that the interoperation of digital and analogue technologies has supported the intensification of efficiency-maximizing institutional routines, now expressed in the so-called optimization function associated with neural networks and artificial intelligence. As a result, the terrain of contestation has shifted in significant ways from arguments over rules to pattern-recognition processes that determine efficient solutions according to optimal outcomes.

The value of efficiency is of a piece with the rational governance style that has defined modern institutional practice.[1] But its valorisation by means of the optimization function in socio-technical systems today exhibits a fundamental change: reflexive legal-institutional practices, which rely on causal interventions (e.g., 'alter condition x to change outcome y'), give way to reactive mechanisms, which rely on a constant management of emergent effects (e.g., 'if outcome y happens, then react with adaptation z').[2] The same change can be described in another register. Institutions under international law have consistently exhibited a distinctly pragmatic streak,[3] one sometimes taken to be in conflict with classical or classically positivist legal institutions.[4] But the nature of pragmatic intervention is changing, becoming less goal oriented and more adaptive, designed to exploit emergent possibilities.[5] AI-supported

1 J. Scott, *Seeing Like a State* (Yale University Press, 2008).
2 F. Johns, 'From planning to prototypes: New ways of seeing like a state', 82 *The Modern Law Review* (2019) p. 833; G. Noll, 'War by Algorithm: The End of Law?', in M Liljefors, G Noll, and D Steuer (eds.), *War and Algorithm* (Rowman & Littlefied, 2019); D. Chandler, *Ontopolitics in the Anthropocene: An introduction to mapping, sensing and hacking* (Routledge, 2018).
3 D. Kennedy, 'The Move to Institutions', 8 *Cardozo Law Review* (1987) p. 841.
4 G. Fiti Sinclair, *To reform the world: International organizations and the making of modern states* (Oxford University Press, 2017).
5 D. van den Meerssche and G. Gordon, '"A new normative architecture" – risk and resilience as routines of un-governance', 11 *Transnational Legal Theory* (2020) p. 267. For a different take on transformations, see: J. Klabbers, 'The EJIL foreword: the transformation of international organizations law', 26 *European Journal of International Law* (2015) p. 9.

decision-making technologies today support direct intervention based on pattern recognition processes, which entail engagement via feedback loops and responsive techniques. And here, in the (subsymbolic) AI system that includes feedback loops, we have a model of the meeting point of digital and analogue technologies. The digital dimension of AI computational programs is probably clear enough; the analogue pertains to the feedback loops, designed like pathways to constitute continuous things. Feedback loops will feature below, from section 3 onwards, as parts of cybernetic systems, which are analogue insofar as they comprise circuits for the recursive and reiterative transmission and exploitation of information on a continuous basis.

The institutional outcome of the operation of AI-supported decision-making technologies today includes transient courses of action determined by continuous and constantly changing flows of information.[6] Whereas historical interventions under international law would match fixed legal mandates to stable working models and observe the result, the emerging practice is marked by an embrace of flux (in contrast to past efforts to minimize it).[7] Further, the adaptive posture of the emerging practice allows diminished room for traditional evaluative distance used to determine whether a legal model has achieved institutional aims.[8] In this vein, Marianne Constable has lately diagnosed relevant legal-institutional changes following from what she calls systems thinking, going so far as to suggest that 'the conjunction of legal theory and legal practice found in the systems-thinking of all manner of institutions may "warrant the label of the legal contemporary"'.[9] The systems thinking that Constable refers to derives from innovations in the name of systems analysis, which I will describe in section 4, below. Systems thinking is a product of information theory developed in the register of management. Constable characterizes systems thinking as concerning 'not only the internal arrangements of institutions but also the very manner in which frontline workers interact – or interface – with clients, constituencies, or users… incorporating the latter into yet higher-order information systems.'[10] The effect of higher order information

6 G. Gordon and D. van den Meerssche, 'The contemporary values of operadiction regimes', in I. Feichtner and G. Gordon (eds.), *Law and the Global Constitution of Value: Ecology, Governance and Political Economy* (Routledge, forthcoming 2023).

7 Cf, D. Desai and A. Lang, 'Introduction: global ungovernance', 11 *Transnational Legal* Theory (2020) p. 219; K. Knorr Cetina and A. Preda, 'The temporalization of financial markets: From network to flow', 24 *Theory, Culture & Society* (2007) p. 116.

8 Noll, *supra* n. 2.

9 M. Constable, 'Law and Language as Information Systems: Perish the Thought!', in J. Desautels-Stein and C. Tomlins (eds.), *Searching for contemporary legal thought* (Cambridge University Press, 2017) p. 155.

10 Ibid., p. 164.

flows on traditional models of legal-institutional authority plays a role in my analysis here.

With Constable, I observe a 'twenty-first century transformation of law into system and information', in which 'knowledge and law become matters of circulating information or communications'.[11] Constable speaks of the consequences of the ascension of systems thinking in terms of a 'loss of thought that paradoxically accompanies the systems-thinking of contemporary law and legal institutions'.[12] It is neither the purpose nor within the scope of this article to substantiate that claim. But the counterpart to Constable's concern with the loss of thought is an emergent pretension in the discourse to grasp 'the real', and to do so with immediacy. By an emergent pretension to grasp 'the real' with immediacy, I mean institutional aspirations to participate directly and on an ongoing basis in the becoming of reality, neither in a classical proscriptive sense (e.g., rule x requires not-y be the case) nor in a classically prescriptive sense (e.g., rule x requires y be the case), but as part of an iterative process of becoming (e.g., if y is the case then implement z to produce new condition yz and run again). Understanding the effects of AI supported decision-making and information flow in this sense problematizes recent calls to revitalize rule of law checks on technical systems in governance applications.

Below, I limit the scope of the inquiry here by focusing specifically on technologies central to the contemporary development of AI-supported decision making, namely algorithmic decision systems and the information flows they comprise. An algorithmic decision system might mean any stepwise decision-making process, though in current debates references to algorithmic decision systems typically mean digital computational systems featuring some form of machine learning or artificial intelligence.[13] I will not, however, limit the analysis of algorithmic decision making here by focusing on contemporary computing technologies only. Rather, I will include interrelated developments from the 20th century onwards in computational techniques, information management routines, and contemporary computing technologies. To substantiate that scope, I will sketch a little history that describes how digital computers and the information sciences associated with them became near-universal problem-solving tools, with institutional implications that continue to evolve with changing material conditions of compute power and information flow.

