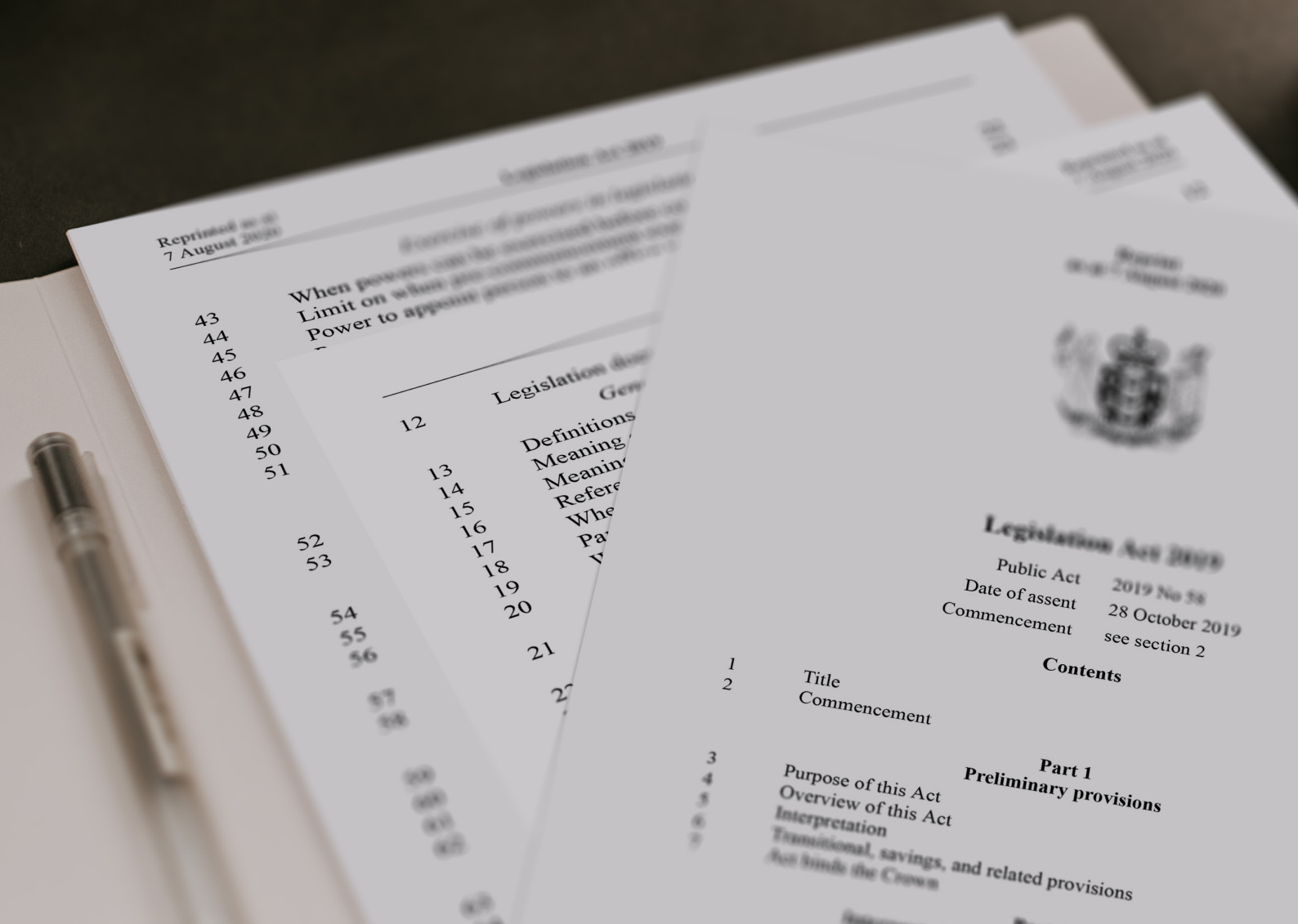# LEGISLATION AS CODE FOR NEW ZEALAND:

OPPORTUNITIES, RISKS, AND RECOMMENDATIONS

March 2021

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EXECUTIVE SUMMARY

OVERVIEW AND PURPOSE

1. This report aims to provide a basis for senior decision-makers in New Zealand to critically assess and act upon the potential of law-as-code initiatives. It was stimulated by the growing attention to the "Better Rules" programme, a "better rules approach", and international "rules as code" efforts. From this starting point we investigated the wider field of "law as code" to assess feasibility, risks, and benefits.

2. There is extensive research underpinning the many different aspects of this topic. Describing this research in sufficient detail would require the use of complex domain-specific language that is only reasonably understood by those with robust knowledge of linguistics, law, computer science, and other topics. Instead, we have aimed to share key conclusions for non-experts and to justify our recommendations.

3. Law-as-code approaches have significant potential benefits that are supported by an extensive history of academic legal and computational research and practice.

4. By contrast, the claims and aspirations of some advocates of "legislation as code" approaches are unjustifiably optimistic about the capacity of code to have equal status to the law, or the benefits of removing legal interpretation from the way legislation works.

5. Despite this, we identify clear opportunities with public and private benefits for proportionate and effective use of law-as-code approaches to policy development, as well as the use of computational models of legal instruments.

6. We identify two existing statutory frameworks for incorporating both a "better rules approach" and "rules as code" models into existing government administration:

    a. Legislation can be revised and clarified through the legislation revision programme under the Legislation Act 2019 where shortcomings are identified in legislation through a better rules approach; and

    b. We identify a pattern of statutory drafting that authorises identifiable people to delegate statutory powers and functions to "automated electronic systems", enabling computational models of the law to be deployed in defined circumstances.

7. On this basis, law-as-code approaches should be explored further in New Zealand, particularly in relation to current internet filtering legislation, and in the re-write of the Resource Management Act 1991. We also propose an incubator (or similar) involving both government and non-government actors. Trust, confidence and reliability in law as code approaches can be built through transparent, multi-stakeholder collaborations on use cases and public sharing of case studies.

KEY CONCLUSIONS

BETTER RULES & RULES-AS-CODE DIFFER

8. We address two recent phenomena within the New Zealand context that have come to be known as "better rules" and "rules as code". These labels have become conflated and confused. We think it necessary to maintain a distinction between these two phenomena, and we articulate that distinction in Part 2.

9. The distinction is best understood by considering how Better Rules brings a service design methodology to policy development, with rules-as-code being one potential output of a Better Rules process. "Rules-as-code" is a wider concept encompassing all things related to the capturing of rules (including law) in code.

10. In short, "a better rules approach" is a policy development method and "rules as code" is a topic of investigation that encompasses the full history of scholarship detailing historic and contemporary attempts to model legal systems in machine-executable languages (code).

A BETTER RULES APPROACH IS GOOD FOR POLICY DEVELOPMENT

11. A "better rules approach" (discussed in greater detail at Part 2) is a method for supporting policy development with clear contemplation of how the policy will be implemented and delivered using digital systems. The capacity for policy, regulation and legislation to be implemented in digital systems is fundamental and only growing in importance. We recommend using a better rules approach when it is likely that government or non-government actors will use an automated (or semi-automated) electronic system to give effect to the law.

12. Independently of whether policy is eventually operationalised in digital systems, a better rules approach produces more conceptually coherent and logically consistent policy through the application of service design techniques, and through concept modelling and computational testing. This makes the task of a legislative drafter easier because of the way a drafter is presented with a fully formed, logically coherent policy to reflect in legislative drafting.

13. If a better rules approach is made sufficiently open to non-government actors, it enables the policy, the legal instrument, and the computational model of that policy to be scrutinised by a range of actors and institutions before it is implemented. This would be complemented by existing Select Committee processes, and would contribute to the production of better, more reliable policy.

14. We identified other situations where, in substance, the key aspects of a better rules approach were being explored. This gives us confidence in the universality and essential merits of a better rules approach.

LEGISLATION CAN BE WRITTEN IN CODE, BUT SHOULD NOT BE

15. In both "better rules" and "rules as code" discussions, there is frequent reference to the concept of "legislation as code", as well as the idea of "translating" law into code. By way of illustration, we include excerpts from public materials around better rules and rules as code in an Appendix. In Part 3, we critically assess the notion of "legislation as code" and reach our most important conclusions.

16. We have been unable to identify anything that would prevent the New Zealand Parliament enacting legislation that is written in code, consistent with the principle of Parliamentary Sovereignty. Any legislation produced according to the correct procedure is valid, even if the content and effect of that legislation is morally repugnant, or its form and symbolic medium is highly irregular. Neither would change the fact that it is the law of the land. Other constitutional actors, including Executive and Judicial branches would be obliged to give effect to such a legal instrument in the usual way.

17. However, we conclude that for both pragmatic and principled reasons, rules written in code (i.e. machine-executable languages) should never be given the status of legislation. Importantly, at the level of principle, enacting code creates serious constitutional confusion and risks undermining the separation of powers between the Executive, Judicial and Legislative branches of government. At a pragmatic level, incorporating code directly into legislation would be a departure from recent moves to make legislation clearer and more concise by avoiding excessive detail and prescriptive drafting, as well as esoteric expression.

18. Code should remain subordinate to legislation. "Translation" is not a useful concept when describing the relationship between legislation and code. Instead, coded models are better understood as a an interpretation of what the law requires. The fact they are computational models does not change this, even where parallel drafted. Further, in practice, most computational models will draw on a wide range of legal sources, and the notion that a single model will represent a single legal instrument is difficult to sustain.

PARALLEL DRAFTING ONLY REDUCES INTERPRETATION RISKS, IT DOES NOT REMOVE THEM

19. Some advocates of rules as code or better rules approaches appear to argue that parallel drafting a legal instrument and a computational model of that instrument during the policy development process will lead to "isomorphism" between the two. In context, this appears to be understood by some as meaning a perfect correspondence of meaning between the two instruments (the law and the code) with no further need for "interpretation" or "translation" between natural language and machine language "versions" of legislation.

20.   It is largely accepted that perfect correspondence of meaning between machine and natural languages is an impossible goal. Isomorphism is best understood as "traceability" between the legal source being modelled and the expression of the rule within the model itself. This traceability acknowledges that computational models of a rule are not the same as the rule itself.

21.   Even where natural language and machine language rules are drafted simultaneously in parallel, they can still diverge in their meaning and effect. Once a legal instrument is passed in natural language, the rule of law (and specific legislative guidance in the Legislation Act 2019) requires that the natural language of the legal instrument be interpreted based on its text, purpose, and context. The meaning of this text can and should be allowed to diverge from the policy intent of the Executive. This means that the policy intent as captured in a coded model can be inconsistent with the way natural language rules are eventually interpreted. This is necessary from a constitutional perspective, as we explain in Part 3.

22.   Even where parallel drafted, a computational model of the law or a regulatory system is only an illustration of Executive policy intent. There is no guarantee the model has identical effect to the legislation.

23.   Taking a better rules approach (including parallel drafting) anticipates the way that legislative drafting will need to be interpreted and then operationalised in digital systems. As a result, it is likely to reduce the frequency of situations where it is not clear to end-users how legislation should be interpreted for implementation in computational systems. However, this general improvement in digital interpretability should not be confused with the idea that no interpretation is taking place. Parallel drafting can minimise interpretive gaps between English drafting and computational model, but it cannot remove them entirely.

INTERPRETATIONS OF THE LAW CAN BE MODELLED

24.   While our findings in Part 3 undermine the suggestion that there could or should be authoritative or ultimate "legislation as code" deployed in New Zealand, that does not mean that highly reliable interpretations of the law, deployed in code at scale, could not be useful.

25.   In Part 4, we explain why we think computational models of the law are still useful, even if they are only interpretations of the law. This is true whether they are produced as part of a better rules policy development approach, or whether they are produced later once legislation has already been passed.

26.   Once laws have been modelled in machine-executable languages, they can be tested for their logical and conceptual coherence, just like any piece of software. There are a range of software development approaches (such as test suites) that can be used to test the computational model.

27.   Importantly, such computational models are only useful if they are reliable: that is, they must be legally correct. It must be possible to assess how the law has been interpreted and modelled. If correct, these models can be useful for certain purposes. For instance, they can provide guidance to citizens about how the law applies to them and their activities, to better understand relationships between different legal instruments, or even to be incorporated directly into software systems used in operational tasks.

28.   We point to the Auckland District Law Society's Sale and Purchase agreement as an example of the potential that reliable, reusable, and authoritative interpretations of the law can have on access to justice and access to the law. We suggest that natural language legal documents of this kind be emulated when it comes to considering how computational models are created, maintained, and deployed.

29.   Greater consideration should be given to how coded models of the law can be created in open ways that generate confidence in their reliability as a faithful and reliable legal interpretation. A better rules approach is a good way of achieving this, particularly where it emphasises greater inclusion of non-government stakeholders.

30.   These models are not the law or equivalent to the law. They are only interpretations of the law and must be subjected to the same scrutiny as all non-judicial interpretations of the law. Their accuracy is a matter of case-by-case analysis. Moreover, they are always open to being challenged as being incorrect, and there must be a clear and reliable process for doing so.

31.   Government ought to play a role in the creation of reliable computational models of the law, but the most important thing is that there must always be an avenue for non-Government actors to advance their own interpretation of the law, including through judicial processes. This may mean that a coded model is deemed unreliable by comparison to a superior model, even where the former was produced through parallel drafting.

CURRENT "AUTOMATED ELECTRONIC SYSTEMS" LEGISLATION CAN BE ENHANCED TO IMPLEMENT LAW-AS-CODE

32.   In Part 4 we identify a pattern of statutory drafting that authorises people to delegate legal tasks to "automated electronic systems" (AES). We explain this drafting pattern and make recommendations about how it could be more widely adopted, as well as recommendations for enhancing the regime if coded models of the law are to be deployed.

33.   Legislation requires that the "reasonable reliability" of AES in particular statutory contexts is assessed by a nominated person. This preserves an agency's ability to use code in optimally efficient ways to achieve an agency's best interpretation of the law governing its operations. It also means any agency responsible for operationalising a coded

model of the law would carry responsibility for the reliability of that model and the context in which it is deployed. It would be up to that agency and that accountable person at the Chief Executive level to create institutional systems and processes to maintain the model's reliability both legally and substantively. There would be clear accountability on that person for any failures.

34. The pattern of statutory drafting around AES should be bolstered by greater Parliamentary guidance around assessing the reasonable reliability of a model operationalised in an AES. Subsequently, that legislative approach could be adopted more widely through the statute book where agencies wish to operationalise coded models of the law.

35. Depending on the context of the legislation and the computational model intended to give effect to that legislation, there is scope for Parliament to indicate more explicitly what it expects Chief Executives to assess when they certify a system's "reasonable reliability".

36. Civil servants should also bear in mind that, in relation to an AES, the standard of "reasonable reliability" must be interpreted by reference to the text, purpose, and context of the relevant legislation.

37. It is important to guard against the risk that, over time, these models are treated as being superior to the primary source materials upon which they are based. There is a risk that the interpretation codified in the model is preferred to the law itself when Executive government perceives the model better achieves the intent of a policy than the legislation upon which the model is based.

38. There must be clear mechanisms (with access to justice supports) for challenging the accuracy of these interpretations. The final decision on the accuracy of the interpretation will be settled by a judge, or other empowered legal tribunal. Where the judge errs, the error may be corrected by appeal. In short, the judiciary still interprets legislation, and has the final word on such matters.

USE REAL-WORLD COLLABORATION TO TEST BETTER RULES AND LAW-AS-CODE APPROACHES

39. The merits of law-as-code approaches will strongly benefit from being anchored to real world applications. The relatively abstract theoretical issues that dominate scholarship in this area may or may not arise in practice in a particular operational context. But it is still essential that those issues be explored and debated to build confidence.

40. For this reason, we recommend that parties with a positive or negative interest in the adoption of law-as-code approaches collaborate to foster development of actual case studies.

41. We recommend that this be facilitated through a kind of incubator or sandbox that incorporates government, private sector, NGO, and academic input. Similar initiatives have been deployed in the Fintech and Regtech fields around the world, and Legal Hackers NZ has also organised hackathons with a similar function on a case-by-case basis.

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OPENING COMMENT

For some, the appeal of "Legislation as Code" is the prospect that legislation could instead be drafted and even enacted in machine-executable languages, and thereby modelled and executed in computer systems. This approach raises several common concerns: that law can be ambiguous; that legal logic cannot be accurately coded; and that law lacks a consistent ontology to facilitate computation. While arguably relevant, they are superfluous to the core reason why legislation should not be written in code.

Rather, the critical failing of ideation around enacted "Legislation as Code" is that it fails to consider the integral power structures that underpin law's technological use of written natural language. The practice of writing law in words and then interpreting their meaning keeps in balance fundamental constitutional arrangements between the Legislature, the Executive and the Judiciary. The relationship between these institutions and the entire structure of law depends on the features of natural language for recording legislative provisions, separating the intent of the Executive from the effect of its words, and balancing power. Code is unavoidably rule AND interpretation. Legislation enacted in code running within computing systems risks disempowering or excluding the Judiciary from its constitutional role as final interpreter.

Standalone code-as-law is not yet (if ever) able to provide the features of natural language that this balancing of power relies upon. In its own right, this is a significant topic beyond the scope of this report, but it is worth noting that:

a. even programmers rely on natural language to communicate with each other, to the point that natural language commenting is a feature of most code languages,

b. it is generally expected that computers will interpret and execute code the same way each time, you can't easily ask the computer to change its interpretation without changing the code.

Short of enacted legislation-as-code, we can instead focus on the opportunities for approaches that I would describe as non-authoritative interpretation-as-code. The insights I've gained from doing this research, have been important for helping me to contextualise my own work in this space and to identify the risks and opportunities coming from that work. The following are two examples from my own experience that I think are significant and would benefit from being explored further through the incubator we propose in our recommendations.

The first example was influenced by work that incorporated interpretation-as-code into policy development and legislative drafting via the better rules approach and the Better Rules programme. This work takes a service design approach to policy development and as part of that, anticipates the way that policy and law will be implemented in computer systems as well as the effects it will have on the people it impacts. It is a

concept that needs on-going case-studies that consider appropriate measures to counter the constitutional risks we identify more fully in this report.

The second example is what I have come to call "Open Interpretation". This is where entities charged with interpreting the law and implementing policy publish their interpretations (in rules-as-code form) as part of the responsibility and accountability that comes with this delegated power. While we do not cover this particular use in depth in the report, this practice offers a significant opportunity to practically implement one of the foundational principles of the rule of law: "the law should be publicly accessible and able to be easily understood by all to whom it applies". While interpretation-as-code may not seem at first an obvious choice to achieve the goal that law be "easily understood", it is not the code itself but the endless tools that can be built utilising such code that will achieve that end. A recent example of this is consentcheck.wellington.govt.nz which utilises the council's coded interpretation of its district plan's residential rules. To be most effective these rules should be made publicly available and versioned, easy to scrutinise, open for feedback, suggestions and recognised as subservient to the law.

A deep understanding of the way that technology and law interact is essential not just for understanding the risks, but also the benefits of rules-as-code approaches. With a proper understanding, both law and code can enhance one another in the public interest. This project began in part because of reservations I had about the wider implications of the Service Innovation Lab's work on the better rules approach, and I want to thank Te Manatū a Ture o Aotearoa for the opportunity to explore these issues and undertake this research.

Hamish Fraser

1st March 2021

PART ONE:

INTRODUCTION AND OVERVIEW

OVERVIEW

42. This report offers analysis of whether computer systems and computing principles can be used to improve the delivery of law and policy. While it has accounted for literature and developments from all around the world, it is primarily interested in the New Zealand legal system, constitution, and policymaking process. These insights will be applicable elsewhere.

43. The report was prompted by two phenomena within the New Zealand policy and legal space: the "Better Rules" programme and its range of potential outputs; and international discussion about "rules as code" approaches, where "rules", including legislation, are translated or modelled in code.