11 Ibid., pp. 155, 156.

12 Ibid., p. 155.

13 D. Restrepo-Amariles, 'Algorithmic decision systems: automation and machine learning in the public administration', in W. Barfield (ed.), *The Cambridge Handbook of the Law of Algorithms* (Cambridge University Press, 2020) p. 273.

I set the stage in two parts, before turning to international legal institutions themselves. I begin in section 2 with a brief historical encapsulation of information flow technologies, principally by reference to the flow chart as detailed by Markus Krajewski. Then, in section 3, I turn to a contemporary debate over the 20th century genealogy of (information) management routines, and their significance for public institutions. In section 4, I present snapshots of management techniques as they intervene in legal practices at international institutions today. Section 5 further analyses the lessening distinction between information technologies and law, with attention to conditions arising out of the combination of digital and analogue technologies. Section 6 concludes.

2 Historical Encapsulation

Markus Krajewski's small study of flow charts offers a brief history of information flow technologies and establishes useful context. Flow charts allow a schematic abstraction of bodies and things in motion, adding the element of (change over) time to depictions of situation. Krajewski identifies the reception of flow charts over time with a progression that begins with the railroads, moves on to include "companies working in the fields at the heart of the so-called Second Industrial Revolution, like electricity and petroleum", then is entangled with communications and computer interests, while being popularized by closely-related figures in the emerging field of management.[14] In this history, a practice that begins with a rendering of the movement of people develops to encompass the flow of materials and energy like oil and electricity, ultimately extending to the flow of information itself, with the military a constant presence in the background.[15]

Across these several groups of interests, the information technology of the flow chart is entangled with several programs. Parties like IBM in the commercial space and the military in the public deploy the flow chart for twinned development of information technologies and management practices (whether for private business or public logistics). The military entangles the flow chart with management practices that were accelerated by ambitions to improve logistical operations, as analysed by Deborah Cowen and others.[16] IBM implicates similar management practices, but from the side of communications

14 Ibid., p. 20.

15 M. Krajewski, 'The Structure of (Information) Infrastructure: Origins, History, and Theory of the Flow Chart', Seminar für Medienwissenschaft, Universität Basel (2020) pp. 20, 24.

16 D. Cowen, *The deadly life of logistics: Mapping violence in global trade* (University of Minnesota Press, 2014).

and private enterprise, arising out of its early 20th century roots in tabulation and computation technologies.[17] These latter technologies point to another, related program with which the flow chart is entangled, namely information theory underlying contemporary computing technologies. Referring to Claude Shannon, the founding figure of information theory, Krajewski writes, "Shannon's visualization of communication in his signal-flow graphs might be seen as the paradigmatic form of representing different stages of the flow of information".[18] On this basis, Krajewski draws a line from flow charts to algorithms, and describes the work they do in common:

> Designing flow charts has always been based in algorithmic thinking, because every step within a process has to be identified and placed in relation to its neighbors and competitors.
> The flow chart is a technology used for controlling movements, processes and organizations, developing logistics, and pursuing strategic aims. In a flow chart, the mobile elements always move to certain destinations, and thus have to be known in advance.[19]

The algorithmic character links the flow chart to computer programming in specific applications as well: "the graphic presentation of algorithms [rendered as flow chart] was turned into the contemporary system for modelling software processes, the United Modeling Language or UML".[20] Thus, Krajewski establishes a connection of the flow chart to information management in computing ecologies:

> The UML (and other computer languages) can be directly linked to the graphical language of scientific management. However, the connection is very abstract, since the so-called »activity diagrams« used in programming languages like the Object Modeling Technique (OMT), Unified Modeling Language (UML), and the Nassi Shneiderman diagrams all give the graphical representation and formalization of best management processes an algorithmic structure.[21]

The reference to 'best management processes' points up a consistent attribute of the flow chart that links its historically distinct uses over time, namely a

17 G. Gordon, 'Engaging an infrastructure of time production with international law', 9 *London Review of International Law* (2021) p. 319.
18 Krajewski, *supra* n. 13, p. 24.
19 Ibid., p. 26.
20 Ibid., p. 24.
21 Ibid., p. 26.

capacity to help minimize loss, whether to minimize the loss of steam heat in an engine (for Matthew Riall Sankey at the end of the 19th century) or the loss of information over communications lines (for Claude Shannon in the middle of the 20th).[22] Accordingly, Krajewski defines the flow chart as "a medium of efficiency" that works by "abstracting and thus simplifying processes".[23] In this light, another term that characterizes the value of the flow chart is 'optimization'.[24] And here is a link with the operation of the subsymbolic architecture that powers most AI applications today: their output is determined by a command for optimization, a command that drives the technology to work better while bracketing the definition of what it is working for.[25]

The optimization mandate, observed through the historical agency of the flow chart, is a clear function of the ability to channel a movement of information, without regard to its substance or semantic content. It optimizes information flow qua information flow, according to privileged patterns discernible in the flow itself. What begins with flow charts winds up, following Krajewski, with applications of compute power "to develop and control the flow of information, the objects modeled in software, coding patterns and data structures within an algorithm".[26] The efficacy of information, by this genealogy, is bound up with its specific propensities to be channelled efficiently in patterned distributions. This propensity connects up with Constable's concern that systems thinking supports processes and suppresses thought, which for the purposes of this inquiry underscores the ambition to intervene in 'the real' in an immediate and ongoing way, to which I return in institutional context in section 4.

3 Debating Management

Having established historical context for a particular reading of information and information technology, I now offer a brief overview of a debate over information management practices, including their roots and valence as a mode of governance.[27] On one side is a view of managerialism as "the first neoliberal

22 Ibid., pp. 21, 24.
23 Ibid., p. 21.
24 Ibid., pp. 22–24.
25 Cf, van den Meerssche and Gordon, *supra* n. 5, pp. 267–299; P. Agre, 'Towards a Critical Technical Practice: Lessons Learned in Trying to Reform AI', in G. Bowker et al. (eds.), *Social Science, Technical Systems, and Cooperative Work: Beyond the Great Divide* (Psychology Press, 1997), p. 131.
26 Krajewski, *supra* n. 13, p. 26.
27 This is neither an exhaustive engagement in this debate, nor does this debate cover all possible readings of information management practices and their histories.

science".[28] On the other side is a distinct lineage for managerialism as a phenomenon that must be understood on its own.[29] The debate is somewhat internecine in nature, with both sides acknowledging entanglements of managerial innovations with neoliberal institutions. Those, like Gerard Hanlon, who view managerialism as a creature and creation of neoliberal governmentality, do so on the basis of specific characteristics valorised by managerialism, and a historical connection of early managerial innovations with industrial capitalist enterprise. Hanlon's view is instantiated by the figure of Fred Taylor and the pretension to managerial rigor known as Taylorism, also known as scientific managerialism. Taylor launched his program in the steel plants that dominated the industrial landscape of the US at the turn of the 19th into the 20th century, and it spread globally across factories and firms through the first half of the 20th century. Taylorism promoted an overriding aim of efficiency keyed to production for competitive markets. It did so by celebrating empirical analysis of production processes, and established the manager as the workplace figure able to analyse the production floor for maximally efficient output.[30]

Hanlon also points to the figure of Elton Mayo, who followed Taylor and deepened the intervention of the market in the figure of the manager. Mayo couched his intervention in societal terms, celebrating a cooperative culture but rejecting socialized institutions. To achieve the former without the latter, Mayo emphasized the role of the manager to ensure workplace adaptability to exigencies of the market, which would ensure a sort of social cooperation in lieu of socialized institutions.[31] It is a short trip from Mayo's market-organized cooperation to Hayek's notion of spontaneous order determined by the market, which functions in Hayek's vision as a vast information processor – but, in Mayo's vision, with the manager as its instrument.[32] On this basis, Hanlon and others identify the ascendance of managerial practices throughout the 20th century as a component part of neoliberal programs that have worked to install and sustain the market as the matrix of socio-political organization.[33]

Against this identity, however, Samuel Knafo and others have pointed to other factors in the rise of managerial practices, historical factors that do not

28 G. Hanlon, 'The first neo-liberal science: Management and neo-liberalism', 52 *Sociology* (2018) p. 298.
29 S. Knafo et al., 'The managerial lineages of neoliberalism', 24 *New Political Economy* (2019) p. 235.
30 Hanlon, supra n. 29, p. 305.
31 *Ibid.*, pp. 306–07.
32 F. Hayek, 'The Use of Knowledge in Society', 35 *American Economic Review* (1945).
33 Hanlon, *supra* n. 29, pp. 306–08.

line up perfectly with neoliberal programs.[34] They trace the history of managerialism to the programs of operations research and systems theory developed during and after World War Two within the United States military and its adjunct think tank, the RAND Corporation.[35] Their work displaces the history of managerialism from its roots in industrial capitalism and market-based competition, to the command-and-control institutions and exigencies of the US military and its logistics. Following this account, the development of managerialism has at least as much to do with the development of information technologies as with the ascendance of neoliberal ideological programs. As Mirowski has demonstrated, however, information technologies – material and conceptual – have been harnessed over time to neoliberal economic programs, and both information technologies and neoliberal programs speak languages of emergent and spontaneous order enabled by systems designed to process information efficiently.[36] Observing the distinct contributions of information theory and technology to contemporary management practices does not necessarily conflict with these observations.

The figures in this other story of managerialism come from academia and applied engineering backgrounds in pioneering technologies, such as telephone networks and contemporary computers. They were brought together under the auspices of the US war effort during World War II by Vannevar Bush, former engineering professor and dean at MIT turned government administrator, and Warren Weaver, mathematics professor. The preoccupations of this community came not directly from markets or production processes, but from computational theory and the possibility of using circuits and machines to solve complex problems with computational techniques, especially problems associated with the war effort during World War II.[37] Bush ran the US Office of Scientific Research and Development (OSRD), which succeeded the National Defense Research Committee and served as predecessor for the Defense Advanced Research Projects Agency, incubator of the internet, among other things. Warren was his closest assistant. The OSRD employed figures like Claude Shannon, considered the founder of information theory, who spent

34 Knafo et al., *supra* n. 30.

35 *Ibid*. Deborah Cowen has also done substantial work identifying the development of managerial practices with innovations in military logistics from the second world war forward. Cowen, *supra* n. 16.

36 P. Mirowksi, *Machine Dreams* (Cambridge University Press, 2002); E. Nik-Khah and P. Mirowski, 'The Ghosts of Hayek in Orthodox Microeconomics: Markets as Information Processors', in *Markets* (University of Minnesota Press 2019) pp. 31–70.

37 Mirowski, *supra* n. 37, pp. 170–180.

the bulk of his career at Bell Labs, working for the communications giant.[38] Shannon worked primarily on matters of encryption at the OSRD, a use case for finding patterns among complex distributions of signals, and a training ground for Shannon's work in computational code. Shannon, Weaver and Bush also enjoyed close contacts with Norbert Wiener and John von Neumann, innovators in communications networks and computating technologies, who were each drawn into the war effort during World War II. Wiener's research into antiaircraft weaponry during World War II led directly to the theory for which he remains known, namely, cybernetics. John von Neumann, the physicist and polymath, was involved in the Manhattan Project and closely integrated with the scientific community marshalled for the US war effort.[39]

Their collective work, conditioned by the demands of the allied war making machine, reflected several anchor points. One anchor point was an appreciation of information as a fundamental, material object, which Shannon came to define as a bit, the (seemingly) irreducible unit of binary choice capable of being stored, moved and manipulated electronically. Another anchor point was a common interest in the electronic transmission of information across reticulated circuits, which for Shannon began with work on rapidly expanding telephone networks. For Wiener, working independently of Shannon, this interest took the form of neural networks, and other architectures featuring feedback loops capable of identifying patterns in information distributions across a network. For von Neumann, who became involved in the build of the famous ENIAC computer for the US army, this interest took the form of computer architecture. The three were foundational figures at the influential Macy gatherings, where innovative combinations of digital (e.g., bits and switches) and analogue (e.g., neural networks and feedback loops) technologies were explored.[40] I return to these material combinations in section 5; for now, the ability to derive actionable information by finding patterns in complex and changing distributions of signals was key.

A third anchor point was a conviction that the utility of information technologies inhered in an optimization function, as a technique for optimizing solutions to practical problems by means of abstract computational processes.[41]

38 The text commonly considered the founding document of information theory contained two essays: a foundational elaboration by Shannon, accompanied by an explanatory introduction by Weaver. C. Shannon and W. Weaver, *The Mathematical Theory of Communication* (EUA: University of Illinois Press, 1949).