44. In Part One, we begin by giving some context to the topic and attempting to define our terms of discussion. There are a variety of alternative terms in-use to describe this topic, and law as code programs and applications come in many shades.

45. In Part Two, we describe our understanding of what a "better rules approach" entails by comparison with what we say is another label for law as code: "rules as code". We state our conclusions on the merits of a better rules approach and foreshadow the reasons for our concern about "rules as code" approaches. In particular, our main concerns arise from any suggestion by "rules as code" or "better rules" advocates that legislation itself should be written in code, or that code could or should have an equal authority to legislation itself. We have included excerpts in an Appendix to illustrate situations where we believe advocates are explicitly or impliedly arguing in support of such a scenario.

46. In Part Three, we justify our concerns about why code should not be law, and why the notion of one-to-one translation of legislation into code without altering the law's effect or meaning is extremely difficult to accept. We avoid diving too deeply into "what law is", but we discuss in depth the way that written legislation and statutory interpretation are fundamental to the rule of law and separation of powers. We note that "ascertaining the meaning" of the law is a complex interpretive exercise that draws from multiple different sources of the law and unstated legal principles. The different institutions and sources of the law are all important to its democratic operation. Interpretation is an essential element of the law, and moreover, an essential role reserved for the Judiciary, by comparison with the Executive and the Legislature. If legislation were to be written in code with a view to removing all interpretation from written (coded) legislation, this risks excluding the

Judiciary from performing its constitutional role as interpreter of legislative language. We say legislation should not be written in code and urge extreme caution.

47.   In Part Four, we salvage the best of "law as code" approaches in light of the conclusions we have reached on the notion of "legislation as code". We describe the ways that we believe a better rules approach and "rules as code" instruments (or computational models of the law) can nevertheless be created and deployed by government in ways that respect the separation of powers. We argue a better rules approach in particular could increase the "reasonable reliability" of "automated electronic systems" (AES) used to perform legal tasks.[1] We point to a specific example of how "interpretation as code" instruments could be used for public and private benefit. We also apply our conclusions to a piece of legislation currently before the House of Representatives dealing with the use of electronic systems for internet filtering.

48.   Part Five of our report states our conclusions and recommendations on how law as code initiatives should proceed in New Zealand.

BACKGROUND TO "LAW AND/AS CODE"

49.   The notion of integrating law and computer systems prompts vastly different ideas in different people. These phenomena may range from interactive models that help citizens to navigate the requirements of the legal system, all the way to legislation written in machine readable languages and implemented in automatic, computer executable forms.

50.   Setting aside visions of Robocop (though "robodebt" and electronic "cops in the back seat" are a distinct possibility), our focus is on a handful of immediate things.[2]

51.   The first is to acknowledge that the current relationship between the legal system and the society it governs leaves much to be desired. Loevinger, writing in 1949, said that: [3]

> It is one of the greatest anomalies of modern times that the law, which exists as a public guide to conduct, has become such a recondite mystery that is incomprehensible to the public and scarcely intelligible to its own votaries.

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[1] These are statutory phrases drawn from pieces of legislation we identify in Part 4.

[2] See Genesereth, M "Computational Law: The Cop in the Backseat" (2015) White Paper, CodeX: The Center for Legal Informatics Stanford University. See also Whiteford, P "Robodebt was a policy fiasco with a human cost we have yet to fully appreciate" 16 November 2020: <theconversation.com>.

[3] Loevinger, L "Jurimetrics: The Next Step Forward" (1949) Minnesota Law Review; reproduced (1971) 12 Jurimetrics Journal 3 to 41: <https://www.jstor.org/stable/29761220>.

52. Law is still arcane and inscrutable to many people. Across the common law world there have been many investigations and statements of public concern over decades about the complexity of the law and sheer number of legal instruments that describe it.

53. The legal system and its processes are lethargic while people's demands are vigorous. The barriers to effectively accessing the justice system are many. Overall, the legal and administrative systems which citizens must engage with to pursue their visions of the good life are so often painstakingly slow and costly, both to the individual and to the government that administers them.

54. Further, there is a long history of examining the way that law as an ostensibly neutral system may be used to authorise, conceal, and justify discriminatory or unjust practices. [4] While the rule of law seeks a degree of impartiality between individuals and groups, frequently, it is perceived with some justification as a tool used by powerful groups to legitimise and maintain existing power structures.

55. It is against this backdrop that interest in the question of whether and how legal effects can be better achieved using computation has grown for many decades. It is an admirable area of investigation, usually spurred by commitment to the public interest.

56. Nevertheless, there are risks to careless adoption of law as code approaches. While we agree that law as code applications can be valuable, we are particularly focussed on risks that are less obvious or a lesser priority, particularly when they are being championed by those working within Executive government – constitutional risks, for example.

57. We understand that some of these risks may seem abstract, remote, or unimportant – particularly where civil servants are tasked with simply finding a way to operationalise whatever Parliament has set out in legislation. Nevertheless, we hope to demonstrate that these risks are unavoidable and significant.

58. As authors, we are conscious of the amount of thought and effort that continues to be invested in this area. We have included a brief appendix with current international research efforts that New Zealand should monitor.

TERMINOLOGY

59. At this stage it is necessary to define the terms we use to describe this subject. This is because ambiguity of language sits at the heart of this topic. Further, it is impossible to communicate our conclusions for the

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[4] See generally the work of the legal realists in legal philosophy. We also discuss the role of law in enabling the Crown to breach the Treaty of Waitangi in Part 3.

benefit of a multidisciplinary audience without pinning down what we mean.

LANGUAGE AROUND THIS TOPIC IS AMBIGUOUS

60. Law as code is a complex subject matter. It includes aspects of computer science, jurisprudence, logic, linguistics, legal drafting, statutory interpretation, legal practice, political science, social policy, economic policy, and the process of making policy generally.

61. We are acutely conscious of how this makes collaborative discussion of the topic more difficult. The word "code", for example, is a homonym with alternative meanings in law, communication theory, and computer science. Each of these disciplines represents a different community of language users, often with their own technical vocabulary (sometimes described as a "domain specific language").

62. For good reason, linguistic precision is paramount to the communities associated with each of these disciplines. In legal systems and in computer systems, extremely minor examples of incorrect expression can be catastrophic (or at least render an entire system ineffective). Each of the disciplines referred to above has a justifiable measure of confidence that the approach taken toward these issues by their own community is pre-eminent, and that people from other disciplines do not understand, or should defer to their leadership.

63. In summary, the current discourse around this topic can be convoluted. Not only is the topic indistinct but the issues raised by it are interdisciplinary. Participants are applying different interpretative biases to the propositions of their interlocutors, depending on what community of language users each belongs to. The result is that participants talk past one another or perceive inaccuracies where there are none.

64. To complicate matters further, even where they are talking about the same thing, the members of these different communities often have divergent assumptions and expectations about what features of a process or end goal are desirable or not. This results in fundamental disagreement about what a process or output is meant to achieve, whether legal or computational. This is partly explained by the differing interests each community has in how those processes affect them. For example, groups may sometimes hold mutually exclusive expectations of government services, computer programs, legislation or litigation – what these things are meant to do, according to what priority, and for whom. We cannot resolve these differing priorities, but we can offer our perspective on legal and constitutional matters that should be considered.

65. Finally, we note that the language available for speaking and writing about this area suffers from the same core problem area in this space – the careful deployment or eradication of ambiguity and the endless scope for linguistic interpretation presented by natural language.

66. We note these points because they have also impacted on the writing of this report. There is simply no one correct way of describing the topic. Further, these factors have strongly influenced one of our core recommendations: that future work in New Zealand on law as code be anchored to tangible use cases, rather than ungrounded, theoretical discussion.

TERMINOLOGY USED IN THIS REPORT

67. In this report we use the phrase "law as code" to refer collectively to a bundle of phenomena that share the fuzzy goal of using computational modelling in relation to tasks traditionally associated with the law. Generally speaking, we seldom refer to bare "legal information retrieval".

68. When we are writing specifically about one of these subsidiary phenomena, we endeavour to do so at the exclusion of other phenomena within the wider "law as code" area. At the same time, we acknowledge that these phenomena tend to overlap at many points. Differences as well as similarities are important to us.

69. Where we use a more precise term than "law as code", we do so deliberately in order to refer to that specific subsidiary phenomenon. We offer some examples below by way of illustration.

    a. Subsidiaries of law include legislation, case law, secondary legislation, contracts or similar. A broader term might be regulation, which also includes regulatory instruments that might not have legal status except by incorporation or reference, or other non-legal means of shaping behaviour.

    b. We never use the word "code" to refer to legal codes.[5]

    c. In terms of the word code, we sometimes distinguish between machine-readable and machine-executable languages. Code can refer to a range of machine-executable digital data which algorithmically instructs a CPU how to conduct computational operations on other data. In this way, code is used to refer to higher or lower-level programming languages, from machine code to Prolog and even Javascript.

    d. Our references to law as "code" should not be taken to deliberately exclude "law as data" either. Machine code, i.e. binary notation, is a form of digital data. Once law has been coded, it is a source of data for other systems.

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[5] In law, a "code" can be a statement of rules, usually in a civil law tradition, whose purpose is to fully and completely state the law. To "codify" the law has a particular meaning in law, which refers to taking a sometimes sprawling set of sources that state the law in cases or other sources, and reducing them to a single statement of rules.

e. Finally, when we say "law as code", the word "as" could imply a logical equivalence. A number of other logical connectors could be used to describe specific relationships between law and code, such as "law in code", "law and code", and so on. The subject of our study is to test the extent to which law and code can be equivalent. For this reason, we have used the word "as", bearing in mind that we do not exclude other possible relationships between law and code from our investigation, as discussed in more detail in Part 4.

ORIENTATION TOWARD NEW ZEALAND

70. This research was prompted by law as code developments within New Zealand. Despite our geographic and jurisdictional focus, these developments influence (and are influenced by) similar developments in other countries, within the private sector as well as government.

71. The primary objective of this report is to guide New Zealand's senior decisionmakers to make informed decisions about the development and deployment of law as code applications. We provide a legal and constitutional perspective.

72. Given this is a report about Legislation as Code in New Zealand, it is important to acknowledge the way we have approached this research within a predominantly European world view. Speaking generally, but particularly given its geographic scope, this subject would benefit from investigation from a te Ao Māori perspective and Māori values. This is particularly so given the central role of Executive government and the Crown in policy-making, the passage of legislation, and delivery of government services.

INCREASING IMPERATIVES TOWARD DIGITALISATION OF LAW AND POLICY

73. Government will increasingly develop and deliver its services through computational systems. At the policy level, and frequently at the Executive level, there is vocal interest in improving the accessibility and quality of government digital services. These services are almost invariably governed by various kinds of laws, which confer powers and obligations on the Executive branch of government. As larger populations require access to more complex government services, it tends to become harder for the state to provide those services with acceptable accuracy in an acceptable timeframe. Subsequently, Executive agencies must figure out how to deliver more, sometimes with less resourcing.

74. The use of digital computational systems presents one way of achieving more with less in high volumes (at scale). Digital systems enable the use of automation. The practical impediment to this is that the application of laws is rarely suitable for automation. Simply put, they were not written for that purpose – semantically or syntactically. They usually require a person to exercise some judgement. Some of

the possible solutions to this are to rewrite the law in various ways, or to write new laws according to a process that is more likely to generate a computer-implementable output.

75. Each of these options generates its own benefits and trade-offs. In New Zealand, a programme known as "Better Rules" aims to do some combination of the two. This programme is discussed in much greater detail later in Part 2. Our investigation is prompted by this attempt to create "better rules",[6] and a wider international movement to create "rules as code".[7]

76. These contemporary movements are not the first time it has been suggested that law and computer code could interact for the public benefit. There are decades of previous research that inform the topic in various ways. Moreover, if research on formal logic or mathematical expression is included as the foundation of computer science and clear expression in argument, then the history of the topic could be measured in centuries.[8]

77. With this historical foundation in mind, the report sets out two things:

   a. In Part 2, the authors' understanding of the suggested processes and implementations that comprise the "better rules" and "rules as code" processes, and the broader aim to produce machine-executable versions of legal instruments.

   b. In Part 3, the author's conclusions on the potential benefits and risks of producing legal instruments in both natural language and machine-consumable languages. In particular we critically examine the claim that all ambiguity can and should be removed from legal instruments and that machine-consumable models of legal instruments can be direct one-to-one translations.

78. We perceive that the greatest risks of adopting "law as code" practices, or in attempting to implement legal objectives through code, will arise from uncritical adoption which fails to account for the variety of disruptions that may occur, and the theory and rationale which underpins the contemporary legal system. These risks are significant enough to outweigh any benefits foregone by adopting a precautionary approach.

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[6] See, for example, Service Innovation Lab "Better Rules and Legislation as Code" (accessed 25 November 2020): <https://serviceinnovationlab.github.io/projects/legislation-as-code/>; see also Better Rules Discovery Report: <https://www.digital.govt.nz/dmsdocument/95-better-rules-for-government-discovery-report/html>.

[7] See, for example, James Mohun, Alex Roberts *Cracking the Code* OPSI Innovation Primer on Rules as Code (OECD, 14 October 2020): <https://oecd-opsi.org/report-launch-opsi-innovation-primer-on-rules-as-code/>.

[8] See M H Hoeflich "Law & Geometry: Legal Science from Leibniz to Langdell" (1986) 30(2) The American Journal of Legal History 95.

PART TWO:

ANALYSIS OF BETTER RULES AND RULES AS CODE

OVERVIEW

79. To critically analyse a better rules approach, rules as code, or the concept of legislation or law as code, we have had to be able to articulate precisely what those things involve.

80. In practice, we have found it difficult to confidently describe conceptual distinctions among the following:

   a. law or legislation as code;

   b. a better rules approach and the Better Rules programme; and

   c. rules as code.

81. In the end, we have elected not to just describe those concepts, but to adopt a position on how the concepts should be distinguished. Effectively, if a better rules approach is to be adopted, it should be adopted in a form that resembles the way we describe it.

82. We feel that this approach is justified based on the direct experience of one member of our research team. We have combined that experience with the critical insights brought by the wider team from experience, reading, and research. In an appendix to the report, we set out in more detail some of the public claims associated with Better Rules and rules as code to provide context to the claims we make and the distinctions we draw. Part Two of this report is intended to be a summary.

83. We note that our formulation of "a better rules approach" appears to diverge at times from Better Rules promotional materials. Throughout the report, we endeavour to refer to the official Better Rules initiative within government using capitalisation. We refer to "a better rules approach" without capitalisation to distinguish the approach itself from the official government programme, which is currently nested within the Better Rules for Business and Better Rules – Better Outcomes programmes within the Ministry of Business, Innovation and Employment.

84. We emphasise that the practices comprising a "better rules approach" can be used regardless of whether the "better rules / Better Rules" label is applied or adopted. For us, "better rules" is primarily a convenient shorthand that links our topic to contemporary developments in New Zealand.

WHAT IS A "BETTER RULES APPROACH"?

HISTORY AND PURPOSE

85.   In 2018, the concept of "a better rules approach" came into existence within the New Zealand government's Service Innovation Lab.[9] It was an approach to help accurately interpret legislation to deliver government services within and among various government departments.

86.   The better rules approach emulated many of the practices of Service Design. In essence, the approach is primarily a policy development method: the merit of this method does not rest primarily on the publication or operationalisation of formal "rules as code" outputs.

87.   The Service Innovation Lab was not the only government department working with "law as code" type approaches. The Inland Revenue Department in New Zealand works with a proprietary Oracle system that uses business process modelling techniques and in the original Better Rules discovery, it is indicated that IRD modellers led the process of coding the rules that became a better rules approach.

88.   In the context of the better rules approach, there are clear signs of it having been influenced by an approach to business rules and business process modelling. Firstly, the modelling was led by the IRD at the Better Rules Discovery documented in the 2018 report, and IRD takes a business rules and business process modelling approach. Second, core advocates of both the better rules approach and the rules as code area have a history of working in business process modelling. Third, the approach of developing "a concept model", "a decision model" and "rule statements" are practices followed in business process modelling and information systems practices.

89.   The Service Innovation Lab's initial work received international acclaim[10] and was featured in the OECD Global Trends 2019 report.[11] A number of other projects within the lab followed, exploring the use of a better rules approach and rules as code techniques. These included:

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[9] We note that many of the techniques adopted were drawn from previously existing approaches, such as service design, computational modelling, business process modelling and business rules analysis.

[10] See Nadia Webster, Department of Internal Affairs "Global Coverage of our legislation as code work" (29 August 2018): <https://www.digital.govt.nz/blog/global-coverage-of-our-legislation-as-code-work/>

[11] See OECD-OPSI "Embracing Innovation in Government: Global Trends" (2019): <https://trends2019.oecd-opsi.org/>

a. Analysis of the Rates Rebate Calculator.[12]

    b. An investigation by the Accident Compensation Corporation into using machine consumable legislation approaches for a structural rewrite of the Accident Compensation Act 2001.[13]

    c. International collaboration on pension eligibility.[14]

    d. Establishment of the "Better Rules – Better Outcomes" Team within MBIE.[15]

90. Since being initially developed and shared with other groups, better rules approaches are being investigated or piloted in specific government policy projects. Government agencies that we understand to have explored the potential of a better rules approach, rules as code, or associated methods and techniques, include:

    a. Inland Revenue Department.

    b. Accident Compensation Corporation.

    c. Parliamentary Counsel's Office.

    d. Land Information New Zealand.

    e. Department of Internal Affairs.

    f. Ministry of Social Development.

    g. Ministry of Primary Industries.

    h. State Services Commission.

    i. Department of Prime Minister and Cabinet.

    j. Ministry of Business, Innovation and Employment.

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[12] See: Gibson, L "Rates Rebate – content changes lead to better experience, more users" (14 June 2019) Digital.govt.nz: <https://www.digital.govt.nz/blog/rates-rebate-content-changes-lead-to-better-experience-more-users/>. See also Thurston, G, McCarthy, S "Rates Rebates (Te Whakamāmā i ngā Reiti) (30 November 2018) Service Innovation Lab Toolkit: <https://serviceinnovationlab.github.io/2018/11/30/Rates-Rebate/>.
[13] See Accident Compensation, Better Rules Discovery Team "Exploring Machine Consumable Accident Compensation Legislation" (July 2019): <https://serviceinnovationlab.github.io/assets/Exploring_Machine_Consumable_Code_With_ACC.pdf>
[14] See Service Innovation Lab "Better Rules and Legislation as Code": <https://serviceinnovationlab.github.io/projects/legislation-as-code/>
[15] See Better for Business "Better rules – better outcomes": <https://www.betterforbusiness.govt.nz/better-rules-better-outcomes/>.

91.   The initial concept for a better rules approach is best described as the application of "service design" techniques to policy development. Public materials from the Service Innovation Lab make the service design connection to policy development explicit:[16]

> What is new is testing the implementation logic and service design impacts alongside the policy development process, utilising approaches from other disciplines such as human centred design and test-driven software development. This opening up of the drafting process to include other ways of thinking and testing the rules has been coined 'Better Rules'.

92.   Digital.govt.nz defines service design as follows:[17]

> Service design is about making government services easy for people to use. This means designing services that put people at the centre and help them do the task they need to do, like learning to drive or buying a house. A service design approach looks at the whole task, rather than the separate parts that might be spread throughout a government agency or across different agencies. Service design identifies problems and opportunities for the people using the service and the people delivering it and works out the best solution.

93.   In a better rules context, a service design approach to policy development means developing policy in a workshop format which combines a collection of methodologies from across the various professions involved in the public service. The team takes an active interest in implementation as an essential component of achieving policy intent. In doing so, it produces a clearer shared vision of what a regulatory system is intended to achieve and how it should achieve it.