39 Mirowski, *supra* n. 37 (2002).

40 B. Siegert, 'Coding as Cultural Technique: On the Emergence of the Digital from Writing AC', *Grey Room* (2018) pp. 6–23.

41 J. Gleick, *The Information: A history, a theory, a flood* (Vintage, 2011) pp. 190–249.

In the military context of the original work, this was the utility of rationalized logistics, promising more efficient deployment of limited resources. The optimization function, however, would not strictly be an ability to achieve one optimal solution to a given problem; rather, enhanced utility lay in the ability to reformulate problems on an ongoing basis, exploiting recursive and reiterative possibilities for information flow. In the language of cybernetics, this was the higher order character of properly-channelled information flows at work, and included the ability to redefine the problem to be solved in the recursive process to optimize its solution. Thus, on the basis of the looping architecture of the technologies to which these figures contributed, the utility of information flow extended to an ability to redefine the problems which optimization would address in the first place.

The work of the OSRD to optimize defence systems with information technologies came within the orbit of the new RAND Corporation. The RAND Corporation was established in the mid-20th century to exploit the unprecedented incorporation of scientific expertise into the US military machine during World War II.[42] RAND combined military and economic interests to develop, among other things, on the scientific methods associated with Operations Research for the US military. The RAND Corporation, staffed with a new breed of economists, but guided in its early years by figures like Weaver and von Neumann, converted OSRD innovations in Operations Research into what is now known as systems analysis.[43] Mirowski describes how RAND became “the incubator for cyborgs inclined to venture out into the worlds of management, the military, and the social sciences. Systems analysis, artificial intelligence, and the discipline of software engineering all enjoyed their first stirrings there”.[44] This hybrid effort became, among other things, the basis for a dramatic change in the curriculum in business schools across the United States, beginning with the Graduate School of Industrial Administration at Carnegie Mellon, and propagated from there into the new management paradigms observed in private enterprise and public institutions today.[45] With this historical propagation in mind, Mirowski, Knafo and others help to specify the distinct governmental valence of this managerial technology and the networks that have enabled it. For instance, when Russel Travers, of the US National Counterterrorism Center, explains that: “If we’re going to get the intelligence

42 Knafo et al., *supra* n. 30, p. 242.
43 Mirowski, *supra* n. 37, pp. 209–12.
44 *Ibid*., 208.
45 Knafo et al., *supra* n. 30, p. 246.

right, we need to get the electrons right",[46] it may seem a far cry from Hayekian market-based techniques, but of a piece with the material information technologies that emerge together with the innovations in institutional managerialism linked to figures like Bush, Weaver, Shannon, von Neumann and Wiener.

4 Management Routines in International Institutions

Against the prior sections' backdrop of developments and debates in information management, keyed to socio-technical dynamics of information flow, I turn now to the impact of these developments on institutional practices in international law. As Michael Riegner has argued, "international institutions are not only negotiation fora, lawmakers or financiers. They also act and govern through information."[47] With reference to institutions like the World Bank and OECD, Riegner posits that "governance of information translates into governance by information: the way information is collected, processed and distributed shapes perceptions and preferences, generates behavioral incentives, influences public policy and opinion, and (re-)enforces or undermines legal norms."[48] Riegner's work has contributed to the appreciation for the work done by indicators as informational tools in international legal practice.[49] Lately, he points to a further transformation: "As more sophisticated digital technologies become available as tools of global data governance, international institutions also need to recalibrate their instruments, roles and functions. They will exercise less public authority through indicators towards member states, and rather engage in more finely-grained global governance of, and by, data …"[50]

In increasing numbers of settings, institutions of international law no longer merely rely *on* simple information flows, in form of things like memoranda, reports, and indicators to inform themselves about the world to which their legal-governance practices apply. They intervene directly, *in* and *with* information flows, whether with new managerial routines or in form of things like dashboards and pattern recognition processes.[51] Here I draw on the transitive

46 R. Travers, 'Counterterrorism in an Era of Competing Priorities', talk given on 8 November 2019 at the Washington Institute for Near East Policy. I found this document through the work of Gavin Sullivan.

47 M. Riegner, 'Towards an International Institutional Law of Information', 12 *International Organizations Law Review* 12 (2015) p. 51.

48 *Ibid.*

49 M. Riegner, 'Legal frameworks and general principles for indicators in sovereign debt restructuring', 41 *The Yale Journal of International Law* (2016): 141–176.

50 M. Riegner, 'The End of Indicators', *Völkerrechtsblog* (2021).

51 Gordon and van den Meerssche, *supra* n. 6.

and intransitive possibilities of 'informing', connoting passive and active relations vis-à-vis information, as spotlighted by Hildebrandt, Noll, and others:[52] in the settings that apply here – think for instance of security lists that effect asset freezes, lists that are populated on the basis of constant flows of digital information, and which are actuated by further intervening in other systems of digital information, as demonstrated by Gavin Sullivan[53] – the institutional practices of international law are conducted with and through a world constituted by information, rather than on and for a differently-constituted world that legal institutions are informed about.

This ontological shift has clear ramifications. At the World Bank, increasing investment in technologies to enhance information flows, and reliance on information management techniques to exploit those flows, have worked to break down institutional guardrails that previously separated legal practice from political activities. Drawing on Dimitri van den Meerssche's pathbreaking study of legal practice at the World Bank,[54] he and I have described the embrace of risk management routines adopted from information management, and the transformative effect these new techniques have had, observing

> salient changes in the practice of lawyering and the processes of internal legal evaluation in the World Bank, where the deformalised technology of risk-management replaced traditional legal hermeneutics, conceived as constraints or prohibitions. These changes … are centred around the shift from 'rules to principles' and from 'risk avoidance to risk management' as the new paradigm for legal interpretation. This 'new normative architecture' also aimed to cultivate a particular prototype of the institutional lawyer: a pragmatic, managerial type who has traded the binary and prohibitive logic of (il)legality for a calculative and adaptive multiplicity of novel techniques to manage contingency and unknowability.[55]

These fundamental changes were part of a suite of policy initiatives to remake the institution under General Counsel Leroy. These changes in legal practice at the World Bank consistently exhibited iterative and recursive routines that correspond with the information and management theory traced in section

52 M. Hildebrandt, 'Law as Information in the Era of Data-Driven Agency', 79 *The Modern Law Review* (2016) p. 1; Noll, *supra* n. 2, p. 78.

53 G. Sullivan, *The Law of the List: UN counterterrorism sanctions and the politics of global security law* (Cambridge University Press, 2020).

54 D. van den Meerssche, *The World Bank's Lawyers: The Life of International Law as Institutional Practice* (Oxford University Press, 2022).

55 Van den Meerssche and Gordon, *supra* n. 5, p. 273.

3, identified with cybernetic systems for information flow.[56] Furthermore, the cybernetic character of the new policy was supported by actual investment in information technologies, and the development of a robust information infrastructure designed to exploit Big Data analytics, including technologies associated with algorithmic decision-making. As we noted:

> the governance strategy [of the World Bank] required new 'diagnostic tools' to 'improve the assessment of country systems' as elements of a 'national capacity building strategy'. The legal vice presidency's companion piece … urges that '[s]trong diagnostics should inform the design of interventions by providing data on the actual functions of the justice system, the political economy of reform and its risks, and the way potential reforms might translate into progress towards justice'. Both operational documents, therefore, articulate calls to expand the World Bank's data-gathering infrastructure and diagnostic capacities. Importantly, this new infrastructure for data analytics was not only needed within the World Bank but also within these 'local' sites themselves. Consequently, the reform 'process', the companion piece states, supports the 'national capacity for data collection' considered necessary for 'cross-country learning and collaboration'.… This enormous flow of data is not (or at least not exclusively) processed through pre-existing schemes of interpretation and policy action, however, but also produces new forms of policy design, learning and implementation. The very point of these interventions often emerges only in dialogue with data analytics (a point no longer expressed in terms of 'right institutions' but emanating from the 'needs of end users').[57]

Elsewhere, Isobel Roele has pointed up the ascension and acceleration over time of management routines across diverse practice areas at the UN, focusing on recent counterterrorism initiatives. She highlights prominent managerial techniques like performance reviews, the effect of which "is to perpetuate and disseminate managerial technologies of strategic planning".[58] The overall product of managerial adaptation is "a cooperative ensemble, [in which] codes of technical standards appear to be close kin to intergovernmental conventions, stakeholder consultations resemble deliberative democracy, and

56 *Ibid.*, *passim*.
57 *Ibid.*, 291.
58 I. Roele, *Articulating Security: The United Nations and its Infra-Law* (Cambridge University Press, 2022) p. 25.

it is difficult to tell the juridical from the managerial".[59] The developments that Roele observes have only accelerated with the appointment of Secretary General António Guterres:

> The UN system's adoption of results-based management makes for, in theory, "decision-making closer to the point of delivery, simplifying rules, policies and procedures and decentralizing authority to enhance the effectiveness of efforts". Secretary-General António Guterres intensified his predecessor, Kofi Annan's efforts in this respect, and he was elected in 2016 on a platform of "shifting the management paradigm in the United Nations".[60]

Within the UN constellation, Fleur Johns has homed in on some of the most recent manifestations of the ongoing incorporation of management practices for legal-institutional purposes. She has examined ramifications of contemporary digital information technologies in institutions like the UN's Global Pulse initiative, where mobilizations of data and data technologies are altering established routines in international law, and doing so by design.[61] Global Pulse was established at the UN with the express intention to take advantage of Big Data and Artificial Intelligence technologies.[62] Johns has observed how the adoption of these technologies and data-driven governance techniques enables an efficacious mode of management that is not anchored in classical legal or policy mandates: "governance by data denotes … the propensity for the gathering, assemblage, formatting, analysis, transmission, and storage of digital data to have governance effects without determinative regard to the policies and intentions of those charged with data management."[63] Deval Desai and Andrew Lang have recently revisited Johns' work on Global Pulse.[64] Rather than describe a move from one mode of governance to another, they look at Global Pulse's practice in Jakarta as arising out of elements of both, planning-style and prototype-driven governance techniques.[65] What they observe

59 *Ibid.*, p. 2.
60 *Ibid.*, p. 88.
61 Johns, *supra* n. 2.
62 https://www.unglobalpulse.org/.
63 F. Johns, 'Governance by Data', 17 *Annual Review of Law and Social Science* (2021) p. 4.3.
64 D. Desai and A Lang, 'From mock-up to module: Development practice between planning and prototype', *Law & Critique* (2022).
65 *Ibid.*

remains within the management register: a privilege for modular design principles, supporting flexible interoperability for governance purposes.[66]

Where Desai and Lang emphasize the way in which contemporary practices arise out of the intersection of planning and prototypes, Johns emphasizes a symbiotic relationship between data-driven governance and contemporary business management techniques. In this light, she describes an institutional shift to lean startup-style governance initiatives.[67] The lean startup program was popularized in the 2010s by Eric Ries, among others, adapting the lean management style developed in the 1970s by Toyota, which stressed robust communications and flexible production routines.[68] Ries's startup-oriented program stresses reiterative outputs and recursive learning models, with the aim of identifying optimizable patterns, and has gained popularity as a favoured management style for technology sector startups.[69] The application of these contemporary business management techniques to governance institutions extends the historical dynamics sketched in section 3, and underscores that recombinant pattern recognition possibilities are driving iterative and inductive governance applications.[70] These new managerial techniques appear to lower barriers for governmental intervention: "No longer are comprehensive evaluations, fully developed costings, sophisticated models, or far-reaching forecasts regarded as preconditions for action."[71] In light of this immediacy, the governmental approach that Johns describes "focuses, thus, on technical optimization towards a more frictionless existence".[72] Optimization is one of the key features of information technologies identified in sections 2 and 3. It also foregrounds what, in Johns' words, "many international institutions seek", namely, "to sate appetite for contact with the Real".[73]

5 Information Technology and/as Law

To further situate information technologies and techniques in contemporary socio-technical governance systems, I turn now to Karen Yeung's analysis of algorithmic regulation. Yeung offers a taxonomy of algorithmic regulation, and

66 *Ibid.*
67 Johns, *supra* n. 2, p. 854ff.
68 E. Ries, *The Lean Startup* (Currency, 2011).
69 *Ibid.*
70 Johns, *supra* n. 2, p. 853.
71 *Ibid*, p. 851.
72 *Ibid*, p. 853.
73 *Ibid*, p. 850.