94.   Importantly, a regulatory system is wider than just the legislation or legal rules that may form the legal bedrock of that wider system.[18] Frequently, we have found that rules as code advocates are really talking about modelling a wider regulatory system, not just the law (legislation) itself.

95.   Because of the way that a better rules approach requires that policy development anticipates service design and implementation

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[16] See Service Innovation Lab Toolkit "Better Rules and Legislation as Code" <https://serviceinnovationlab.github.io/projects/legislation-as-code/>.

[17] See Department of Internal Affairs, Digital Government "Service design – overview": <https://www.digital.govt.nz/standards-and-guidance/design-and-ux/service-design/service-design-overview/>

[18] See Hildebrandt, M "Legal Protection by Design: Objections and Refutations" (2011) 5(2) Legisprudence at 223. Hildebrandt examines definitions of "regulation" by reference to "code as law" in her discussion of Black, J "Critical Reflections on Regulation" (2002) Australian Journal of Legal Philosophy 1.

requirements, it produces a superior description of the overall regulatory system required to deliver a policy programme.

96. In a policy development context that results in legislation or a legal instrument, this superior description of the overall regulatory system provides better information for drafters to understand what role legislation plays in that system, and how to implement that policy through legislative instruments – whether drafting legislation, secondary legislation, policy instruments, standards, or guidelines. We note that, independently of the Better Rules programme, there has been significant attention on improving the way that government departments prepare drafting instructions for the Parliamentary Counsel's Office.[19] A better rules approach could assist.

97. A core "knowledge asset" in the process is the "concept model". Within computer science, a conceptual model is also known as a domain model. It represents the core concepts in a problem domain and the relationships between them:[20]

> The conceptual model attempts to clarify the meaning of various, usually ambiguous terms, and ensure that confusion caused by different interpretations of the terms and concepts cannot occur. Such differing interpretations could easily cause confusion amongst stakeholders, especially those responsible for designing and implementing a solution, where the conceptual model provides a key artifact of business understanding and clarity. Once the domain concepts have been modeled, the model becomes a stable basis for subsequent development of applications in the domain. The concepts of the conceptual model can be mapped into physical design or implementation constructs using either manual or automated code generation approaches. The realization of conceptual models of many domains can be combined to a coherent platform.

98. A better rules approach to policy development rests heavily on the use of such conceptual models, which are drawn in part from information systems and computational theory.

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[19] See Parliamentary Counsel Office "Turning Policy Into Law: A step-by-step guide for instructors": <http://policy-to-law.pco.govt.nz/>; "Whole Step-by-Step Guide (Text Only)": <http://policy-to-law.pco.govt.nz/view-whole-guide/>; See also Performance Improvement Framework "Review of the Parliamentary Counsel Office (PCO)" (November 2014): <https://www.publicservice.govt.nz/assets/Legacy/resources/pif-review-pco-nov14.PDF>

[20] See the helpful working definition on Wikipedia, "Conceptual Model" (accessed 26 February 2021) <https://en.wikipedia.org/wiki/Conceptual_model_(computer_science)>. See also Knackstedt, Ralf; Heddier, Marcel; and Becker, Jörg "Conceptual Modeling in Law: An Interdisciplinary Research Agenda," (2014) 34 Communications of the Association for Information Systems art 36.

99. Taking a service design approach to policy development improves a policy's suitability for implementation in digital systems (i.e., computers). This is achieved by emphasising the way that a service will ultimately be delivered and received. A service design approach to policy using a multidisciplinary team also means incorporating expertise from people with experience in the operational side of government, who can sometimes be excluded from the policy development process.

"TRANSLATION" IN A BETTER RULES APPROACH

100. The original Better Rules Discovery Report mentions "translation" at multiple points, and translation occurs in multiple ways.

101. Our examples below are not intended to uncharitably dismantle the original discovery report: we are conscious of the circumstances in which it was produced. Rather, our intent is to illustrate how confusion might arise when it comes to considering the concept of "translation" in a better rules approach.

102. In summary, there are two points at which "translation" is relevant to a better rules approach.

   a. One translation point is the one that exists between the natural language instruments that describe the relevant regulatory system and the machine-executable code modelling or implementing that regulatory system. This is the translation point that we have scrutinised from a legal perspective in Part 3 of our report. This is the translation point that has attracted the most public attention, particularly for rules as code and law as code advocates.

   b. There is a second translation process which is not easily understood by outsiders to the policy process. This translation point exists between different groups of people that work together in different parts of the policy development process.

103. There are signs that both these points of "translation" are anticipated in the Better Rules Discovery Report, although they are not always carefully delineated.[21]

104. At page 26, a "translation gap" can be "removed" between policy, legislative intent, and software supporting service delivery:

   Making legislation or business rules machine consumable at the creation of rulesets would enable: ... remov[ing] the "translation gap" that currently exists between policy and legislative intent, and the software that is developed to support service delivery.

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[21] See Better Rules For Government Discovery Report (March, 2018) available from <https://www.digital.govt.nz/dmsdocument/95-better-rules-for-government-discovery-report/html>. We include further excerpts in an Appendix to this report.

105.   At pages 7-8, "translation" is anticipated in relation to "policy, legislation and the business rules of government", where "the logic of these rules" is turned into "reusable, machine consumable programmatic logic":

> There are opportunities if we consider how we might make policy, legislation, and the business rules of government not just human and machine readable (like the XML, or Extensible Markup Language version of New Zealand's legislation on legislation.govt.nz), but machine understandable. Turning the logic of these rules into reusable, machine consumable programmatic logic at source (rather than through translation) supports service innovation by both government and, where appropriate, by third parties (including artificial intelligence). However, we must remember that ensuring human and machine consumable rules have equivalence and are openly accessible is essential for transparency of government and algorithmic decision-making.

106.   At page 12, in a future state, it is hypothesised that "we remove the need for translation of the rule" and at page 14, "translation gaps" can be "reduce[d] or negate[d]" in "policy production and consumption", leading to "delivery of the rules to humans and systems":

> We hypothesised that this future state approach would reduce or negate the translation gaps in policy production and consumption and lead to more timely and reliable delivery of the rules to humans and systems.

107.   At page 10, both translation points are run together. Translation is anticipated from "rules" into rules that can be delivered in business systems. At the same time, translation is considered between "each group next in the production and consumption chain" who must "translate the output from the previous step", which creates a risk of errors:

> We explored the issues around the work of translating rules so they could be used by business systems to deliver services. It became apparent that all the different groups involved in the policy to service delivery process use a structured language, have standards and frameworks and use manuals and guidelines. However, the language and the tools and materials are unique to each of the different groups and are largely not shared. The different groups work more or less in silos. This means that each group next in the production and consumption chain has to translate the output from the previous step without full knowledge of that step, and without having had input into that step. The translation process is inefficient, opens up the process for errors and there is limited sharing of knowledge and experience across the groups … Inefficiencies are amplified as business systems with embedded, or hard coded, rules rely on being notified of upstream changes and must replicate the change process.

108.   In traditional policy development approaches, policy development tends to be linear. This is why the language of "agile" software development is sometimes used to describe a better rules approach, in order to contrast it with the more "waterfall" based approach that metaphorically describes traditional policy development.

109.   In a linear approach, each stage of the policy development process tends to be siloed. Each silo has its own area of expertise and skill. As the policy moves from one silo to the next, the implicit assumptions about the policy made within each silo compound at each stage of the process. Different siloes in a linear policy process must explain the policy not just to the world at large (in the final legal instrument), but also to each other as the policy moves from one stage of the process to the next.

110.   This intra-government translation process is the reason why the better rules approach emphasises the production of common knowledge assets. These knowledge assets are produced by multidisciplinary teams sitting across the various siloes and can be used in any of the various siloes in the policy process. These knowledge assets are primarily the concept model, decision flow diagram, and rule statements (from business rules modelling approaches). However, one additional knowledge asset that has captured attention is the coded computational model of the regulatory system or policy as produced from those assets.

111.   The coded "rules-as-code" model of the policy is simply another tool for facilitating communication between policy development siloes. Those knowledge assets are designed to require the implicit assumptions held by different actors to be stated explicitly, reducing the likelihood of "incorrect translation" between stages in the policy process.

112.   We pause to note that, from the very initiation of a "better rules approach" as first described in the Discovery Report, there was the intention that the rules of government be drawn from legislation, policy and business rules, and that these rules would be incorporated directly into coded systems that are used to implement government policy. Also, there was some suggestion that, through a process of parallel drafting, the "translation gap" between legislation and other human readable sources of the rules and the software implementation of them could be not just reduced, but at times removed entirely.

FEATURES OF A BETTER RULES APPROACH

113.   Having dealt with these points, we summarise our view that a better rules approach has the following features:

   a.   Policy is developed using a multi-disciplinary team. To our understanding, this is a departure from the usual policy development approach. This is a significant point to note when assessing the overall relative merits of wider adoption of a better rules approach.

   b.   The multidisciplinary team includes policy professionals, legal experts (lawyers), legal drafters, service designers, business rules analysts and computer programmers. This facilitates a wide perspective on the topic being considered in relation to policy development. The approach aims to be user-centred, co-

creative, evidence-based and holistic.[22] The different skillsets of all members contribute to the process. Communication across disciplinary boundaries can be difficult, but being able to identify areas of miscommunication or misunderstanding between these groups is a beneficial and essential part of the process.

c. To date, there has been less observable emphasis on the formal inclusion of people outside government employment who are intended to be the recipients of these services. Service designers are the primary way of capturing the needs and experiences of people outside government in a better rules approach. We think there is a further significant opportunity to incorporate the perspectives of people outside government into the policy development process through a comprehensive better rules approach that includes them .

d. Like Rules-as-Code approaches, a better rules approach incorporates skillsets from computer science and business process modelling, including concept modelling, decision flow diagrams, and rule statements. The primary purpose of using these methods is to clarify the intended regulatory system being developed: they clarify policy intent.

e. The use of these "knowledge assets" (concept models, decision flow diagrams, rule statements) reflects the holistic perspective brought by service designers. A service design approach accounts for the way many of the "rules" produced through a policy development process will eventually be implemented in digital systems. These rules will influence the way a service is delivered, whether they are derived from legislative instruments or not. Other non-legislative instruments (including the limitations of software design or code) can also exert a normative influence. A core goal for some better rules and rules as code advocates is to better account for the source of various rules that comprise an overall regulatory system so that the legitimacy of rules can be assessed, and the comparative significance of legislative rules can be incorporated by contrast with other rules and limitations, such as the limitations of software systems or the imperatives of operational delivery.

f. The better rules team produces an array of outputs. One possible output includes rules-as-code: by "rules-as-code" we mean a computational model of the intended regulatory system. This model will include both legal and non-legal rules. The model, because it is intended to be computable, is produced in machine-executable languages. Based on workshops run to

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[22] See Department of Internal Affairs "Service Design Principles" (Digital Identity Programme): <https://www.digital.govt.nz/standards-and-guidance/design-and-ux/service-design/service-design-principles/>.

date it has been recognised that the act of attempting to code the rules is valuable, even if the coded model is eventually discarded.[23] This is because the team must attempt to "explain" the policy to a computer system, which does not share the assumptions and contextual understanding of the team. [24] Whether or not a coded model is ever executed, the process alone serves to highlight whatever assumptions and implied contextual factors that have been brought by the policy development team. Without being surfaced in this way, these assumptions might otherwise have been implicitly incorporated into the policy design, and only surfaced later at the point of service design and operational delivery.

g. Another output produced from a better rules approach is a list of questions that the regulatory system or computational model requires to be posed to a user (or service designer). The list of questions reflects the need to identify "inputs" to both the policy system and the computational model. The team identifies these questions/inputs during the better rules process. For example, if eligibility is based on age, service designers will need to ask questions such as: what is your birth date; are you over the age of 18; what is your age; etc.

h. Identifying these questions compels the team to identify the kinds of inputs that will be required to answer those questions. It also enables consideration of how the inputs would be implemented in a digital (coded) system. This in turn enables the team to consider whether those inputs can be drawn from existing records or whether they will require data entry by a human. Accordingly, areas of judgement, ambiguity and discretion can be identified, as well as inputs that cannot be drawn directly from digital datasets. This is also important from a service design perspective. It enables the team to consider the burden that a regulatory system puts on citizens or staff having to enter those inputs. It is also possible to assess the overall "computability" of a legal instrument or regulatory system based on the extent of human input required in order for the computational model of the system to operate.

i. By representing a policy or regulatory system in code, this enables the use of software development techniques to test and

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[23] See Accident Compensation, Better Rules Discovery Team "Exploring Machine Consumable Accident Compensation Legislation" (July 2019), para 51: "Whether the developed code is used and published is a separate discussion to the value that just writing the code offers to the policy development process."
[24] This is not to say that a computer system does not reflect the assumptions of its designers, or a set of implied limitations produced by the nature of computation. We are confident this will be explored elsewhere.

assess the proposed policy system represented in the code. One promising opportunity is to use "test driven development" and test suites. Test suites are used extensively in software development. They have also been used in rules-as-code demonstrations. France has used the OpenFisca platform to model its tax and benefits system and subsequently used test suites to assess whether or not the model (and by implication the relevant regulatory system) was performing as expected.[25]

j.   Within the Better Rules workshops, test suites were easily understood by the non-programmers on the team. Test suites worked as a bridge between programmers, non-programmers, and the coded model. If a non-programmer had a question about the implementation of a policy, they could propose a test, and see how the model responded to it. In the policy space, test suites can be seen as a crude (or brute force approach) to capturing policy intent. Testing is, at its essence, a collection of scenarios represented by input data and the expected outcomes to be produced by the system when presented with those inputs. By contrast, policy development and legislative drafting is normally directed toward expressing the rules and guidelines that link those inputs and outputs (which are finite and reproducible), rather than the inputs and outputs themselves (which are potentially limitless in their scale and variety).

k.   Test suites offer a way to retain institutional knowledge that arises during the policy development process by illustrating what a policy development team intended to be the output of a coded model or regulatory system when presented with particular inputs or scenarios. The test suites can be preserved as another "knowledge asset" in a better rules approach alongside the coded model of the system.

GOALS OF A BETTER RULES APPROACH

114.   Considering the expansive discussion above, the goals of people pursuing a better rules approach appear to include the following:

a.   Achieving improved clarity, logical consistency, and conceptual coherence in a policy or regulatory system being developed.

b.   Any policy in development will have been examined and investigated thoroughly from a multidisciplinary perspective that includes consideration of factors relevant to service delivery, implementation and operationalisation.

c.   Anticipating how a legal instrument is to be operationalised in computer systems, thereby reducing the frequency of situations where the Executive must make potentially unwarranted

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[25] OpenFisca Github: <https://github.com/openfisca/openfisca-france>.

implementation decisions in situations where the statute is silent or ambiguous.

d.   Assisting in the preservation of institutional knowledge about a particular policy while it is under development (e.g. through test suites and knowledge assets like concept models).

e.   Identifying unintended gaps in regulatory systems and legislation.[26]

f.   Providing a methodology through computational modelling for allowing large enactments to be restructured in a way that tracks the way original policy intent may have changed or not, for example through the use of test suites.

g.   Ensuring that, using a service design approach, the implementation of the legislation in an operational setting will not undermine the overall intent and purpose of the Act. An example is the use of a better rules approach to make changes to the New Zealand Rates Rebate Act by removing the mandatory requirement to make a statutory declaration. This improvement was identified through service design processes that noted how this procedural requirement in an operational setting was working to undermine the purpose of the Act [27])

COMPARING BETTER RULES WITH 'RULES AS CODE'

115.   There exists no specific authoritative definition of "rules as code" and so this analysis is based on our own impressions, including the sources used above to comprehend a better rules approach.

116.   The term "rules as code" is mostly used as a rallying point or hashtag (#rulesascode) to encourage a wider conversation engaging the many perspectives and practices that surround the practice of putting these two fields ("rules" and "code") together.

117.   Academic practitioners with expertise in computational law have also grappled with understanding what "rules as code" specifically refers to, both by way of inclusion and exclusion.[28]

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[26] Accident Compensation, Better Rules Discovery Team "Exploring Machine Consumable Accident Compensation Legislation" (July 2019).
[27] (24 September 2019) Rates Rebate (Statutory Declarations) Amendment Bill – First Reading: <https://www.parliament.nz/en/pb/hansard-debates/rhr/combined/HansDeb_20190924_20190924_24>.
[28] See Casanovas, Pompeu, Hashmi, Mustafa, Barnes, Jeffrey, de Koker, Louis, Ho-Pun Lam, Governatori, Guido, & Zeleznikow, John. (2020, October 31). Comments on Cracking The Code: Rulemaking For Humans And Machines (August 2020 draft) Comments on the draft

118. One useful historical artifact is a PDF archive of a discussion forum around "Better Rules", which also frequently uses the phrase "rules as code".[29]

119. A report by the OECD entitled "Cracking the code" provides an extensive look at the term (see Part 4, OECD Primer).[30] In the primer report prepared by the OECD, the authors took an approach of defining what rules as code is not, rather than what it is, partly to respond to fervent and repetitive disagreement about the concept in online discussions. There have also been articulations of both "wide" and "narrow" understandings of the term,[31] as well as distinctions between rules as code as a process (referring mainly to a better rules approach) versus rules as code as an output.[32]

120. Our description seeks to extract the key conceptual points that frame the recent discussion primarily to contrast it from a better rules approach as we understand it.

GOALS

121. A fundamental perspective of the Rules as Code movement is that coded rules giving effect to a policy, legal, or regulatory system could be elevated from their incidental existence as a tool of operations to being purposefully and structurally designed. They could then be incorporated into software systems as well as being published openly for whatever uses might be identified.

122. Within the rules as code movement, "rules as code" (or coded models of the law) can be produced from legislative instruments and other sources of "the rules" once those rules are already in effect. A key insight from the Better Rules Discovery projects is that this was a very difficult task when legislation had not been produced with digital systems in mind, hence the emphasis on using various approaches to improve the policy development process itself.

123. Once rule-sets have been coded, the clear intent in a rules as code approach is that these rules should be a reliable indication of what "the rules" require. These rules go beyond mere guidance, to the point that

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OECD White Paper on Rules as Code, submitted on 27 August 2020 to the authors. <http://doi.org/10.5281/zenodo.4166115>.

[29] See "Archived Loomio Forum Discussions: September 2018 – June 2020" < https://www.betterforbusiness.govt.nz/assets/archived-loomio-forum-discussions.pdf>.

[30] James Mohun, Alex Roberts *Cracking the code: Rulemaking for humans and machines* (OECD Working Papers on Public Governance, No. 42, Paris: OECD Publishing 2020) <https://oecd-opsi.org/projects/rulesascode/>.

[31] See Waddington, M "Research Note. Rules as Code." (2021) 37(1) Law in Context at 1, DOI: https://doi.org/10.26826/law-in-context.v37i1.134

[32] See Mohun and Roberts "Cracking the Code" (above).

they can be relied upon for the purposes of assessing legal compliance or even to form a regulatory base layer for government as a platform.

124. Projects like the open-source platform OpenFisca have been influential in shaping the shared values and vision that do exist around the term rules as code. These include:

    a. Coding rules modelled directly from legislation and publishing them in an open and reusable format.

    b. Publishing services that allow people to navigate the coded rules to understand how the rules apply to their situation.

    c. Using coded rules to inform and model changes to the law for research purposes.[33]

125. Rules as code advocates frequently point to the opaqueness, inscrutability and inaccessibility of written law to the average person and argue that rules (understood to include law) represented in code would enable the use of software systems to understand what the law requires people to do.