highlights twinned antecedents for algorithmic regulation in cybernetics and in (innovations to) regulatory governance systems. The meeting point between them is captured in her definition of algorithmic regulation, where risk management meets systems operations to regulate a domain of activity:

> I refer to algorithmic regulation as decisionmaking systems that regulate a domain of activity in order to manage risk or alter behavior through continual computational generation of knowledge from data emitted and directly collected (in real time on a continuous basis) from numerous dynamic components pertaining to the regulated environment in order to identify and, if necessary, automatically refine (or prompt refinement of) the system's operations to attain a prespecified goal.[74]

Yeung's taxonomy is part of a critique of algorithmic regulation designed to make apparent the conflict between algorithmic regulation and fundamental tenets of liberal democracy, especially due process and the rule of law. Thus:

> My examination has highlighted some of the deeper legal, social, democratic, and moral implications for both individuals and societies of the algorithmic turn, demonstrating that there is much more at stake than informational privacy, including core legal and constitutional principles that are ultimately rooted in the liberal commitment to treat individuals with fairness and dignity and which, in liberal democratic societies, include principles of transparency and accountability, due process, and the rule of law.[75]

Yeung makes clear that algorithmic regulation derives from an embrace of cybernetic processes, as part of a "move away from a linear understanding of cause and effect", and describes the product as outcome-based regulation.[76] When Shannon and Wiener devised their respective networks, the solution space was not defined by a simple or linear cause and effect relationship, but by multiple interactions in complex relationships – which has become a template for legal-institutional practices in complex social environments. In this context, institutional practice is not determined by conformance to preset objectives, but by the optimal or suboptimal designation of emergent

74 K. Yeung, 'Algorithmic regulation: a critical interrogation', 12 *Regulation & Governance* (2018) p. 507.
75 *Ibid*., p. 519.
76 *Ibid*., 507, 510.

outcomes, relative to a flexible and overarching ambition. Yeung describes the way algorithmic regulation works as follows:

> complex forms of algorithmic regulation that are configured to optimize a fixed (but reprogrammable) overarching system goal while allowing variable adaptation of behavioral standards within the system by utilizing machine learning techniques that operate on large multiple sources of data collected from ubiquitous digital sensors that continuously track behavior, offer a genuinely novel form of design-based control.[77]

Two key terms here are optimization and design. The former has come up repeatedly already; the latter refers to the algorithmic capacity to execute normative code directly, as in regulation by design, rather than via the intermediation of any reflective process. Regulation by design, and the faith in what Yeung calls 'data-ism' (adopting the term from Yuval Harari), which supports regulation by design, obscures the normative and ideological commitments from which the regulatory mandate proceeds in the first place.[78] The terms of optimization and design both put Yeung's observations in line with Krajewski's analysis of the flow chart. In both cases, information flow is marshalled to make another apparatus more efficient, and does so principally by intervening as a higher order control on the form of that flow.

In a somewhat different register, Mireille Hildebrandt has also acknowledged the close proximity of computer science and legal practice, and has attempted at once to address both computer scientists and lawyers by theorizing law as information. Her take on law as information borrows from STS and ANT orientations, and specifically relies on the analytic of affordances.[79] First, however, information is organized around a basic division, touched on above, between an active, transitive dimension of the verb *inform* – in which the action of informing does work on an object, for instance in the way a past experience is said to colour a current understanding (e.g., 'the past informs the present') – and an intransitive dimension, in which to inform is simply to have delivered information. The analytic of affordance is organized around the transitive construction, which indicates work done on an object, or the constitutive work that technologies do with respect to social relations. The transitive dimension points to performative capacities to determine (in greater or lesser

77 *Ibid.*, 509.
78 *Ibid.*, p. 513.
79 M. Hildebrandt, 'Law as an affordance: The Devil Is in the Vanishing Point(s)', 4 *Critical Analysis of Law* (2017) p. 116.

degree) the subjects to which law and technology apply, and to codetermine each other. The ways in which they do this will vary with the sorts of affordances that are involved.

When the law is known according to textual reproduction in books and paper files, its performative capacity may be determined by (contests over) ways to read, circulate and implement such texts.[80] This exists in contrast with the performative capacities afforded by algorithmic decision systems designed to anticipate behaviour, whether to foreclose possible futures before they happen, or to 'nudge' subjects into one course of action rather than another (which amounts to much the same thing).[81] Again, immediacy and flow are key. The hardcopy text affords things like reading, interpretation and deliberation: an agent outside of the text must read it and decide a course of action relative to some other object on the basis of that reading. The affordances of the AI-driven algorithmic decision system do not similarly allow for reading, interpretation and deliberation. In their place is an automated outcome machine designed to alter recursively its own action based on an automated, electronic flow of information, its application informing (in the active sense) and thereby reconstituting the digital reality to which it applies, without the clear intermediation of any reflective or representational point.[82]

Following Hildebrandt's distinction, the regulatory work communicated by textual exegesis differs from the regulatory work communicated by an AI- or machine learning-driven algorithmic system. This distinction drives Hildebrandt's clear normative ambition to fortify the rule of law by fortifying the performative force of traditionally-interpretive law in ecologies structured by new technological affordances. Hildebrandt acknowledges, however, that representational political systems under a separation of powers, like in the *trias politica*, can be described as proto-cybernetic systems.[83] By this reading, the legal branch of government exists as part of a series of feedback loops meant to keep the overall system of government in a state of self-regulating homeostasis, a hallmark of cybernetic systems. As such, *contra* Hildebrandt, the basic distinction starts to break down between the law that is informed by reasoned argument and the law that is informed by a higher order of control on communication flows in the design of the system. In the *trias politica*, the reasoned argument is already preconditioned by the cybernetic nudge towards

80 Hildebrandt, *supra* n. 53; Noll, *supra* n. 2.
81 Hildebrandt, *supra* n. 53.
82 Gordon and van den Meerssche, *supra* n. 6; A. Rouvroy and B. Stiegler, 'The Digital Regime of Truth: From the Algorithmic Governmentality to a New Rule of Law', 3 *La Deleuziana* (2016).
83 Hildebrandt, supra n. 53, p. 23.

homeostatic self-preservation for the overall political system. This may seem a marginal concession, on the assumption that the higher order of control in the liberal political system is designed to support government that includes reasoned argument and popular participation. But there are shortcomings here. For one thing, the emphasis on reasoned arguments neglects the tendency of each distinct communication pathway (executive, parliamentary, juridical) to develop its own specialized vocabulary and specific set of interests, incentives and disincentives, which will condition the reasonable exercise. For another, the celebration of reasoned argument cabins critiques of liberal political systems, and ignores histories in which governmental pretensions to reasonable values like rule of law programs have been steeped with colonial violence, even when articulated by progressive figures for progressive purposes.[84]

Moreover, the ascendance of information management routines in governmental institutions, as sketched in section 4, demonstrates that the cybernetic character of contemporary governance institutions is not limited to the select feedback loops of divided government and popular elections. Also as pointed out with Marianne Constable in the introduction, legal institutions have come to rely on cybernetic information and information management techniques through and through, across the full scope of their legal and governmental operations. With that in mind, the significance of Hildebrandt's two meanings of 'to inform' can be reconsidered: the emphasis shifts from her normative demonstration (to illustrate what law should not become), to the descriptive one (to illustrate how institutional practice works today). In sum, the socio-technical systems that constitute international institutions have exhibited an expansion of their relationship to and with information, moving beyond a posture of receipt or delivery of information – for instance by text, to be interpreted and acted upon by some agent outside the text – to a pretension to direct action on 'the real' with and through information, whether by professional adoption of recursive and reiterative management techniques, or by designing algorithmic decision-making into automated computational technologies.

In sum, what emerges is an arguably subtle but nonetheless significant transformation of international institutional practices and the world in which international institutions operate. Arguably subtle because the transformation in question has emerged through everyday practice over a period of decades, though it has been accelerated and amplified by algorithmic decision-making

84 I. Feichtner and G. Gordon, 'Introduction', in I. Feichtner and G. Gordon (eds.), *Constitutions of Value* (Routledge, 2023); A. Anghie, *Imperialism, sovereignty and the making of international law* (Cambridge University Press, 2007); M. Koskenniemi, *The gentle civilizer of nations: the rise and fall of international law 1870–1960*, (Cambridge University Press, 2001).

technologies more recently. It pertains to a shift away from linear, rule-based legal judgments, towards reiterative solutions tailored to conditions of non-linear complexity. That complexity has only grown with the compute power available to institutions, following a trajectory Constable has described: "Governance of and through institutions comes to depend more and more on increasingly recursive communicative systems of technology and personnel. Systems form circuits of information, which in turn manage the functioning of the system, generating further information, which in turn manage …".[85] In this sense, legal institutions adapt themselves ever more to a practical condition that drives an imperative for ever more information, fed continuously into higher-order information flows better to learn the 'real' problem and solution for future regulatory iterations in constant loop.

This change can be contextualized within a wider ontological shift, one in which the status of the real is increasingly contingent on the flow of digital information. The ontological valence of digital information, however, was not always what it is now. Bernhard Siegert describes "how digitization became the materiality of ontologization of the twentieth century par excellence".[86] Siegert also focuses on the formative advances in cybernetics that featured in the production of management science described above in section 3. The same characters – Wiener, Shannon, etc. – populate Siegert's genealogy of the cybernetic relationship between analogue and digital. Siegert's analysis explores the emergence of techniques leading to the affordance of digital switches to determine analogue command and control operations in form of the neural network. A key part of Siegert's analysis focuses on "a paradigm shift that formed the condition for the emergence of a technical episteme in which the switch from continuous [analogue] to discrete [digital] phenomena and vice versa played a central role, as well as the question of the ontological status of codes and the calculability of the real".[87] Ultimately, it is a movement back and forth between the analogue and digital that affords the ontological status of codes and calculability of the real.

It is the same combination of analogue and digital across the circuits of contemporary information flow that affords the transformative governmental power exhibited by algorithmic decision systems today. As Evgeny Morozov put it, referring already in 2014 to the emergence of algorithmic regulation, "the principle behind 'algorithmic regulation' would be familiar to the founders of cybernetics – a discipline that, even in its name (it means 'the science

85 Constable, *supra* n. 8, pp. 156–57 (ellipses in original).
86 Siegert, *supra* n. 41, pp. 7–8.
87 *Ibid.*, p. 10.

of governance') hints at its great regulatory ambitions".[88] In this light, Morozov asked hypothetical questions that demonstrate the transformations legal institutions are undergoing: "If so much of our everyday behaviour is already captured, analysed and nudged, why stick with unempirical approaches to regulation? Why rely on laws when one has sensors and feedback mechanisms?"[89] Morozov anticipated the appeal of these programs: efficiency and a closer regulatory grasp on the real. He also made clear the stakes: the immediacy of algorithmic regulation short-circuits political possibility, and even political engagement, making institutional policy seem "as if the very choice of how to achieve those 'desired outcomes' [read: optimized solutions] was apolitical and didn't force us to choose between different and often incompatible visions of communal living".[90] Legal institutions, following Morozov, become technocratic ones, obscuring the ideologies that animate them. The endpoint of the institutional regime that "maintain[s] its stability by constantly learning and adapting itself to the changing circumstances, is what the British psychiatrist Ross Ashby, one of the founding fathers of cybernetics, called 'ultrastability'".[91] This is governance by homeostatic regime. Paradoxically, it suggests that the shift from 'static law' to 'dynamic feedback' leads to the stabilization of already-existing conditions: legal institutions as status quo machines.

David Chandler, working in the field of international relations, has described this mode of governance in terms of Sensory governance, enabled by algorithmic decision systems fuelled by Big Data. Echoing Morozov, Chandler highlights the concern that "Big Data approaches aspire to remove the need for governance on the basis of rules and laws, displacing this with real-time feedback mechanisms based on new forms of (datafied) relational awareness" – such as were evident in section 4.[92] Under regimes of Sensory governance, as Chandler observes them, tools of legal governance predicated on causal intervention – e.g. 'change condition a to achieve outcome x' – have been traded for cybernetic tools that intervene strictly on the level of effects – e.g. 'effect y triggers response z'. The latter is Morozov's homeostatic regime, an exercise in information management to sustain the already-existing order. Information management represents a transformed mode of institutional practice, one which suppresses political agency. As Chandler puts it: "[f]or Morozov … the

88 E. Morozov, 'The rise of data and the death of politics', *The Guardian* (2 July, 2014), available at https://www.theguardian.com/technology/2014/jul/20/rise-of-data-death-of-politics-evgeny-morozov-algorithmic-regulation.