126. In an Appendix, we include excerpts from the OECD primer that clearly anticipate that "rules" include a wide range of sources that give a guide to conduct, and importantly include legislation and case law as well as non-legal materials. Generally speaking, there is not always careful distinction between the way that the sources of "the rules" might affect the legal character of the "rules as code" being produced.

127. By publishing "rules as code", advocates suggest the following outcomes can be achieved.

    a. Society (or rule-takers) could leverage computing platforms and tools to create the means of ensuring that, in line with one goal of the rule of law, "the law should be clear and clearly enforceable".[34]

    b. Further, it is suggested that coded rule sets can be published in a way that structurally separates the logic of the rules (their syntactical structure) from the way the law is applied. This facilitates the incorporation of rule logic into government department software architecture. If further steps are taken to

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[33] See, for example, Hélène Périvier "Do separated fathers bear a greater sacrifice in their standard of living than their ex-partners?" (8 July 2015, Blog of the Observatoire français des conjonctures économiques): <https://www.ofce.sciences-po.fr/blog/separated-fathers-bear-greater-sacrifice-standard-living-ex-partners/>. See also France Strategie "Comment partager les charges liees aux enfants apres une separation? (18 June 2015): <https://www.strategie.gouv.fr/publications/partager-charges-liees-aux-enfants-apres-une-separation>.
[34] As described in the Legislation Guidelines (2018 edition) Chapter 4 "Fundamental constitutional principles and values of New Zealand law".

make the code publicly available, it allows government departments to be "open by default" and allow users to see how "the law" has been incorporated as code directly into software operations.

FEATURES

128. Recent advocates for rules-as-code posit the following features and desired effects:

    a. Implementing law and legislation in digital systems (in "code"), including the assessment of compliance with the law through digital systems.

    b. Publishing law and legislation in coded form, or in machine-executable languages, with the intention that such published code be relied upon by the community at large.

    c. A focus on reducing the "translation gap" between the law and the computational model of the law, and in some cases, attempting to leave no translation gap at all through one-to-one correspondence between the expression of a rule in machine executable languages and in natural language.

    d. The use of computational models of "the rules" (including the law) that can be produced by government and relied upon by citizens and executive government staff. This is a key foundation of the "Government as a Platform" concept, [35] and advocates see availability of such models creating the means for wider integration between government and non-government entities through digital platforms.

    e. As with better rules approaches, a shared use of techniques from computer science and business process modelling, including concept modelling, decision flow diagrams, and rule statements to produce a coded model of the law.

    f. A greater emphasis on legal instruments that already exist, rather than legal instruments under development in the policy process (by comparison with a better rules approach).

    g. Incorporation of other concepts from the field of software development including sandboxing, version tracking software (such as git), and virtualisation (digital twins).

    h. An open approach to how operational rules (including legislation) will be implemented in digital systems, leading to wider scrutiny and public ownership of any particular coded rule set used in operations. Advocates argue that public availability

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[35] Pia Andrews "Gov as a Platform: A Value Proposition Discussion Paper" (8 September 2017): <https://www.digital.govt.nz/blog/gov-as-a-platform-a-value-proposition-discussion-paper/>

of these coded rule sets would allow incorrect legal interpretations of the law in software systems to be identified more quickly.[36]

BRIEF HISTORY OF LAW AND CODE

129. In response to a primer written by the OECD on "rules as code", scholars with an extensive history of exploring law and code have noted that rules as code is effectively a new label, attitude or approach to a well-furrowed concept.

130. There is a complex body of scholarship on the interaction between legal systems and computer systems. Some of this scholarship deals with the theoretical and jurisprudential questions raised by modelling law in code and implementing those coded models. Some of this scholarship focuses primarily on the constitutional implications of using code to achieve legal objectives. Other scholarship touches on the way democratic legislatures might be capable of implementing law that protects individual privacy, copyright, and any number of other legal concepts in an age of pervasive computing technologies.

131. We think there is a significant link worth exploring further between the way that better rules and rules as code approaches owe their lineage to business process modelling techniques, including the use of computational languages and systems for modelling business compliance with law and other regulatory instruments. Policymakers should also be aware of the influence of RegTech and FinTech principles and motivations behind the renaissance of law as code concepts in the contemporary better rules and rules as code movements.

132. The practice of intentionally implementing law in and through computer systems has a long history. In recent decades, the most notable application was research and development of "Legal Expert Systems". that was particularly prevalent during the 1980s and 1990s. There is a substantial body of legal and computational academic research detailing the challenges of building such systems.

133. New Zealand's Accident Compensation Corporation has explored the use of better rules approaches for a structural rewrite of its governing legislation, but it has a longer history of attempting to model legislation in machine languages. From discussions with people involved at the time, ACC had previously attempted in the 1990s to encode the

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[36] For example, the approach to redundancy payments by WINZ identified in 2020. See Glen Scanlon "Work and Income acts 'unlawfully' over benefits and redundancy payments" (8 May 2020) *Radio New Zealand*: <https://www.rnz.co.nz/news/national/416174/work-and-income-acts-unlawfully-over-benefits-and-redundancy-payments>.

incoming ARCIC 1992 in the Prolog language for implementation in software systems and for claims triaging.

134. Generally, by contrast to more recent rules as code initiatives, research into legal expert systems placed lesser emphasis on the public production of coded rule-sets for reliance and use, and a greater emphasis on building systems that would enable people to pose and answer legal questions. The potential uses of such systems were cast broadly and included, for example, an attempt to predict and model judicial reasoning in litigation without using statistical methods, as well as extracting normative rules from difficult source material such as case law.

135. The history of modelling law in computer code has numerous methodologies, technologies, and techniques. To aid in understanding this practice we believe there are a few main objectives with differing core objectives that seem to dominate law as code attempts.

   a. Legal information retrieval. This area of scholarship aims to standardise the way legally relevant sources of the law are standardised, categorised, and able to be retrieved by software systems. This area falls largely outside our immediate focus.

   b. Providing authoritative answers. This was often the objective of the Legal Expert Systems of the 1980s and 1990's. This is generally the most obvious objective for people first introduced to the concept of code as law. Expert systems were rule-based artificial intelligence systems that combined expert information and a logic for solving domain-specific problems that replicated the process of human experts. The goal was to be able to seek legal answers to legal questions from computer systems.

   c. More recently, Legal Expert Systems scholarship has shifted to simply modelling an interpretation of the law, without aiming for authoritative answers.[37] This approach is underpinned by the idea that code may never adequately mimic the features of natural language nor the authority of the written law. As such, any coded model of the law can never be considered absolutely correct for all tasks in all cases. Subsequently, this approach focuses instead on achieving a sufficient interpretation, or producing a software system that operates in partnership with human operators as a decision-support system.

136. We say that the aim of some contemporary rules as code advocates are the same as those of the builders of legal expert systems: they wish to build models of law that can in any case be relied upon to

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[37] Karpf, J "Inductive modelling in law: example based expert systems in administrative law" (paper presented at ICAIL '91: Proceedings of the 3rd international conference on Artificial intelligence and law, May 1991) 297 to 306: "Any law model must be conceived to give decision support only".

conclusively answer legal questions, to the point that they can be automated and systematised, to form a regulatory base layer for digital government.

137.   In a useful article, Greenleaf, Mowbray and Chung succinctly state important historical features of the AI & Law movement which should have direct bearing on development of Rules as Code approaches, saying "it is important to realise that this field is not a tabula rasa."[38]

138.   One crucial insight from the history of developing legal expert systems is the way that legal expert systems rely on knowledge-bases which are shaped through the legal interpretation of the law, as formulated by the people who created that knowledge base. Another crucial insight is that legal expert systems will never be exclusively technical: they require inputs, assessment and interpretation by a human user in order to function correctly.

139.   Greenleaf et al summarise these insights into a 15-point list, which is further summarised as follows (although edited for length):[39]

> … looked at from the user perspective, … what counts as a useful level of legal expertise is relative. A system may be valuable to a class of users even though it has a relatively low point at which it admits that a problem is beyond its expertise, and it may serve as a method of triage. … [I]t is not realistic to try to build legal expert systems that encapsulate all the knowledge necessary to answer user problems ... The more realistic aim is to build decision support systems, in the use of which the program and the user in effect pool their knowledge/expertise to resolve a problem … Expertise can and should be represented and utilised by pro- grams in many ways … This means the knowledge- based system (the knowledge representation and the program) should not be 'closed': it must be integrated with text retrieval, hypertext and other tools which allow and assist the user to obtain access to whatever source materials are necessary to answer the parts of a problem dependent on the user's expertise … The result is an integrated decision-support system.

140.   Greenleaf and colleagues have recently demonstrated the value of this historical expertise to the rules as code community. In 2020, the New South Wales government released a computational model of gaming regulations intended to enable people to understand their compliance when running community gaming (or gambling) events. In reply, Greenleaf et al demonstrated that their DataLex system, which is the product of decades of legal scholarship and computational development, could produce a coded rule-set in approximately 24 hours.[40]

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[38] Greenleaf, G, Mowbray, A, Chung, P "Building sustainable free legal advisory systems: Experiences from the history of AI & law" (2018) 34 Computer Law & Security Review 314 at 317.
[39] Ibid at 321.
[40] See Australasian Legal Information Institute, Media Release "Smart AI: AustLII's DataLex turns NSW gaming Regulations into code in 24

141.   The lessons from those building Legal Expert Systems therefore must be considered. In the extract below, Greenleaf et al state the conclusions reached by builders of such systems at the time, and the importance of interpretation both legally and factually:[41]

> The aim in building legal expert systems is not to build a 'robot lawyer', which simply extracts unproblematic facts from a user and then comes to a conclusion. Almost all systems require the user to provide some degree of interpretation of the questions asked, and the sources of law involved, requiring at least a minimal level of interpretative skills. The real model of a legal expert system is therefore one of collaboration between a semi-expert computer system, and a semi-expert user, with control of a problem's resolution alternating between them. The aim is to support decisions made by human users. The result is best described as a 'legal decision support system', rather than an 'expert system' or 'robot lawyer'.

142.   Greenleaf et al also emphasise that "interpretation issues cannot be eliminated from "knowledge-bases" that inform rules as code / legal expert systems:[42]

> Access to legal sources and other forms of legal expertise is almost always necessary, except in the most trivial of legal expert systems, because interpretation issues cannot be eliminated from knowledge-bases. This means that inferencing systems cannot be 'closed': they must give users access to the legal sources on which interpretation is based. Because law is constantly changing (most notably, by the creation of new case law), if such access is to a limited set of resources ('closed' in another sense) it will be unsatisfactory. From a user perspective, inferencing systems must be as open as possible to all relevant legal resources, primary and secondary.

143.   We do not make these points to diminish the potential of modern rules as code, law as code, or better rules approaches – or the standing of their respective advocates. Instead, we believe it is essential to briefly note the existence of these issues as the tip of a significant iceberg of scholarship.

CONCLUSIONS ON BETTER RULES AND RULES-AS-CODE

ENDORSING A BETTER RULES APPROACH

144.   Rules as Code is a term that is used in a discussion forum created for the purpose of discussing "Better rules". It began to be used in the

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hours" (2 October 2020): <https://www.austlii.edu.au/austlii/announce/2020/1.pdf>.
[41] Ibid at 320. We note Jason Morris reaches similar conclusions at p 47 et seq in his LLM Thesis: Morris, J "Spreadsheets for Legal Reasoning: The Continued Promise of Declarative Logic Programming in Law" LLM Thesis, 2020, University of Alberta.
[42] Ibid at 321.

context of an international movement inspired in part by the better rules approach and the Better Rules programme.

145.   The focus of rules as code as we see it is taken to be much more focused on the use and implementation of coded rule-sets, with less emphasis on the use of modelling and service design in policy development.

146.   People sometimes use the "rules as code" label to refer to what we have described here as a better rules approach. There are also examples of better rules advocates focusing primarily on the alleged benefits of using and implementing a rules as code output produced during the better rules process. We raise this to highlight the challenge of determining the boundaries and overlap of both concepts.

147.   We define a better rules approach as follows:

   a.   the use of multidisciplinary policy development methods and expertise;

   b.   to enhance the conceptual coherence and logical consistency of a policy initiative;

   c.   with a view to its superior expression in natural language legal instruments;

   d.   and consideration of how that policy or regulatory system (as bounded by the legal instrument) will be implemented as a matter of service design, both by human and digital systems.

148.   The better rules approach is an attempt to develop legislation and regulatory systems in ways that make them more amenable to being operationalised in digital systems while minimising the kind of unwarranted interpretive leaps that must sometimes be made by executive agencies created coded interpretations of the law.

149.   A better rules approach is also a way of ensuring that delivery of policy through digital systems adheres closely to Parliamentary intent, as expressed in legislative language. In this sense, it has positive democratic implications for the use of software to deliver government services.

150.   As we discuss in the next part, our concerns about better rules and rules as code approaches stem from situations where the legal status of the rule sets produced, by comparison with legislation itself, are said to be equivalent.

151.   In particular, we explain why there are risks to any apparent lack of critical appreciation about the role of natural language for statutory interpretation and the separation of powers, and the value of interpretability in natural language legal instruments.

THE PROCESS OF MODELLING IS OFTEN MORE SIGNIFICANT THAN COMPUTATION OF THE MODEL

152. When a policy or regulatory system is modelled in code using a better rules approach, it is important to recognise that the task is often more about creating and mapping the concepts and their relationships to each other than it is about creating computational formulas. The resulting models capture what often is the most complex aspect to law; understanding what parts are pertinent to a given situation and what questions need answering.

153. We are persuaded of the benefits that can be derived from creating accurate, reliable and accessible coded models of the law and its legal effect, but these benefits equally derive from modelling a wider regulatory system or the way a policy will operate. By a "coded model" we mean a sort of schematic (or "blueprint", as the better rules community often describes it) of a particular legal or regulatory system or a device that allows users to gain a better understanding of how the law affects them in any given activity. Such models can be instructive, promote efficiency, reduce barriers to accessing justice, and reduce the risk of misunderstandings between legal parties.

FAIRLY COMPARING LEGISLATION TO CODE

154. One point to emphasise is that the advantages of enacting law in code should be compared with statutory drafting as it is now, not as it was in the past. In New Zealand, for example, there has been a demonstrable shift to plain language drafting and drafters internationally use a range of digital tools, including extensible mark-up languages (XML).[43]

155. Drafters have been aware of the ambiguities that can be created by imprecise use of logical operators for decades, and avoiding undue syntactic ambiguity is a basic expectation of legislative drafters.[44] If vague or semantically ambiguous drafting has been used, that is generally because it is what is required to pragmatically and constitutionally give effect to the intended policy as understood by the drafter.

156. Many legal instruments may be drafted without access to people with specific drafting skills, including contracts, or secondary legislation, and this can produce very poor legal instruments. But legislative drafting is seldom if ever done by untrained drafters.

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[43] For a critique of plain language drafting see Jeffrey Barnes "When 'plain language' legislation is ambiguous – sources of doubt and lessons for the plain language movement" (2010) (34) Melbourne University Law Review 671.

[44] See by way of illustration Stephen M Rice "Leveraging logical form in legal argument: the inherent ambiguity in logical disjunction and its implication in legal argument" (2015) 40 OklA City U L Rev 551.

157. It is important to bear in mind that not all drafting is done under ideal conditions, even where the drafter is highly skilled and experienced. One of the greatest benefits of a better rules approach is the way that it tightens ambiguity in a policy before the policy is given to a drafter for legislative drafting. Equally, the preparation of a variety of knowledge assets – such as the concept model – is an important way of communicating policy intent, and thereby enhancing legislative drafting.

IMPRECISION CAN BE MODELLED, BUT NOT AUTOMATED

158. Imprecision in the law, or ambiguity in natural language legal instruments, might be thought by some to make modelling of the law impossible. In practice, coded models can incorporate mechanisms for human input, where an input would otherwise not be able to be computed.

159. The task of coding a rule-set means that areas of computability and non-computability can be identified, which can be beneficial from the service design perspective at the heart of better rules.

160. It is possible and programmatically simple to incorporate human discretion into a computational model as an input to the model's operation, however this human discretion element cannot be automated.

161. Importantly, the deliberate modelling of imprecision in a computational model does not avoid the initial step of interpreting the law in order to decide how that model should be constructed. The decision about where imprecision exists in legislation and how that is to be reflected in a coded rule set as drawn from legislation is fundamentally a matter of legal interpretation, and in principle contestable.

THE SOURCES OF THE RULES

162. When producing coded models of "the rules" or "the law" or a wider regulatory system, it is essential to maintain a distinction between various rules based on their source and the authority they carry. A legislative rule should generally always override a rule based on operational policy and practice, for example.

163. Descriptively, based on documentary materials describing better rules and rules as code, it is difficult to say whether these important distinctions are always taken into account by all advocates for rules as code or better rules approaches.

164. When rules as code or better rules approaches sit exclusively within government, there is a risk that they become too inwardly focused. There can be a temptation to treat operational policy interpreting the law as having equal weight to the law itself.

165. Some advocates clearly express the intention that coded rule sets will be used for assessing legal compliance. Despite this, in some cases, the "rules" of the system to be coded appear to include sub-legislative

or extra-legal sources of rules, such as organisational practice and policy, or "policy intent" as understood independently from the Parliamentary intent manifested in statutory language. There is not always clear consideration of the way that incorporating these non-legal or extra-legal rules might affect the legality of the coded rule-sets being published or operationalised.

166. It is equally important to note that, for others, this ability to clearly ascertain the legal authority for a coded rule within a rule set is a core benefit of a better rules approach. Presently, digital systems used by the state can incorporate normative limitations that stem from the software system itself or from operational limitations, not from the law itself. By preparing coded models of the law (during policy development or after legislation is passed), there can be enhanced transparency about when a rule is drawn from an authoritative or legal source, as opposed to when it has been introduced due to other considerations.

167. Isomorphism, in a law as code context, refers to the traceability and structural similarity between a coded representation of a rule and its legal source. It is desirable because it allows a coded representation of a rule to be traced back to its authorising source, as well as to scrutinise that rule for the faithfulness and accuracy of its interpretation.[45] This traceability is a key goal for some better rules and rules as code advocates.

168. Given the links between the rules as code movement and the public service, the authority to dictate an operational interpretation of what "the rules" mean to the community at large is often taken for granted.

169. If coded rule-sets were to be created by non-government actors, we suspect the distinction between legal rules and extra-legal (or non-legal) rules would be more carefully observed. Coded rule sets created by non-government actors that are not legally compliant can be simply dismissed by government regulators. By contrast, a non-government actor seeking to displace a coded rule set used by a government agency faces much greater barriers to displacing that rule set, such as litigation or administrative and judicial review.

170. In summary:

    a. It is essential that any coded model of the law that is to be treated as a guide to what the law requires people to do must carefully distinguish between rules in the model drawn from the law itself, and rules in the model drawn from non-legal sources

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[45] See Greenleaf et al (2018) at p 319. See also Bench-Capon, T J M, Coenen, F P "Isomorphism and Legal Knowledge Based Systems" (1992) 1 Artificial Intelligence and Law 65 for more detailed explanation of isomorphism in legal knowledge bases.

like policy instruments, business rules, or operational considerations.

b. For some advocates of better rules approaches and rules as code, achieving this careful distinction between the legal authority of coded rules is a key goal and contended benefit.

LEGAL IMPLICATIONS OF "CODE AS LAW"

171. Our overarching impression is that recent work around rules as code and better rules shows a lack of understanding around the constitutional implications of both approaches. There is little attention to the role of the separation of powers, the independence of Parliamentary Counsel, case law, contestable legal interpretation or legal argument, and the constitutional significance of the judiciary.

172. Some rules as code and better rules advocates clearly intend to create legislation-as-code that leaves no room for interpretation at all.[46] That may be acceptable when it comes to some kinds of legal instruments, or various policy or rules-based instruments that sit below the status of legislation, however to suggest that Parliament should pass legislation that, by its architecture, permits no interpretation, should ring significant constitutional alarm bells.

173. The constitutional implications of using computers and principles of computation to deliver legal effects is the predominant focus of this report.

174. Finally, we note that the New Zealand Parliament has created a range of legislative mechanisms for both:

a. revising the wording of legislation where it is unclear or to take account of technological changes (discussed in Part 3); and

b. also to delegate authority to an AES to exercise legal tasks (discussed in Part 4).

175. In Parts 3 and 4, we explore the way that these existing mechanisms can be used to give effect to the key benefits of better rules and rules as code approaches, without undermining constitutional principle or undermining the status of natural language legislation as a key method of balancing and separating power in a constitutional democracy.

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[46] For some examples in support of this general proposition, see Appendix: Excerpts from Better Rules and Rules as Code Publicity Materials.

PART THREE:

CODE SHOULD NOT BE LEGISLATION

WHAT IS LEGISLATION?

176.   Our focus has been on "legislation as code". This is because, along with the notion of "machine-consumable legislation", is a phrase that has been used by advocates for better rules approaches, the Better Rules programme and among rules as code discussions.

177.   As discussed at Part 2, we have observed that the important distinctions between the sources of any "rules" being coded is sometimes overlooked.

178.   It is important to understand the difference between legislation and other kinds of rules. There are for two reasons for this:

     a. First, better rules and rules as code advocates have referred to their work by the label of "legislation as code". One intended outcome that frequently arises is the notion of machine consumable legislation. Advocates are therefore proposing significant changes to the development and implementation of legislation as specific kind of legal instrument.

     b. Second, legislation has a particular legal status in relation to other sources of understanding what the law is. That status is superior to all other sources, generally speaking. If advocates for law-as-code approaches are setting their sights on legislation, this has a significant effect on the relative risks of producing coded models and how they will impact wider legal and regulatory systems.

179.   Legislation is one of the two primary sources of law in New Zealand. In New Zealand, "legislation" is a statutorily defined term in the Legislation Act 2019. It "means the whole or a part of an Act or any secondary legislation"[47] and includes Acts, Bills, Legislative Instruments, Other Instruments, and Supplementary Order Papers (although Bills and Supplementary Order Papers mainly relate to proposed legislation).[48]

180.   Legislation is produced by the New Zealand Parliament (which is comprised of the Legislature and the Governor-General, as

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[47] Legislation Act 2019, s 5.
[48] Ibid, and definition per the New Zealand government Legislation website: <https://www.legislation.govt.nz/glossary.aspx#l>.

representative of the Sovereign), one of the three branches of government.

181.   Because of the doctrine of Parliamentary Sovereignty, legislation is the highest law of the land. It is superior to the other primary source of law, case law.

182.   Secondary legislation is sometimes referred to as "regulations", but should be understood as being distinct from "regulation" more generally, which includes a range of non-legislative instruments. Secondary legislation is also defined and "means an instrument (whatever it is called) that—(a) is made under an Act if the Act (or any other legislation) states that the instrument is secondary legislation; or (b) is made under the Royal prerogative and has legislative effect."[49]

183.   Instrument is defined expansively, and "includes secondary legislation and any instrument that is not legislation (for example, an administrative document)."[50]

184.   Typically, legislation is a communication written in a natural language, although it is common practice in New Zealand to express some rules as mathematical or algebraic formulae where the use of language would be unnecessarily confusing to a reader.[51] For example, some statutes in New Zealand incorporate formulas, tables, examples and flow charts.

185.   In New Zealand, the body responsible for preparing legislation is the Parliamentary Counsel's Office (PCO). The PCO uses a range of technologies beyond simple word processors, including extensible mark-up languages (XML) and schematron validation software that identifies patterns in XML text. New Zealand's official legislation is available online.

186.   The PCO receives drafting instructions from government agencies when legislation is to be prepared. These instructions are subject to legal privilege, which makes studying them empirically extremely difficult if not impossible.

187.   There is extensive academic, public sector and private sector work on the flaws in legislation and the consequences of these flaws. It is vital that any advocate for improved legislation, or critic of statutory flaws, is at least passingly acquainted with some of the material analysing why legislation is the way it is, what flaws have been identified in its preparation and maintenance, and why suggested reforms are difficult to implement. Starting points for investigation include reports by the New

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[49] Legislation Act 2019, s 5.
[50] Ibid.
[51] Parliamentary Counsel Office "Principles of Clear Drafting". See "Other Drafting Tools": <http://www.pco.govt.nz/clear-drafting#otherdraftingtools>. For a basic legislative example, see Accident Compensation Act 2001 Schedule 1 clause 34.

Zealand Law Commission,[52] the legislation guidelines produced by the Legislation Design Advisory Committee,[53] the Legislation Act 2012, the principles of clear drafting (and other resources on the Parliamentary Counsel Office's website),[54] the Cabinet Manual,[55] and digests of Parliament's regulation review committee – which is responsible for reviewing the lawfulness of secondary legislation.[56] At one point, a treasury briefing paper shows the New Zealand Government considered a potential "Regulatory Responsibility Act" to create an Act to require better legislation.[57]

188. When speaking of coding "rules", it is vital to consider the legal authority of different sources of rules. Legislation is fundamentally different from case law, policy, technical standards, incentive schemes, business rules, operational requirements, software systems, or any other kind of policy tool that might be described as "regulation" comprising a wider "regulatory system". Legislation is not the same as regulation. There are fundamental differences between legislation and other legal or non-legal instruments that reflect constitutional considerations like Parliamentary Sovereignty and the rule of law.

189. The exact text of legislation is debated by democratically elected representatives in the House of Representatives. It is also published for public comment through Select Committee processes. There is a presumption in statutory interpretation that Parliament has deliberately chosen anything that is included in legislation as a matter of preference over any other means of expressing the rule. In short, it is assumed that Parliament meant to say what it said. Legislation represents an often artfully ambiguous statement of what the law requires people to do in order to facilitate democratic disagreement between Parliamentary factions that generally disagree on matters of policy.

190. We make these points as a foundation for our discussion later about how the notion of "translating" or paraphrasing legislation using different

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[52] See for example: "Legislation Manual: Structure and Style" (May 1996) NZ Law Commission, r 35; "Review of the Statutes Drafting and Compilation Act 1920" (May 2009) NZ Law Commission r 107; "Presentation of New Zealand Statute Law" (October 2008) NZ Law Commission in conjunction with Parliamentary Counsel Office, r 104.
[53] Legislative Design Advisory Committee "Legislation Guidelines: 2018 edition" (2018): <http://www.ldac.org.nz/guidelines/legislation-guidelines-2018-edition/>.
[54] See "Instructing the PCO" Parliamentary Counsel Office website <http://www.pco.govt.nz/instructing-the-pco/>.
[55] Department of Prime Minister and Cabinet "Cabinet Manual" (2017): <https://dpmc.govt.nz/our-business-units/cabinet-office/supporting-work-cabinet/cabinet-manual>
[56] Dean R Knight and Edward Clark *Regulations Review Committee Digest* (6th ed, New Zealand Centre for Public Law, Wellington, 2016).
[57] See: Regulatory Impact Statement "Regulating For Better Legislation – What Is The Potential Of A Regulatory Responsibility Act?" (2 February 2011), New Zealand Treasury.

words to achieve what we presume is the same intended effect is fundamentally fraught at a constitutional level.

"ASCERTAINING THE MEANING" OF LEGISLATION

191. It is widely agreed that legislation can only be understood by a process of interpretation. In New Zealand, interpretation is framed in statute as a process of "ascertaining meaning". This framing is helpful when assessing the status of coded models of the law – they are the modeller's attempt to ascertain the meaning of the statute (as well as other relevant law) and represent that in a computational model.

STATUTORY INTERPRETATION CANNOT BE AVOIDED

192. Hildebrandt has written a text called "Law for Computer Scientists and Other Folk",[58] which summarises important topics she has explained while teaching law to masters students of computer science.

193. Hildebrandt succinctly captures the way that interpretation of text is an inherent part of the anthropological shift from governing by oral expression to governing by written expression. Because legislation is written down it is much more permanent and accessible, but it must embrace its interpretability. Concomitantly, society needs methods of narrowing interpretive scope, because legislation must have meaning with some consistency across time and geographical space:[59]

> The reach of handwritten manuscripts is far beyond that of orality, both in space (the same text can be copied and read across geographical distance) and in time (the text will survive its author and the very same text can be read by later generations). The distantiation this involves has curious implications for the interpretation of text; as a text emancipates from the tyranny of its author, its meaning will develop in response to subsequent readers that need to interpret the same text in new circumstances. The rigidity of written manuscripts, so much less ephemeral than spoken words, thus generates a need for iterative interpretation. This also results in the possibility to counter and contest specific interpretations. … In the end, the stability of text combined with the ambiguity of human language turns interpretation and contestation into a hallmark of the law, thus offering a very specific type of protection that is at the root of the legal protection offered by modern positive law.

194. This feature of written text is intensified further by the introduction of technologies that replicate written text, such as printing presses:[60]

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[58] Mireille Hildebrandt *Law for Computer Scientists and Other Folk* (2020, Oxford University Press, Oxford, UK). Open access available: <https://fdslive.oup.com/www.oup.com/academic/pdf/openaccess/9780198860884.pdf>.
[59] Ibid at p 4.
[60] Ibid at p 5.

The proliferation of text and the comparative speed of producing identical copies deepen the distantiations in both time and space between text and author, author and reader, and, finally, meaning and text. This intensifies the quest for stable meaning in the face of increased opportunities to contest established interpretation.

195.   Hildebrandt continues:[61]

The need for interpretation that is core to text-driven law results in an increasingly independent position for the courts. Originally, judges are appointed by the sovereign to speak the law in his name: rex est lex animata (the king is the living law). Kings thus feel free to intervene if a court rules against their wishes. However, as the proliferation of legal text requires study as well as experience, courts increasingly distance themselves from the author of the law (the king), providing a buffer zone between the ruler and those ruled. Montesquieux's famous iudex est lex loquens (the court is the mouth of the law) announces the end of 'rule by law' by the sovereign, thus revoking the old adage of rex est lex animata. This signifies the beginnings of what we now term 'the rule of law', based on an internal division of sovereignty into legislative, administrative, and adjudicative functions that provides for a system of checks and balances. Core to 'the rule of law' is an independent judiciary that is capable of sustaining legal certainty, justice, and the instrumentality of the law — if necessary, against the arbitrary will of either the legislature or the administration.

196.   As we discuss later, Setting aside any other practical effects it may engender, suggesting that interpretations of the law (or expressions of Executive will) embodied in code could replace natural-language based legislation fundamentally changes the relationship between Executive, Legislature and Judiciary.

AMBIGUITY IN WRITTEN LANGUAGE IS USED INTENTIONALLY

197.   It is important to acknowledge that ambiguity is not necessarily a sign of bad legislation. Affording latitude for interpretation is a deliberate strategy deployed by legislative drafters who use language techniques that increase the scope for interpretative flexibility when and where it is required. These techniques, such as ambiguity, vagueness, and generality, are all tools in a drafter's toolkit for when the policy requires it.[62] Those drafting techniques can be overused or underused relative to the legislative intention, but their utility should not be in question.

198.   A trained drafter is generally aware of the complementary role between the Legislature and the Judiciary in generating law. However, drafting is frequently undertaken by persons without adequate training.

199.   If a question of statutory interpretation comes before a member of the Judiciary, it is not necessarily a sign that the statute is inadequately

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[61] Ibid at p 6.
[62] Dickerson, R, "The Diseases of Legislative Language" (1964) 1 Harv J on Legis 5.

drafted. Put bluntly, the advent of legal disputes around what legislation requires is not an inherently bad thing. Such disputes are a necessary part of the law-making cooperation between statute and case law, and New Zealand courts are often empowered by statute to receive applications and issue judgments "declaring" how the law should be understood.[63] In fact, in such disputes the role of lawyers in New Zealand is to "uphold the rule of law and to facilitate the administration of justice":[64] i.e. provide the court with all the relevant information and interpretations necessary for it to determine what the law means and how it applies to a set of facts.

200. If this ambiguity or imprecision is unsuitable for "code as law" then it is the code that must move to the law, rather than the other way around. If it cannot, that is not a problem for the law. This holds true no matter how strong the desire to achieve the intended policy effect.

201. With that said, we fully agree that not all ambiguity or imprecision is desirable. Authors such as Kevin Ashley distinguish between semantic and syntactic ambiguity:[65] the former is often desirable for various reasons, whereas the latter is seldom justified.

202. Equally, just because ambiguity is desirable from one perspective does not mean it is inconsequential for the people trying to ascertain what the law means. The resolution of ambiguity may require the application of judgement or assessment processes, or the need to defer to some kind of authority to generate confidence in how an ambiguous provision should be understood. This can entail practical consequences such as delay, additional procedural steps, or uncertainty. The service design perspective brought by a better rules approach can assist with understanding the way that ambiguity in drafting may shift burdens onto particular groups, and where the sticking points in a process are likely to occur.

DISCRETION DOES NOT MEAN LAW IS ABSENT

203. Aside from ambiguity, statutory drafting regularly empowers a particular person with discretion to make a decision using judgement. This requires the use of interpretive techniques to understand the scope of the discretion available and how it should be exercised.

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[63] See, for example, Declaratory Judgments Act 1908 and Resource Management Act 1991 at s 310-313.
[64] Lawyers and Conveyancers Act (Layers: Conduct and Client Care) Rules 2008, s 2.
[65] See Ashley, K D *Artificial Intelligence and Legal Analytics: New tools for Law Practice in the Digital Age* (2017, Cambridge University Press, Cambridge, United Kingdom) 38-42. Chapter 2 of Ashley's book is also notable for the way it discusses ambiguity, vagueness, statutory interpretation, computational modelling before turning to the topic of business rules systems and business process modelling, a core part of the heritage of a better rules approach.

204.   Hildebrandt, citing Ronald Dworkin, notes that discretion is a core part of the law, rather than being an area that law does not touch:[66]

> As Dworkin argued: "[D]iscretion is not the absence of principles or rules; rather it is the space between them." … [W]ithout rules or standards the concept of discretion makes no sense; the mere fact of being bound by a particular authority creates the need to judge whether a norm applies, what decision it calls for and how it should be performed. The rule-bound nature of discretion makes possible a discussion about the interpretation and employment of discretionary competences; it allows a learning curve by requiring those who intervene to give reasons for their actions if called to account. Those reasons are—in part—the norms that regulate their behaviour as public officials, but in the end, those reasons also include the situated interpretation of those norms. In that sense, discretion is not close to but the opposite of arbitrary rule.

205.   We note this because:

   a.   the presence of discretion in a statute does not make modelling the law impossible, it simply requires the creation of a space within or input to that model where discretion can be lawfully exercised by a human decision-maker; and

   b.   in Part Four, we point to the way that a human decision-maker is called upon to assess whether the use of an AES to perform a legal task can be "satisfied" or the system's "reasonable reliability".

LEGISLATION IS ONE COMPONENT IN THE WIDER SYSTEM OF LAW

206.   Legislation is just one component among many that comprise the wider system of laws and rules, some of which are not written down and cannot be easily modelled (if at all).

207.   We can offer no better framing of legislation's position among the other constituents of modern law than that encapsulated by Hildebrandt:[67]

> Modern law is the set of rules and principles that determine positive law; they establish what 'counts as' or 'qualifies as' a violation of a legal norm or a legal right. The rules and principles that constitute modern positive law are generated by the binding sources of the law: legislation, case law and treaties, in combination with doctrine, fundamental principles and customary law. They are enacted by legislators and courts (that produce the binding sources of the law) and applied and thus interpreted by government authorities. In a constitutional democracy, that interpretation can be challenged and the final word on how the law must be interpreted is with independent, impartial courts.

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[66] Hildebrandt, M "Algorithmic regulation and the rule of law" (2018) Phil. Trans. R. Soc. A 376:20170355 at 5-6.

[67] Ibid. We note that the role of treaties is a matter that varies among jurisdictions and depends upon whether they are monist or dualist as a matter of international law and their domestic constitutions.

208.   The increasing frequency with which statutes cross reference other statutes, as well as the relationship of any given statute to a body of case law, means that interpreting the law is a process of synthesising multiple inputs into a contextually dependent output.

209.   In short, a statute on its own does not state the law sufficiently to understand the law's effect. Subsequently, law as code applications must account for a much wider range of legal devices and norms than just the legislation itself. It will not be uncommon to find that an attempt to code legislative effect must also incorporate the effects of a much wider range of law, some of which is not written down (e.g., constitution, norm, and custom).

210.   On this basis, it is impossible to understand the notion of "legislation as code" as being an exercise in directly translating single pieces of legislation into a single machine executable version.

LEGISLATION GOVERNING INTERPRETATION IN NEW ZEALAND

211.   The rules for interpreting what a statutory provision means are themselves governed by statute. In New Zealand, most lawyers practicing today will have been trained to apply the Interpretation Act 1999.[68] Section 5 is situated within Part 2 of the Act, entitled "Principles of interpretation". Section 5 states:

> **5   Ascertaining meaning of legislation**
> (1)   The meaning of an enactment must be ascertained from its text and in the light of its purpose.
> (2)   The matters that may be considered in ascertaining the meaning of an enactment include the indications provided in the enactment.
> (3)   Examples of those indications are preambles, the analysis, a table of contents, headings to Parts and sections, marginal notes, diagrams, graphics, examples and explanatory material, and the organisation and format of the enactment.

212.   Subsections (2) and (3) clarify that it is not only the text of a provision that guides its interpretation, but also the broader structure of the Act, including any other "indications" provided in it. This means a statutory provision cannot always be considered in isolation from its relative structure in an Act.

213.   We think it is notable that s 5, which itself attempts to illustrate the relationship between text and purpose, relies on metaphorical expression – "in light of". In terms of coding the law, it is an open question how this should be interpreted and implemented.

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[68] We note that the Interpretation Act 1999 has been updated and incorporated into the Legislation Act 2019. We discuss this next.

214.   Some advocates for "legislation as code" seem to work on the basis that legislation can be modelled without the need to consider case law. Some argue that the influence of case law can be incorporated into the way the law is modelled, but in doing so, must surely concede that the model they create reflects only one arguable interpretation of the law.

215.   Even a person's approach to interpreting (or, per s 5(2) "ascertaining the meaning" of) an Act must also consider case law. When it came to interpreting legislation pursuant to the Interpretation Act 1999, failing to account for leading case law on the Interpretation Act could lead to an error of law. This error would subsequently be reflected in computational modelling. In the Supreme Court of New Zealand in *Commerce Commission v Fonterra Co-Operative Group* Ltd [2007] NZSC 36, [2007] 3 NZLR 767 at [22], the Court concluded that:[69]

> [22] It is necessary to bear in mind that s 5 of the Interpretation Act 1999 makes text and purpose the key drivers of statutory interpretation. The meaning of an enactment must be ascertained from its text and in the light of its purpose. Even if the meaning of the text may appear plain in isolation of purpose, that meaning should always be cross checked against purpose in order to observe the dual requirements of s 5. In determining purpose the court must obviously have regard to both the immediate and the general legislative context. Of relevance too may be the social, commercial or other objective of the enactment.

216.   Since the Supreme Court's decision, section 5 of the Interpretation Act 1999 and associated sections have been updated and incorporated into ss 8-12 of the Legislation Act 2019 and now incorporates the Supreme Court's reference to "context".

STATUTORY INTERPRETATION REQUIRES CONSIDERATION OF CONTEXT

217.   Since section 5 of the Interpretation Act was amended by its incorporation into the Legislation Act, the equivalent provision to s 5 now includes explicit reference to the "context" of legislation, presumably to reflect the Supreme Court's statements above.