89 *Ibid.*

90 *Ibid.*

91 *Ibid.*

92 Chandler, supra n. 2, p. 212.

governance mode of Sensing through Big Data … reduces politics to the regulation of the interactions and choices of the private and social sphere, where individuals are increasingly 'responsibilised' for social, economic and environmental problems, rather than a mode of governance and politics aimed at addressing the causes of the 'effects'".[93] Consequently, "Big Data does not so much enable learning and growth as stability and the reproduction of the status quo; in this respect, Sensing as a mode of governance is homeostatic."[94] And Chandler observes this practice specifically in the institution of Global Pulse, from section 4, among other international initiatives.

6 Conclusion

As institutional practices of international law increasingly attain to higher order management of information flows, a reflexive character associated with modern law and the rule of law appears to diminish. The reflexive character inheres in a dual structure for a legal system, for instance as associated with Hart's famous distinction between primary and secondary rules – primary rules to determine (allow, mandate or prohibit) conduct, and secondary rules to determine the primary rules themselves (including the ways in which primary rules are adopted, recognized, contested and changed).[95] The integrity of secondary rules are key to the legitimacy vested in rule of law systems, as defended by Yeung and Hidebrandt. But cybernetic pretentions to a higher order management of information flow do not leave space for the reflexive controls associated in traditional practice with secondary rules. As Gregor Noll observes, "Cybernetics is about 'control' as such and therewith also about controlling control. It is about regulation and therewith also about the regulation of regulation".[96] The controlling or regulating principle of a Hartian rule of law system, the reflexive condition incorporated with secondary rules, becomes regulated by the cybernetic character of contemporary institutional practices. The reflexive element sustained by a division of labour between primary and secondary rules is suppressed by the higher order control baked into an automated system of recursive and reiterative pattern recognition in perpetual renewal. Information, in this context, becomes the law of law: "Even as information is managed by a system, information manages a higher-order system or

93 *Ibid.*, p. 215.
94 Ibid., p. 216.
95 H.L.A. Hart, *The Concept of Law, 3rd ed.* (Oxford University Press, 2012 [1961]).
96 Noll, *supra* n. 2, p. 81.

provides it with the means to self-correct; in this sense information is not only language but law."[97]

To take Constable one step further, the inquiry here suggests that it is not information itself, as constructed, that is tantamount to law, but its (managed) flow. The management routines described in section 4 all fall within the discursive construction of the sensory mode of governance described by Chandler, discussed in section 5. That mode of governance relies on a reactive practice, one that intervenes at the level of effects, rather than causes, to achieve homeostatic stability.[98] This takes international institutions away from the practice of adopting and attaining to models, or aiming at deliberated ends, instead bringing them seemingly closer to (the becoming and re-becoming of) the thing itself to which institutional practice applies.[99] This is the mode of legal practice that emerges from sustained engagement with the information management science described in section 3, a practical science at the interface of analogue and digital technologies, propagating feedback loops in networks deploying sensors in combination with digital compute power. The international institution becomes one moment in the recursive operation of an overall algorithmic decision system, supercharged with AI or machine learning components. This brings with it the promise of ever more efficient institutional praxis, and the possibility to (re)calibrate reiteratively and in real time the execution of an institutional mandate with conditions 'on the ground'. But this engagement 'on the ground' also suggests the loss of a hierarchically elevated discursive position, one that formerly established a privileged space for juridical evaluation.

In section 4, Secretary General Guterres represented the intensification of this transformation at the UN, and Roele, Riegner and others observe the process continuing. As just noted, this is the nature of higher order systems with recursive architectures, a process of constant refinement. Against this tendency, commentators such as Hildebrandt and Yeung have called to update and revitalize the rule of law tradition in the new socio-technical ecologies that encompass legal institutions. But while that remains a crucial agenda, it does not seem an adequate response to developments in institutional practice. In part, that is because the ascendance of information techniques and technologies has precisely been organized against the limitations of things like classical rule of law programs. Chandler demonstrates that sensory governance is,

97 Constable, *supra* n. 8, p. 157.

98 Chandler, *supra* n. 2.

99 D van den Meerssche, 'Performing the rule of law in international organizations: Ibrahim Shihata and the World Bank's turn to governance reform', 32 *Leiden journal of international law* (2019) pp. 47–69.

in part, a product of progressive and reformist innovations.[100] And the figures and events surveyed in section 3 worked deliberately to achieve advantages over classical rule-based decision-making systems by adopting problem-solving exercises with multiple computational pathways to optimal solutions for complex problems. The solutions of network engineers and computer scientists were embraced by private enterprise and public institutions on the basis of being able to achieve what classical decision-making systems could not.[101] In the socio-technical ecologies where their counter-programs have been successful, the terrain of contestation has shifted from arguments over rules to pattern-recognition processes that determine efficient solutions according to optimal outcomes.[102] This new terrain privileges modes of practice that emerge from and in response to techniques of reiterative and recursive pattern and problem definition, to the relative diminution of deliberative legal work that deploys reflective techniques, whether for or against institutional aims.[103] But for all of the newness, there appears at least one familiar characteristic at work: the power of the new institutional practice inheres in the capacity to define the problem to be addressed. But now, the combination of digital and analogue technologies and techniques, with their recursive and reiterative structures, amplifies that institutional power into the capacity not just to define but to redefine the problem on a continuous basis and in the act of addressing it. This situation, which I call in closing the 'optimizing institutional mandate', represents a transformative and unsettling institutional possibility, as well as a challenge for traditional checks on legally vested powers.

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100 Chandler, *supra* n. 2.

101 Cf, M. Castells, *Communication Power* (Oxford University Press, 2013 [2009]): 19–27; and Kennedy, *supra* n. 3, p. 841.

102 Cf, F. Johns, 'On Dead Circuits and Non-Events', in I. Venzke and K.J. Heller (eds.), *Contingency in International Law: On the possibility of different legal histories* (Oxford University Press, 2021).

103 D. van den Meerssche and G. Gordon, 'Is This the Rhizome? Thinking Together with Fleur Johns', *Law and Critique* (2022).