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[69] Notably, the Court was being asked to consider evidence from an academic witness about what the plain and ordinary meaning of a word should be (the word "capital" in a contract). This is illuminating for any suggestion that parallel-drafted code might dominate the interpretation of natural language legal instruments. See Justice Susan Glazebrook "Statutory interpretation in the Supreme Court" an address given to the New Zealand Parliamentary Counsel Office in 2015 based on S Glazebrook "Do they say what they mean and mean what they say? Some issues in statutory interpretation in the 21st century" OtaLawRw 7; (2015) 14 Otago LR 61.

218. The legislation itself prompts readers to compare s 10 to the old s 5 (as it was under the Interpretation Act), as an example of the way that even repealed law can influence the interpretation of current law. Section 10 now states:

> **10   How to ascertain meaning of legislation**
> (1) The meaning of legislation must be ascertained from its text and in the light of its purpose and its context.
> (2) Subsection (1) applies whether or not the legislation's purpose is stated in the legislation.
> (3) The text of legislation includes the indications provided in the legislation.
> (4) Examples of those indications are preambles, a table of contents, headings, diagrams, graphics, examples and explanatory material, and the organisation and format of the legislation.

219. In theory and in practice, this means that proper interpretation of any statutory provision must account for factors beyond the arrangement of the words within that provision. Not only must the provision be interpreted from its text, but also where that text sits within an Act, by reference to the wider construction of the Act, and also its context, including its social, commercial, or other objectives.

220. Moreover, approaches to statutory interpretation can change over time in different contexts. Academic scholarship, including judicial comment extra-judicially on that scholarship, notes that New Zealand has had three distinct "interpretive eras" in relation to taxation statutes.[70]

LEGISLATION ANTICIPATES THE WAY THAT LANGUAGE CHANGES OVER TIME

221. Another principle of statutory interpretation in the Interpretation Act (and now the Legislation Act 2019) is section 6:

> **6   Legislation applies to circumstances as they arise**
> Legislation applies to circumstances as they arise.

222. As such, Parliament anticipates that words expressed in legislation can reasonably shift in meaning over time in response to changes in circumstances, the use of language, and social context.

INTERNATIONAL HUMAN RIGHTS INSTRUMENTS INFLUENCE INTERPRETATION

223. International and domestic human rights instruments can influence statutory interpretation, limiting the power of the Executive. Computational models of legislation would need to account for such matters.

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[70] See Burrows and Carter Statute Law in New Zealand as cited in Glazebrook, ibid.

224.   It is well established that international human rights instruments can be used as a guide to statutory interpretation in New Zealand. Unless there is clear statutory indication, judges will assume that Parliament has not legislated contrary to its international obligations.[71] This is a vital safeguard when it comes to the rights of vulnerable groups protected by international human rights instruments. For example, this approach has been applied in the context of the United Nations Convention on the Rights of Persons with Disabilities,[72] and in the United Nations Convention on the Rights of the Child.[73] Similar arguments have been made on the basis of international conventions protecting refugees and the impacts of climate change.[74]

THE NEW ZEALAND BILL OF RIGHTS ACT 1990 INFLUENCES INTERPRETATION

225.   The New Zealand Bill of Rights Act 1990 also represents Parliamentary acknowledgement that statutory interpretation can shape the balance of power in New Zealand society between different groups. Sections 4-6 of the Act deal with the relationship between the NZBORA and other enactments that appear on their plain text to limit civil and political rights. Section 6 states that:

> **6   Interpretation consistent with Bill of Rights to be preferred**
>
> Wherever an enactment can be given a meaning that is consistent with the rights and freedoms contained in this Bill of Rights, that meaning shall be preferred to any other meaning.

226.   Section 4 of the NZBORA reflects the separation of powers between the legislative and judicial branches. It deprives the judiciary of the ability to "strike down" laws in the manner of other constitutional systems:

> **4   Other enactments not affected**
>
> No court shall, in relation to any enactment (whether passed or made before or after the commencement of this Bill of Rights),—
>
> (a)   hold any provision of the enactment to be impliedly repealed or revoked, or to be in any way invalid or ineffective; or
>
> (b)   decline to apply any provision of the enactment—
>
> by reason only that the provision is inconsistent with any provision of this Bill of Rights.

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[71] Ye v Minister of Immigration [2009] NZSC 76, [2010] 1 NZLR 104 at [24]; and New Zealand Air Line Pilots' Assoc Industrial Union of Workers Inc v Director of Civil Aviation [2017] NZCA 27, [2017] 3 NZLR 1 at [56]–[58].
[72] Chamberlain v Minister of Health [2018] NZCA 8; [2018] 2 NZLR 771.
[73] Above n 70.
[74] See the helpful summary of the litigation culminating in Teitiota v Ministry of Business Innovation and Employment [2015] NZSC 107 (20 July 2015) available from Library of Congress "New Zealand: 'Climate Change Refugee' Case Overview", last updated 30 December 2020 <https://www.loc.gov/law/help/climate-change-refugee/new-zealand.php>.

ONLY THE JUDICIARY MAKES AUTHORITATIVE INTERPRETATIONS

227.   It is uncontroversial to say that legal disputes frequently turn on how the ambiguity in a legal provision should be interpreted. The interpretive rules, principles, maxims, and norms discussed above help to ensure consistency in that process. They also impose a procedural finality on argument in the Courts, where judges choose the interpretation most persuasive to them and give reasons for that interpretation.

228.   It is these interpretations – formulated and expressed by judges in written decisions – that hold weight. They may be incorrect, but this will only be determined by a process of appeal that brings the matter before other judges within a judicial hierarchy, who may prefer an alternative interpretation reached through a process of legal reasoning.

229.   Ultimately, the power to say what statutory language really means in a particular context is to have the power to determine the law's final effect, even in a situation where the meaning of the text might appear to be "plain and ordinary".

230.   An example which illustrates the power of statutory interpretation to dictate the law's final effect is drawn from Australian legal history as described in a public address given by Hon Justice M J Beazley AO. Her Honour's account describes the experience of Ada Evans, one of the first women to seek to practice law in Australia:[75]

> Although she graduated with her cohort, practice was denied to her. The Legal Profession Act 1898 (NSW) had established a Board to approve "properly qualified persons" for admission to the bar – but the conventional thinking at that time was that a "woman" was not a "person" for the purposes of such legislation. This was despite the Acts Interpretation Act 1897 (NSW) providing that "[w]ords importing the masculine gender shall include females".

231.   The speech continues:

> In a newspaper interview shortly after her graduation in 1902, [Evans] noted that when she had sought to be admitted, the Chief Justice had "pointed out that women were not admitted in London, and so could not be here". In 1915, Gwyneth Bebb tested that theory in London – she brought an action against the Law Society seeking a declaration that she was a person within the meaning of the Solicitor's Act 1843 (UK) – but without success.

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[75] Hon Justice M J Beazley AO "100 Years of Women in Law in NSW" 18 October 2018, Sydney, Australia. President, New South Wales Court of Appeal. At para 6. Her Honour relies on Justice Virginia Bell AC, 'By the Skin of Our Teeth –The Passing of the Women's Legal Status Act 1918' (Speech delivered at the Francis Forbes Lecture, NSW Bar Association Common Room, 30 May 2018).

232.   In short, dictating the "correct" interpretation of legislation is a very powerful legal tool that is constitutionally reserved for the Judiciary. An interpretation of the law that is not produced by judges can never be described as "the law" – this includes those that are embedded in rules as code applications, and computational models.

PRESCRIPTIVE DRAFTING DOES NOT AVOID INTERPRETATION

233.   Some advocates for rules as code seem to hold the view that prescriptive rules expressed in natural language do not require interpretation, and that an absence of any scope for interpretation is desirable. At a practical and a theoretical level, we do not think this can be sustained.

234.   Any person who claims prescriptive rules do not require interpretation should be asked to nominate a specific provision that can be tested.

235.   Highly prescriptive drafting may reduce the degree to which a rule's interpretation is capable of reasonable argument. However, frequently, such drafting requires more words to achieve that effect, not less, thereby making statute law even less accessible to the general public and even more arduous for public servants to comprehend and model Parliament's intent.

"POLICY INTENT" VERSUS "PARLIAMENTARY INTENT"

236.   Some members of Executive government advocate for rules as code on the basis that others have wilfully or carelessly misapprehended the "policy intent" of a regulatory system as expressed in natural language rules, including legislation. These people appear to ignore how or why textual provisions may be interpreted differently, leading to different potential meanings.

237.   It is true that competing interpretations are barriers to Executive government actors achieving the policy goals they are told to implement. As such, there is a will to remove these barriers – through the substitution of ambiguous natural language with unambiguous code, for example. We have documented some instances of this in an Appendix with selected excerpts from publicity materials on better rules and rules as code.

238.   On this point, we highlight that the Judiciary has ultimate control over statutory interpretation precisely because of the risk of Executive government's general and contextual inability to appreciate the following:

- there is value in preserving the potential to advance competing interpretations of the law;

- there are reasonably differing interpretations of the law; and

- the Executive's preferred interpretation might lead to injustice or absurdity.

239.   As such, measures taken by the Executive and Legislative branches which effectively remove the Judiciary, or the capacity for Judicial interpretation, raise constitutional issues.

240. Frequently, discussion in policy circles focuses on the way that courts or other public servants have failed to understand or implement the "policy intent" held by the original people developing the policy. By contrast, lawyers and judges focus on "Parliamentary intent", which is primarily drawn from the words that have been used by Parliament (the Legislature) in legislation.

241. This distinction is essential from a rule of law perspective. "Policy intent" is drawn from the Executive branch and may or may not be reflected in legislative drafting, depending on the words that have been used and the realities of policy and political processes.

242. This separation of powers and the principle of the judicial branch's independence keeps the power to decide on the interpretation of the law separate from the other branches.

243. Interpretation preserves the ability of individual citizens to come to an authority independent of Executive government and say "this is not what the law means, no matter what the Executive thinks", or "this is not how the law should be understood or applied in my case for these reasons".

A RECENT EXAMPLE OF "POLICY INTENT" VERSUS "PARLIAMENTARY INTENT"

244. We raise a useful case study from recent New Zealand legal history that illustrates the constitutional interplay between Executive, Judicial and Legislative branches, as well as the role of international human rights instruments in statutory interpretation and influence on the Executive at a political and diplomatic level. The saga demonstrates:

    a. The role of litigation in creating an opportunity to determine the meaning of the law through a process of legal argument and reasoning.

    b. The constitutional role of the Judiciary as "interpreters and expounders of the law" who determine the meaning of Parliament's statutory expressions.

    c. The importance of comity (or considerate association) between the Judiciary and the Legislature in the law-making process

    d. The risks of legislation that deprives access to the courts or excludes courts from interpreting the law.

    e. The role of other legal devices and institutions (including international human rights instruments) in domestic statutory interpretation

245. There has been significant legal activity around the New Zealand Public Health and Disability Amendment Act 2013, expressed fully in the case of *Attorney-General v Spencer* [2015] NZCA 143. We find this example particularly relevant because it is plausible that the family carers assessment process is something that might have been semi-automated or modelled using computational models, or where it might have been

seen to be valuable to remove the matters of interpretation that compromise "policy intent".

246. The saga relates to the legislative and litigation steps taken by the Government and Ministry of Health to give effect to an Executive policy position: that relatives of people with disabilities should not be paid for the support they provide to a family member to the same extent as a non-family carer. Plaintiffs alleged this was discriminatory following a litigation process under the Human Rights Act 1993 and were successful before the Human Rights Review Tribunal. The Tribunal found the policy to be inconsistent with the New Zealand Bill of Rights Act 1990 and the Human Rights Act 1993.

247. Subsequently, the New Zealand Parliament passed a retroactive statutory legalisation of the approach that had been found to be discriminatory. Further, the amendment ousted the Court's jurisdiction to hear any claim that the policy was discriminatory. Litigation relied frequently on the use of declaratory judgment proceedings, which seek a Court's authoritative interpretation of what a legislative provision means.

248. In the *Spencer* case at [69]-[70] the Court of Appeal made this pithy statement about the distinction between the Executive's intent, as it argued its intent was when the law was made, and what the statutory language actually says. The Court said:

> [69] … We cannot be expected to strain Parliament's language to incorporate by implication or corollary within the scope of that permissive definition a prohibitory [sic] policy which had the opposite purpose and effect, or to read into the plain words of the text what the Ministry now submits the words were meant to say.

> [70] As this Court has previously observed, "the inquiry is not as to what the legislature meant to say but as to what it means by what it has in fact said".[76] To that we would add the words "Nor can the Court be expected to adopt an interpretation based on what Parliament has not said." The political context cannot assist where the legislature elects to frame its formal response to judicial decisions in terms which plainly do not reflect the intention now ascribed to them.[77] And there is nothing in the statutory purpose … which would lead us to a different conclusion.

249. Litigation on a similar topic continued, and later in *Chamberlain v Minister of Health* [2018] NZCA 8; [2018] 2 NZLR 771, the Court relied on an international human rights instrument to influence its approach

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[76] Citing *Donselaar v Donselaar* [1982] NZCA 13; [1982] 1 NZLR 97 (CA) at 114.

[77] Citing Daniel Greenberg (ed) *Craies on Legislation* (10th ed, Sweet & Maxwell, London, 2012) at [27.1.14.2]: "it would clearly be most undesirable for the courts to begin to attach significance to what Parliament does not do, the manner in which it does not do it and the reasons for which it does not do it."

to statutory interpretation, contrary to the Executive's intended position:[78]

> [31] New Zealand is a party to the Convention on the Rights of Persons with Disabilities and its Optional Protocol. Our interpretation of all relevant legal and policy instruments must account for New Zealand's international obligations.

250.   Also relevant is the way that an international human rights body, the United Nations Committee on the Rights of Persons with Disabilities, exerted its influence on the Executive at a diplomatic and political level in its 2014 concluding observations:[79]

> The Committee notes that, in 2012, the New Zealand Court of Appeal affirmed that the policy of not paying some family carers to provide disability support services to adult disabled family members constituted unjustifiable discrimination on the basis of family status. The Committee is concerned that the Public Health and Disability Amendment Act 2013 reversed this court decision by denying carers' pay to some family members. The Committee is also concerned that these provisions also prevent some family members who are carers from making complaints of unlawful discrimination with respect to the Government's family care policy. The Committee notes that the independent monitoring mechanism has recommended reconsideration of this matter.

> The Committee recommends that the State party reconsider this matter to ensure that all family members who are carers are paid on the same basis as other carers are, and recommends that family members who are carers be entitled to make complaints of unlawful discrimination in respect of the State party's family care policy.

251.   *Spencer* also provides an opportunity to consider occasions where the legislation deliberately prevents access to the courts. This is achieved through ouster clauses (also known as privative provisions). The Legislation Design Advisory Committee have this to say on the existence of ouster clauses:[80]

> Ouster clauses are objectionable because they interfere with the courts' constitutional role as interpreters and expounders of the law. In general, legal obligations are enforceable by the courts. Where judicial review is ousted, it is often argued that the public body whose decisions cannot be reviewed is not subject to the law and therefore has legally unlimited power. ... [T]he undoubted normative strength of the presumption

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[78] The Court relied on Ye v Minister of Immigration [2009] NZSC 76, [2010] 1 NZLR 104 at [24]; and New Zealand Air Line Pilots' Assoc Industrial Union of Workers Inc v Director of Civil Aviation [2017] NZCA 27, [2017] 3 NZLR 1 at [56]–[58] for these propositions.

[79] Concluding observations on the initial report of New Zealand: Committee on the Rights of Persons with Disabilities (Geneva, 31 October 2014) Adopted by the Committee at its 12th session: <https://digitallibrary.un.org/record/791464?ln=en>.

[80] Legislation Guidelines: 2018 Edition, Legislation Design Advisory Committee Chapter 28 "Creating a system of appeal, review and complaint", Part 1 "Does the legislation seek to exclude or limit the right to apply for judicial review?"

against ouster clauses means that Parliament should only seek to oust the courts' review jurisdiction in exceptional cases.

252.   If legislation were to be published in code, the fact that it is unable to be interpreted in the same way as natural language – perceived by advocates as a feature of a rules as code approach, not a bug – effectively denies the Judiciary from performing its constitutional role in relation to legislation and ousts its jurisdiction in the manner of an ouster clause.

LEGISLATION ENACTED IN CODE CREATES SERIOUS RISKS AND UNPREDICTABLE CONSEQUENCES

253.   Legislation is produced according to a prescribed process. The details of this process do not need to be reproduced here.[81] It is sufficient to say that when the prescribed process is followed, the output is the creation of a statute which is inarguably valid law – regardless of its content or effect. In New Zealand, the judiciary cannot invalidate legislation for inconsistency with a written constitution.

254.   In our opinion, even though Parliament could enact code as legislation, it should not do so. Neither should code be given the status of legislation. Writing authoritative code within legislation itself, and giving that code the status of legislation, degrades the rule of law and the separation of powers.

255.   This conclusion is probably unwelcome for some advocates for legislation-as-code. It is also our most important conclusion in the sense that we aim to guard against significant risks of substantial harm, even though it is difficult to predict exactly what shape that harm might take.

THE RULE OF LAW

256.   New Zealand has a constitutional commitment to the rule of law. This commitment is acknowledged in s 3(2) of the Supreme Court Act 2003. The Legislation Design Advisory Committee conceptualises the rule of law in the following ways.[82]

   a.   "Everyone is subject to the law, including the government – People and institutions that wield power must do so within legal limits …"

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[81] See, for example, "How laws are made", NZ Parliament: <https://www.parliament.nz/en/visit-and-learn/how-parliament-works/how-laws-are-made/>.
[82] Legislation Guidelines: 2018 edition, Legislation Design Advisory Committee, Chapter 4: "Fundamental constitutional principles and values of New Zealand law": <http://www.ldac.org.nz/guidelines/legislation-guidelines-2018-edition/constitutional-issues-and-recognising-rights/chapter-4/>.

b. "The law should be clear and clearly enforceable – The law should be publicly accessible and able to be easily understood by all to whom it applies ..."

c. "There should be an independent impartial judiciary – Certain decisions must be made by judges who are independent of the government. Judges interpret legislation and develop the common law. …"

257. As part of her writing on using algorithms in legal contexts, Hildebrandt neatly captures the components of the rule of law.[83]

> In the context of a constitutional democracy the Rule of Law has at least two requirements. First, the scope and the content of the law are determined by a democratic legislator. Second, the final decision on what constitutes the correct interpretation of the law is in the hand of the courts. … This means that individual citizens have a means to challenge the administrations interpretation of enacted law, thus preventing a mere rule by law that employs the law as a neutral instrument to achieve the goals of policy makers. Instead, constitutional democracy entails that enacted law is seen as an instrument to achieve the goals of the democratic legislator, whereby the instrument embodies the constitutional constraints that are inherent in the Rule of Law.

THE SEPARATION OF POWERS

258. The Judiciary's independence from those who make the law (the Legislature) and those who initiate and later enforce the law (the Executive) is an important component of our constitution, known as the separation of powers.

259. The separation of powers is about preventing the concentration of power in society and its key ingredient is that each of the three branches of government should act as checks and balances on the other branches, but otherwise not intrude into their responsibilities.

260. Per the Legislation Guidelines from the Legislation Design Advisory Committee, the separation of powers can be summarised as follows:

a. The Courts have a constitutional role that is separate to Parliament.

b. They are interpreters and expounders of the law.

c. In general, legal obligations are enforceable by the courts.

d. Where courts cannot or are incapable of reviewing the law, it can mean that a public body has unlimited power and is not subject to the rule of law.

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[83] Hildebrandt, M "Legal protection by design: objections and refutations" (2011) 5(2) Legisprudence 223 at 234.

e. Only in exceptional cases should Parliament create conditions by which the courts are incapable of reviewing the law.

261. As such, any reform that generates risk to any pillar of government within the rule of law or separation of powers should be treated with extreme caution.

262. From the academic writing we have reviewed, and based on our understanding of how law and code operate, we have concluded that enacting code as legislation creates significant risk to the rule of law and separation of powers.

WHY DOES CODE ENACTED AS LEGISLATION CREATE RISK TO THE RULE OF LAW AND SEPARATION OF POWERS?

263. When law is expressed in code, the question of how the law should be interpreted is subsumed into the code itself. This deprives the judiciary of the ability to interpret the written law to assess whether the interpretation reflected in the code is legally justified.

264. Hildebrandt refers to this as "algorithmic regulation" or "code-driven regulation": [84]

> Algorithmic regulation refers to standard-setting, monitoring and behaviour modification by means of computational algorithms. Such algorithms may be self-executing, meaning that standard-setting integrates with behaviour modification. I call this code-driven regulation.

265. Hildebrandt describes the way that coded systems (by comparison with statistical or data-driven machine learning systems) function based on deterministic logic in response to the inputs provided to the system, so long as those inputs are recognised.[85]

> Code-driven regulation depends on IFTTT … 'if this then that', providing the fundamental logic for all algorithmic decision systems. This type of decisional logic is deterministic, entirely predictable and basically consists of simple or complex decision trees. Whoever determines 'this' as a condition of the 'that' decides the output of the system, which has no discretion whatsoever. … The point here is that we are dealing with an entirely deterministic system that is self-executing.

266. This deterministic manner of operating is frequently suggested as a benefit of coded systems over natural language legal systems. There is some indication that better rules or rules as code advocates see the absolute removal of interpretation by publishing rules-as-code as a good thing.

267. Importantly, the deterministic nature of a coded system is not assisted at all by the suggestion that only "the logic" or syntax of a piece of

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[84] Hildebrandt M. "Algorithmic regulation and the rule of law" (2018) Phil. Trans. R. Soc. A 376:20170355 at pp 2-3
[85] Ibid at p 2.

legislation is being captured. Any decision made about what the logic of a piece of legislation is and how it will be captured remains subject to an exercise of statutory interpretation for the various reasons described above. It is impossible to exclude a situation where, for example, a logical connector must be read in a different manner than its plain and ordinary meaning requires, if, for example, the number of other textual, purpose-based and contextual indicators supporting that interpretation are overwhelming.

268. Equally, the fact that a coded system is deterministic is not mitigated at all by the way that coded models can incorporate "gaps" or inputs for human judgement or to account for ambiguity. The decision to code those inputs into the model, and to decide what those inputs are and how they relate to each other, are also matters of statutory interpretation. By encoding them, we take something that was capable of interpretation and argument – expressed in text – and create something without that possibility, and thereby oust the role of the Judiciary.

269. Hildebrandt clarifies that the deterministic way that code-driven regulation (or rules-as-code) operates does not remove issues of interpretation. Rather, it embeds those issues into the way the system is designed, and can thereby deprive others from understanding those interpretive decisions or challenging them through legal processes.[86]

> Though it may seem that the overdetermination and the lack of discretion imply complete transparency and the absence of interpretability issues, this is not at all the case. Such issues are, instead, hidden in the formalization that precedes the operations of the system. … [Decisions made using code-driven regulation] can be explained by referring to the decision trees that have been implemented, but whether this explanation also justifies the decision depends on how the legal norms have been translated into computer code.

270. Legal rules written in human language are ambiguous, and while interpretation is inevitable, it is also essential for the rule of law and the separation of powers:[87]

> Legal norms are expressed in human language, which is notably ambiguous, and any particular interpretation is, therefore — in principle — contestable. This is not merely cumbersome compared to code-driven regulation, but — on the contrary — also protects us from over-inclusive as well as under-inclusive legal norms.

271. Hildebrandt continues:[88]

> Administrative decisions taken by code-driven regulation must thus always be contestable on the double basis of: 'the decision is based on legal conditions that do not apply because the system got the facts

[86] Ibid at 2. We note the same point is cited above in Part 2 in our reference to Greenleaf et al (2018).
[87] Ibid at 3.
[88] Ibid at 3.

wrong', and 'the decision is based on a wrong interpretation of the relevant legal norms'. The latter means that, even if the IFTTT standard applies, one can always appeal that this code-based standard is an incorrect application of the relevant legal norm in the case at hand.

272. This means code-driven legal models must be able to be contested in two ways:

   a. first, based on whether the inputs to a system are correctly assessed (as prominently discussed in the literature around automated decision-making systems);

   b. but more importantly, whether the algorithmic system itself actually operates according to a correct interpretation of the natural language legal instrument from which it draws its authority.

273. This conclusion significantly influences our suggestion that coded models should, if at all, be delivered subject to the AES regime already present in some New Zealand legislation, and that the "reasonable reliability" safeguard included with that regime should be clarified.

DELIVERING LEGAL EFFECT THROUGH CODE RATHER THAN TEXT WILL HAVE UNPREDICTABLE EFFECTS

274. Giving effect to the law in code changes the technological delivery of law, which will have incidental effects that are difficult to foresee.

275. Hildebrandt,[89] as well as New Zealand Judge and scholar David Harvey,[90] have relied on Elizabeth Eisenstein's work[91] to explore the link between the law as we understand it now and the affordances of printed text as a communicative medium.[92]

> … [M]odern law has evolved from the information and communication infrastructure of the printing press, creating a body of written legal rules, written case law and doctrinal treatises that determines the substance of positive law. The systematic nature of modern legal systems builds on the need for systemisation, rationalisation and linear thinking that is inherent in the affordances of the printing press. This has triggered the growth of a class of legal professionals with the task of maintaining legal certainty in the face of proliferating legal texts (codes, cases, treaties and doctrine). The structure of modern law, with its emphasis on separate national jurisdictions, institutionalised appeal, constitutional review, litis finiri oportet, and the separation of legislator, administration and courts, has nourished the law as a relatively autonomous domain. This has eventually turned the rule by law that was typical for absolutism into the rule of law that is typical for constitutional democracy. Speaking

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[89] Hildebrandt (2011) "Legal protection by design" at 236.
[90] David Harvey "Collisions in the Digital Paradigm: Law and Rulemaking in the Internet Age" (Hart Publishing, Oxford, 2017).
[91] See for example E. Eisenstein, The Printing Revolution in Early Modern Europe (2nd ed, Cambridge University Press, Cambridge 2005).
[92] Ibid at 236.

of autonomous law does not, however, imply that law could ever function as a stand-alone device. Rather, under the Rule of Law the legal system acts as a buffer between ruler and ruled, creating the possibility to contest state-authority in an appeal to a court that is in fact supported by the authority of the state … [A]ll this cannot be taken for granted, because the Rule of Law is not only a historical artefact but also rooted in a specific ICT infrastructure that may soon be overruled by another.

276. In other writing, Hildebrandt captures the way that technological choices can influence patterns of behaviour. This is an essential starting point for considering how code-driven regulation, if adopted in New Zealand, might introduce unintended effects.[93]

> [T]echnology is neither bad nor good, but never neutral. … The fact that technology is never neutral refers to the fact that any technology has normative force in the sense that it induces or enforces specific behaviour patterns and/or inhibits or rules out specific behaviour patterns.

277. Hildebrandt gives some examples of how the "normativity" of particular technologies have produced incidental behavioural effects.[94]

> The term normativity denotes more than mere regularity but less than morality: speed bumps generate slow driving, books generate silent reading, the Internet triggers peer-to-peer file sharing, the Forum Romanum generated a hierarchical distinction between speaker and audience, the Greek Agora triggered peer-to-peer discussions on the marketplace, artificial light generated longer working hours, Western music notation generated harmony and counterpoint, letters of credit generated trade beyond the local environment and in the end - paper money.

278. Diver's writing on "digisprudence" compares the normativity and affordances of code with the normativity and affordances of text.[95] He has considered what effects code-as-law might have, based on the characteristics of code, which he summarises as being that code is "ruleish", opaque, immediate, immutable, and pervasive. By ruleishness, we understand him to mean that code-as-law reflects the way legal rules are thought to work by some, but only in their most restrictive and anti-democratic incarnation, described as legalism. His writing includes, as he describes it:[96]

> …an analysis of code's regulative characteristics from a legal theory perspective, from which I develop the concept of computational legalism. This idea is borne of the parallel I observe between code's ruleishness – its reliance on strict, binary logic instead of interpretable

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[93] Hildebrandt (2011) Legal Protection By Design, at 239.
[94] Ibid.
[95] See Diver, L E "Digisprudence: the affordance of legitimacy in code-as-law" (April 2019, PhD Thesis, University of Edinburgh).
[96] Ibid at p 95. We note the parallels between Diver's summary and the statement in Appendix: Selected Statements from Publicity Materials that "people don't want legislation in and of itself. They want the results of the legislation."

standards – and its conceptual equivalent in the jural realm, known as legalism. Legalism is a perspective that eschews a holistic interpretation of legal norms, instead requiring that citizens merely follow legal rules as they are presented to them, without enquiring as to their efficacy or their legitimacy beyond the question of where they come from.

279.   Diver notes that:[97]

> Even in the most tyrannical state there is space to interpret, and perhaps to disobey – the hermeneutic gap between the text of a norm on the page and its translation into behaviour in the world makes this at least a notional possibility. In the environments where code is designed, however, the elision of that gap is not only easy to do but is entirely standard, not necessarily through malice or intentional obfuscation (although they are certainly a problem), but simply by the underlying characteristics of code, which by nature presents norms to the end-user that 'just are'.

280.   Diver notes the way that the safeguards provided by interpretation can be withheld from end-users of code, and that coded systems will only reflect these legal safeguards if they are incorporated in advance in system design.[98]

> The hard edges of code rules admit of no interpretation or latitude beyond what the designer has had the foresight (and incentive) to implement. These are strengthened by the immediacy of code: it executes without delay, imposing those potentially harmful rules without deliberation. While the end-user may in some cases have the opportunity to alter the default configuration of the rules, the literature shows that they tend not to do this, deferring instead to the perceived knowledge and expertise of the designer. In any event, the provision of an option is contingent on both the designer deciding to do so and the interface making it clear what the options are and what they mean.

281.   Diver's digisprudential framework is oriented towards a similar goal to the advocates for a better rules approach as we describe it. He directly investigates ways that better design processes for code (such as, we say, a better rules approach) might confer some of the legitimacy conferred on law onto code as well: in his words, "Can mechanisms for designing legitimate legal normativity be adopted to ensure the design of legitimate technological normativity?" [99] This is important because:[100]

> As code is increasingly the medium upon which other parts of social, political, and commercial life are built, it seems reasonable to assume that it will become the target of more and more law. However, laws that fail properly to be embodied in the code that they target tacitly undermine law-making as an expression of democratic will …

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[97] Ibid at p 32.
[98] Ibid at p 141.
[99] Ibid at p 301.
[100] Ibid at p 304.

282. Policymakers and senior decision-makers should be cognisant that the notion of code-as-law is a topic subject to careful reflection over an extensive period. This scholarship should be incorporated into their thinking. But we also note that some of the suggested responses to dealing with these issues match closely the approach taken by better rules advocates. For example, by the adoption of open, transparent multidisciplinary design approaches. This is why we endorse the exploration and development of better rules approaches, subject to the caveat that any code-driven regulation that is produced must remain contestable and, ideally, always be subjugated to the authority of natural language legislation.

TRANSLATING OR REVISING LEGISLATION CHANGES ITS MEANING AND EFFECT

283. A core claim explored through a better rules approach is the way that co-creating law, policy and code simultaneously will result in three means of expressing the same intention. In Part 2, we explore the way that this parallel drafting process might be said to minimise a "translation gap".

284. Considering our analysis above, some might say that while coded models of pre-existing law are flawed because they are only interpretations, using parallel drafting processes is a means of ensuring that the same intent is expressed identically through different methods of expression (whether natural language or code).

285. In response, we argue that there will always be a gap in meaning between natural language legal instruments and coded models of that instrument, even where they are produced through a process of parallel drafting.

286. When we are considering whether natural language law could be translated or reformulated into machine readable languages, we engage with complex questions around whether the words of a statute can be revised, paraphrased or reformulated without changing the law's meaning or legal effect. One traditional view was that this was not possible:[101]

    > Unlike a case law rule, a statutory provision cannot be paraphrased and still be law. Its connotation may change, but its formulation is fixed. This characteristic both eases the task of the interpreter by providing him with a starting point for interpretation and complicates it by presenting, at least superficially, no leeway for interpretation through the manipulation of the form in which the rule is expressed.

287. Despite the orthodox position on whether statutory provisions can be translated or reformulated without changing their meaning and effect,

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[101] Miers, D, Page, A "Teaching legislation in law schools" (1980) 1(1) Statute Law Review 23 at p 25.

the New Zealand Parliament has legislated for a "legislation revision programme", which purports to do exactly that, subject to significant legislative and constitutional safeguards.

288. We describe this programme in detail for two reasons.

    a. First, to demonstrate the level of constitutional assurance required when it comes to expressing the same piece of legislation in different words, even in the same language, and even without any intent to change the legislation's effect.

    b. Second, to note how the legislative revision programme has features that allow for the insights generated by a better rules approach to be incorporated into natural language legislation without changing its meaning, subject to constitutionally adequate oversight.

289. The legislation revision programme also supports our conclusion that legislation should not be written in code, and that there are two methods of incorporating the insights from a better rules approach.

    a. The legislation revision programme is an existing method of using the better rules programme to improve legislation for implementation in digital systems, or to better express Parliament's intent, or clarify ambiguity.

    b. Later, we identify a separate statutory regime (around "automated electronic systems") that might allow for "rules as code" models of the law to be operationalised within a wider legislative framework while respecting the primacy of legislation.

NEW ZEALAND LEGISLATIVE "REVISION" PROGRAMME

290. The purpose of the legislation revision programme is to enable progressive and systematic revision of legislation by re-enacting it: [102]

    > in an up-to-date and accessible form, but (except as authorised …) without changing its effect.

291. The legislation revision programme illustrates that while Parliament may revise the way it expresses its intent through legislation, this requires significant constitutional and legislative machinery to stabilise the effect of the law despite changes in the way it is expressed.

292. Part 3 subpart 3 of the Legislation Act 2012 creates a scheme for statutes to be "revised". Sections 59-62 of the Act also give legislative guidance as to how revision Acts should be interpreted by reference to "old law", a statutorily defined term at s 59.

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[102] Legislation Act 2019, section 92.

293. The Act requires the Attorney-General to seek input from the public and the House of Representatives on a programme of revisions to be initiated over a three-year period.

294. A revision Act's provisions, per s 60:

> are the provisions of the old law in rewritten form; and are intended to have the same effect as the corresponding provisions of the old law.

295. This general statutory direction can be "overridden" expressly, or "by necessary implication" – i.e., as a matter of statutory interpretation:

> Section 60 is overridden to the extent that a provision of a revision Act—
> (a)   is expressly provided by the revision Act to be intended to change the effect of the old law; or
> (b)   has a meaning that is expressly or by necessary implication to a different effect than the corresponding old law provision; or
> (c)   is enacted, amended, or repealed by legislation that is not a revision Act (for example, an amendment Act intended to change the effect of the old law).

296. Section 61 requires that the old law is used to interpret the new law if the meaning of the new law "is unclear or gives rise to absurdity":

> If the meaning of a provision of a revision Act is unclear or gives rise to absurdity, the wording of the old law that corresponds to the provision must be used to ascertain the meaning of the provision.

297. Revisions are made by preparing a revision Bill. Section 96(2) creates a limited list of revisions that "may" be made. Revisions may:

> (c)   omit redundant and spent provisions:
>   …
> (e)   make changes in language, format, and punctuation to achieve a clear, consistent, gender-neutral, and modern style of expression, to achieve consistency with current drafting style and format, and generally to express better the spirit and meaning of the law:
> (f)   include new or additional purpose provisions, outline or overview provisions, examples, diagrams, graphics, flowcharts, readers' notes, lists of defined terms, and other similar devices to aid accessibility and readability:
> (g)   include new or additional provisions alerting users of the revision to legislation that is not incorporated in the revision but is relevant to the subject matter of the revision:

298. Section 96(2) therefore presents notable opportunities to use the revision programme to incorporate insights from a better rules approach. Those insights could be incorporated in the form of basic improvements to readability through to the incorporation of flowcharts, all the way to changes "to express better the spirit and meaning of the law".

299. On the plain and ordinary meaning of s 96(2), it would be possible to incorporate the outputs of a better rules process into a revision Bill. For example, a concept model is a diagram or graphic that could be

appended to the legislation as an interpretive aid and legitimately used as a guide to "ascertaining meaning" of the legislative text. Further, it would be possible to use the powers at s 96(3) to make changes that go beyond bare clarification of the text as it is, for example by including "new or additional purpose provisions".

300.   Section 96(3) separates other powers from the powers in s 96(2), presumably because they are taken to have a greater risk of changing legislative meaning. Importantly, sub (4) states that a revision Bill "must not change the effect of the law, except as authorised by subsection (3)." Subsection (3) states a revision Bill "may also":

(a)   make minor amendments to clarify Parliament's intent, to resolve ambiguity, or to reconcile inconsistencies between provisions (or to do all of those things):

…

(c)   make minor amendments to update how provisions can be complied with, or operate, in a way that takes account of changes in technology if those amendments are consistent with the spirit and meaning of the law:

301.   Notably, the "spirit and meaning" of the law is a guide in s 96(2) and (3) and "Parliament's intent", resolution of "ambiguity", and reconciliation of "inconsistencies" are all legitimate reasons to use the revision powers in sub (3).

302.   Of particular note for the better rules approach and its emphasis on digital service provision is that amendments consistent with the "spirit and meaning" of the law can be used to take account of changes in technology, including, presumably, to allow legislation to "be complied with, or operate" in digital systems. Subsection (3) therefore presents a clear opportunity to incorporate the insights of better rules approaches to the statutory revision programme without the need to enact computer code as legislation.

303.   Several provisions also indicate a clear Parliamentary intent that any changes to the wording of the law – even if they are not intended to change its meaning – must be transparent and identifiable to unwitting readers.

304.   Section 97(2) requires that a revision Bill's explanatory note must "include a statement setting out, in general terms, the inconsistencies, anomalies, discrepancies, and omissions that were identified in the course of preparing the revision, and how they have been remedied in the Bill." Section 96(2)(g) also enables the inclusion of provisions for the purpose of "alerting users" of legislation.

305.   The Legislation Act 2019 empowers the Chief Parliamentary Counsel to authorise PCO to make "Editorial changes" to legislation, but only in tightly constrained circumstances. Section 86(2) reiterates that ss 87 and 89 "do not permit any change to the text of a provision of any legislation that, if enacted, would change the effect of the provision." Section 91 requires all such changes to be noted in the legislation.

306. It is essential to note that revision Bills go through a process of certification outside of the Parliamentary process.

307. Section 98 requires that revision Bills are submitted by the Chief Parliamentary Counsel to identified "certifiers", who "may" certify a Bill "if they are satisfied that" both:

    (a) The revision powers in section 96 have been exercised appropriately in the preparation of the revision; and

    (b) The revision Bill does not change the effect of the law, except as authorised by section 96(3).

308. The certifiers "may require the Chief Parliamentary Counsel to make whatever changes they consider necessary" before certifying a revision Bill. This certificate must be provided with the Bill to the Attorney-General and a copy of such a certificate is available here by way of illustration.[103] At the time of writing, only two certificates were available: one in relation to the Contracts and Commercial Law Act 2017; the other in relation to the Partnerships Act 2019.[104]

309. Certification is conducted by a group of people set out in the legislation, being:

    a. The President of the Law Commission, a statutory research body and independent crown entity tasked with legal research and law reform.[105]

    b. The Solicitor-General, an appointed member of the Executive responsible for leading Crown Law.

    c. A retired Judge of the High Court, nominated by the Attorney-General.

    d. The Chief Parliamentary Counsel, who has statutory responsibilities for the administration of the statute book under the Legislation Act 2012.

310. The certifiers clearly reflect a diverse range of constitutional actors with statutory obligations to the administration of the law and the legal system itself. Further, none of the certifiers are elected by popular vote. Notably, even the judicial member of the group is someone who no longer practices a constitutional role as a member of the Judiciary, to avoid any suggestion of judicial intervention in a legislative process.

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[103] Link to the Certification of the revision Bill for the Contract and Commercial Law Act 2017: http://www.parliament.nz/en-nz/pb/presented/papers/51DBHOH_PAP69057_1/legislation-act-2012-contract-and-commercial-law-bill.
[104] The revision programme is described on the Parliamentary Counsel Office website: http://www.pco.govt.nz/revision-programme/.
[105] Law Commission Act 1985.

"Revising" statutory wording, even for innocuous purposes and with no intent to change a provision's meaning, is constitutionally fraught.

CONCLUSIONS ON REVISION BILL PROGRAMME

311.   Notably, the way the revision programme is framed in the statute reflects Parliament's acknowledgement that it is possible to change the legal effect of the law, even if only minor revisions are made, and even if there is no intent to change the law's effect. It resolves this doubt by declaring its intent not to change the legal effect of the original drafting and attaching considerable safeguards from a range of constitutional actors throughout the revision process.

312.   When law is modelled with the intent that it be machine-executable, not just machine-readable, it is the anticipated legal effect of the law that is modelled, not its drafting. To the extent its drafting is the thing being modelled, that is achieved by reformulating the statutory language, which again risks incidentally influencing the law's effect as originally intended.[106]

313.   Isomorphic modelling practices aim to create clear links between the law as drafted in its source material, and the way that source material has been modelled in a coded system, in the same way that "old law" can be used to interpret "new law" in revision Bills. This allows any gaps or changes in meaning to be independently scrutinised.

314.   The revision bill programme is an interesting opportunity to put the better rules programme into practice: it is a good opportunity to use the program to illustrate conceptual incoherence or logical inconsistency in existing statutes by following a better rules methodology, and to suggest proposed changes to the law that would better reflect Parliamentary intent. It would be possible for better rules outputs to also then be incorporated into the statute as a guide to statutory interpretation, short of an actual "rules-as-code" operational output.

315.   The revision bill programme is also an indication of the importance of transparent constitutional procedure when the wording of an Act is going to be reformulated, in order to independently assure that its intended effect is not changed.

316.   If legislation were to be "translated" into code and intended to have the same legal status and effect as that legislation, we would expect that a process of similar gravity be followed. There would also have to be clear Parliamentary indications about the primacy of the natural language text over the coded model akin to the relationship between "old law" and "new law", although only one could have primacy.

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[106] We note that some approaches involve creating knowledge bases directly from the language of legislative text. Two examples are DataLex, and the RASE Require1 tool from AEC3 shared with us by Nick Nisbet.

317. Of course, if coded models of legislation are only to be treated as an interpretation of the legislation, and able to be knocked out by declarations of inconsistency or unlawfulness, then these concerns are less significant.

BILINGUAL DRAFTING, THE TREATY AND TE REO MĀORI

318. The New Zealand public service deals frequently with the legacy of New Zealand's colonial history, including breaches of te Tiriti o Waitangi – the Treaty of Waitangi. As such, public servants should be well aware of the risks of assuming that a legal instrument in one language comprehensively reflects that same legal instrument in another language.

319. The Treaty is New Zealand's original lesson in the potential consequences that can flow from multilingual parallel drafting (although, we note some would argue a concept model might have helped). Equally, we recognise that breaches of the Treaty did not flow solely from the way it was drafted: there were intentional and flagrant breaches regardless of how either version is interpreted.

320. Legislation in New Zealand has been an instrument whereby Parliament legalises colonial acts and breaches of the Treaty. Legislation is also an instrument used to formalise treaty settlements between iwi and the Crown. New Zealand uses te reo Māori in various ways in legislative drafting.[107]

321. Some Acts have been passed in both English and Māori in their entirety, requiring a Parliamentary direction as to how any conflict in meaning should be resolved. In the Te Ture Whenua Māori Act 1993 (Māori Land Act 1993), the preamble to the Act is stated in English and Māori. The interpretation section requires the Act to be interpreted in light of the preamble, and that the Māori version of the preamble "shall prevail […] in the event of any conflict in meaning":

> **2   Interpretation of Act generally**
>
> (1)   It is the intention of Parliament that the provisions of this Act shall be interpreted in a manner that best furthers the principles set out in the Preamble.
>
> (2)   Without limiting the generality of subsection (1), it is the intention of Parliament that powers, duties, and discretions conferred by this Act shall be exercised, as far as possible, in a manner that facilitates and promotes the retention, use, development, and

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[107] See by way of illustration and analysis Tai Ahu "Te Reo Māori as a language of New Zealand Law: the Attainment of Civic Status" (2012, LLM Thesis, Victoria University of Wellington) at 58 and 70 et seq, and at 64: "If Māori is to eventually develop into a language of statutory enactment alongside English, there must be some legal mechanism to resolve potential conflicts in meaning between the two languages".

control of Maori land as taonga tuku iho by Maori owners, their whanau, their hapu, and their descendants, and that protects wahi tapu.

(3) In the event of any conflict in meaning between the Maori and the English versions of the Preamble, the Maori version shall prevail.

322.   As previously stated, the power to interpret the law is to have the final power to say what it means and what its effect will be. In the provision above, interpretation is used as a deliberate tool to "best further the principles set out in the Preamble" to the Act, which is some acknowledgement of the way that interpretation could be used in order to undermine those principles too.

323.   New Zealand is entering a period of greater recognition of the role, influence and value of tikanga Māori in the common law and the wider colonial legal system.[108] In the *Ellis* criminal appeals during the 2019-2020 period, the New Zealand Supreme Court was asked to determine whether it had jurisdiction to continue with a criminal appeal after the appellant had died. The appellant argued the appeal should proceed, contrary to usual practice, as the reputation of an appellant lasts beyond death in tikanga Māori, despite the English common law approach. While predominantly a question of common law rather than statutory interpretation, counsel for Mr Ellis made the following legal submission on the Treaty and statutory interpretation in support of the proposition that tikanga is a part of the common law.[109]

> … the Treaty of Waitangi has been held to be of such constitutional importance that it's been read into areas of law, even when there's no legislative reference to it. So it's been well acknowledged that the Treaty of Waitangi has that significant place, and so it can be a relevant consideration or an interpretive aid. The Treaty, of course, imports tikanga considerations. Tikanga is both a taonga under Article 2 of Te Tiriti O Waitangi, and also tikanga being highly relevant to rangatiratanga as well. The two are interconnected. So in that sense tikanga has also been read in, in a number of different cases. Now the Crown in their submissions refers to public law. I would just point out that that's public law in that very wide sense of the Treaty of Waitangi meaning, and so tikanga has been read in in environmental law cases, in family law and recently in respect of immigration. So tikanga principles have been imported in that respect as well.

324.   There is every reason to think that tikanga, as part of the common law, will play an increasing role in shaping the interpretation of legal instruments. It is another source of principles that must be taken into account when modelling legislation.

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[108] For example see Takamore v Clarke [2012] NZSC 116.
[109] R v Ellis [2020] NZSC Trans 19 at p 7 per Counsel N R Coates: <https://www.courtsofnz.govt.nz/assets/cases/Hearing-date-25-June-2020-tikanga-hearing.pdf>.

325. Where we create computational models of the law, we encode a particular interpretation of it. We thereby risk removing the right of others to advance competing interpretations based not just on text and purpose, but also other legal instruments, including the Treaty, human rights instruments, and international conventions on the rights of indigenous peoples.

326. Where law is executed automatically through semi-automated decision-making tools, people subject to a decision can be deprived of a right to be heard: equally, their right to be heard at an appeal can have transformative effects for the way the law is understood.

327. One of the claims in Better Rules promotional materials is that legislation could be drafted "in any language", although there is only reference to English and "code". There is an international literature on multilingual drafting as drawn from the experiences of the European Union and from Canada in particular.[110] These bodies of scholarship and practice give a useful starting point for the complexity of drafting and interpreting legal instruments set out in multiple natural languages.

328. Te reo Māori requires close attention to the richness of its language and vocabulary, including the whakapapa of particular words and phrases. If restricted to the public service, a better rules approach would have to account for this in the diversity and expertise of its multidisciplinary teams.

329. If policy is developed through a better rules approach, and rules as code models are created without the input and influence of Māori, it risks simply presenting a computational means of perpetuating the Crown's colonial relationship with Māori and implementing the Crown's interpretation of the law at computational scales in digital systems. As such, there is reason for extreme caution when it comes to "code as law" systems and te Tiriti.

WHAT IS CODE?

330. In the preceding analysis, we have been speaking about the ability to "translate" legislation generally, but more specifically to translate it into "code". It is important for policy-makers to understand that "code" is a

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[110] See for further reading by way of example: Robertson, C "Multingual legislation in the European Union. EU and National legislative-Language Styles and Terminology" (2011) 9(1) Research in Language 51; Leung J "Statutory interpretation in multilingual jurisdictions: typology and trends" (2012) 22(5) Journal of Multilingual and Multicultural Development 481; Sin, K K "Out of the Fly-Bottle: Conceptual Confusions in Multilingual Legislation" (2013) 26 Int J Semiot Law 927; Schafer, B "Formal Models of Statutory Interpretation in Multilingual Legal Systems" (2017) 38(3) Statute Law Review 310; Cao, D "Inter-lingual uncertainty in bilingual and multilingual law" (2007) 39 Journal of Pragmatics 69.

term that covers a wide range of computational languages, tools, and techniques.

331. Advocates frequently speak of "translating" law into "code" or "machine executable languages". With a full appreciation of what code is, it is easier to understand how "modelling" law in computational languages is a better route to comprehension.

332. Traditionally, for legal expert systems, the inability to comprehensively code the one true meaning of the law was perceived as being an insurmountable obstacle. Like Morris, we agree that it is not an obstacle to coding effective "interpretations" of the law:[111]

> Here's a thought experiment: Think of a law that you are pretty sure you understand the meaning of. Now, remove human beings from the universe. Does that law still have a significant meaning? For my part, I'm comfortable that the answer is no. Laws do not have meaning in and of themselves. They are given meaning by interpretation. It is therefore not possible to encode the meaning of the law and not merely an interpretation of it. Every possible meaning of the law, including the correct one if such a thing exists, is an interpretation. So what we are encoding is interpretations. Full stop.

333. The metaphor of a "model" only becomes more appropriate when it becomes clear how code works and how it differs from human "language", despite the way computational "languages" are described.

334. When presented with the concept of "legislation as code", one of the first questions anyone with expertise in computer programming will ask is: "what kind of code?"

335. As legal researchers, we have had to come to some working understanding of what computer code is, how it works and what it does.[112] There is a long history of scholars with expertise in both law and computer science attempting to merge these two areas, or to use computers to achieve legal tasks.

336. At the outset, we state our belief that a significant part of the confusion around "translating law into machine languages" stems substantially from the metaphor of code as language. Again, the academic writing on what does or does not constitute a language is significant. It is sufficient to say that there are important differences between natural language, as used by humans and given meaning through a shared and developing system of social usage, and programming languages,

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[111] Morris, J "10 Questions and Answers about Rules as Code" (26 May 2020) Medium: <https://roundtablelaw.medium.com/10-questions-and-answers-about-rules-as-code-a26ecc091828>. This approach is reflected in Morris' LLM Thesis, cited above.
[112] We reiterate the multiplicity of "code" as a homonym. It can refer variously to legal codes, cryptographic codes, and the research methodologies of "coding" text into categories.

which are a formalised system for instructing a computer system to process data algorithmically.

337.   We have found it useful to understand "code" from the starting point of what a computer is and what it does. The essential elements of a computer system are inputs, a processor, memory, and outputs. The processor and the memory are used to take a data input and produce a data output.

338.   It is also helpful to briefly state a definition of data, including digital data, and binary or machine code. A core problem in computer science deals with how to represent knowledge about the world around us in a way that a computer system can process. Knowledge is represented through the use of digital data. Computer systems receive information inputs at a fundamental level in binary notation. Any number or letter can be represented in base-2 format, as a string of 1s and 0s. This means any knowledge that can be represented numerically can be represented in a computer system.

339.   Binary notation is captured in a computer system, at its most fundamental level, in the computer's hardware, through a system of switches, or transistors, that close and open circuits. This system of transistors can be used to represent a 1 or a 0 by being switched to "on or off" (by closing or opening a circuit and controlling whether an electrical current can flow).

340.   Representing numbers in binary can result in extremely long strings of digits. For this reason, programming languages use abstraction: programmers seldom engage with computer code at the level of 1s and 0s. Instead, there are formalised systems of instructing computers (processing units with access to memory) how to process those 1s and 0s, or data. Different systems of formalising those instructions are referred to as different "languages". Unlike natural languages, if they are used incorrectly, there is very little if any leniency for error.

341.   In this project, we have found it more helpful to think of code as a tool, rather than a language. This leads to much more nuanced thinking when it comes to the notion of "translating" between one language and other without loss of meaning.

342.   In the past, systems of computation have also been attempted without the use of electronic circuits. In the Reserve Bank headquarters in Wellington, New Zealand, there is a restored hydraulic model of an economic system. This is a useful way of thinking about the idea of modelling law using code. Code, and machine executable languages, are simply a system of knowledge representation and processing using digital systems. In order to use code to model a legal system, decisions have to be made about how best to decide what parts of the system are being modelled and how the model operates.

343.   One important distinction to appreciate is between legal materials that are machine-readable, and legal materials that are machine

executable. This distinction is also important for considering the academic history of the idea of "law as code".

    a. Machine readable: this refers to the ability to use automated processes for the structuring, storage and retrieval of legal text. The use of machine-readable languages in law generally involves no fundamental change to the basic text-based nature of the law. A dominant example is the use of mark-up languages, such as XML, which create "wrappers" for text that enable a computer system to understand the semantic or formal significance of a string of text. Scholars attempt to create formalised standards that allow the various components of legal materials to be signified using machine languages in ways that are predictable and formalised within or between jurisdictions. Materials that are machine readable are still predominantly intended to be used as text, not as code. Despite the important distinction between machine readable and machine executable law, many research programmes deal with both. That is because the creation of machine executable law from legal text is manually intensive. The goal of many law-as-code investigators is to automate the process of extracting legal norms from legal text: to do that, there has to be some formalisation of that legal text to enable machine processing. To some extent, the better rules approach as we define it could be used to produce standardised law that is more amenable to machine readability using standards such as LegalDocML / Akoma Ntoso, but this is not the focus of contemporary rules-as-code or better rules advocates.

    b. Machine executable: making law machine executable refers to developing or modelling laws into forms that enables computers to model the effect of the law. By machine executable laws, it is intended that computational systems can be given data inputs that represent legally significant events, and that the effect of the law can be modelled in response to that event. The computational rules that comprise the modelling system are intended to mimic the effect of legal rules in the system being modelled. Machine executable law is therefore intended to answer legal questions.

344.   We note some also insist on a distinction between computational, programming and machine languages. We do not think that distinction has any implications for our findings but we raise it for completeness.

345.   Code languages are formalised. They are working tools that like any other human-designed tool have limitations, or intended purposes, that make them more or less suitable for particular uses than others. They are usually subject to some kind of oversight or standard that formalises the way they are used.

346.   One important limitation to consider is that a computational model of the law written in "code" can only really be operationalised in a

computer system. That sits in contrast to law written in natural language, which applies everywhere within its jurisdiction at all times, and is enforced by humans and institutions who exercise discretion about whether or not enforcement will be pursued. Law written in natural language can be relatively brief because many assumptions and background factors can be taken for granted. The same ruleset drafted in computational languages cannot always take such matters for granted, and paradoxically, becomes much longer and more prescriptive by comparison.

A HYPOTHETICAL NON-CODE MODEL OF THE LAW

347. Once code is understood as being a "coded model" using a range of tools and techniques, this makes the illusory equivalence between "law in natural languages" and "law as code / machine executable languages" more nuanced. We have found it useful to consider the following hypothetical:

    a. Imagine that, using a non-digital better rules approach, a policy system is being developed that enables people to exchange used bottle caps for a monetary payment in coins. The purpose of the system is to encourage the recycling of bottle caps.

    b. Instead of modelling the policy system using a digital computer, a non-digital non-electric system of weights and pullies is developed which takes bottle caps as inputs and produces coins as outputs.

    c. The system of weights and pullies is used to model how many coins will be exchanged in response for a given number of bottle caps and can be calibrated to reflect different policy settings and exchange rates.

    d. In this situation, few people would seriously suggest that the system of weights and pullies should be "the law". Further, it would be easy to accept that the system of weights and pullies is simply a model used by the policymakers to test (or deliver) their policy intent. If the model's effect departed from the wording of the legal instruments shaping the regulatory system, few people would suggest that the system of weights and pullies should take dominance over a judicial interpretation of that legal instrument.

    e. By contrast, we might happily accept that the system of weights and pullies is a useful indication of how the law was intended to operate in the process of drafting natural language rules.

    f. We could also accept that, when it comes to "ascertaining meaning" through statutory interpretation, it might be possible for the natural language in the legal instrument to diverge from the way the model operates in significant ways. Suppose that someone discovers a method of producing new bottle caps that costs less than the return from exchanging a bottle cap for the

associated monetary payment. A court finds that introducing bottle caps in this way is contrary to the text and purpose of the Act, and to recover a payment from the system in this way is unlawful. The system of weights and pullies has no means of distinguishing between new and recycled bottle caps. The model has become out of step with the legislation as drafted and interpreted by the Court.

g. The model's operation might depart from how the legislation is ultimately drafted and interpreted but any suggestion that the law should, contrary to its text, purpose and context, be interpreted in a way consistent with the system of weights and pullies' operation, would clearly run contrary to the rule of law.

h. We might decide, as if using a non-digital API, to enable access to the system of weights and pullies by non-government actors in order to implement the law, or by putting it in a central location that can be accessed, or replicating it in regional centres. In that case, we would insist that there are verifiable methods of making sure that the model is reliable and meets particular technical standards. The model would have to be maintained over time. Again, though, no one would suggest that the system of weights and pullies should supplant legislation, or be given equal status to the words approved by the legislature and the Sovereign in the legislative text.

348. While perhaps fanciful, this hypothetical scenario does reveal important assumptions that are imported when we speak of "translating" law into other "languages". Those assumptions are easier to avoid when the specific differences between natural languages and machine-readable languages are clarified through the example.

CONCLUSION TO PART THREE

349. In this part we have explained in some detail why we believe code should not be given the status of legislation in New Zealand based on a range of practical and principled objections.

350. Pragmatically speaking, the notion of translating only one piece of legislation cannot be sustained, given the way legislation sits as one thread in a wider fabric of legal instruments.

351. We have explained how "interpretation" is an unavoidable and inherent process for ascertaining what the law means. That interpretation, as a matter of pragmatism and principle, must be able to be contested. Where a coded model of the law is created, an interpretation of the law is adopted, which may not always be able to be scrutinised or contested.

352. Further, New Zealand's constitutional arrangements require different institutions to be responsible for setting legislative text as opposed to conclusively interpreting it. A key plank of this constitutional

arrangement is that it is the Judiciary, not the Executive, who has authority to declare the final and correct interpretation of the legislation.

353. We have made the argument that legislation cannot be prepared in two languages at once without serious risks to changing the meaning and effect of the law and the way that Parliament needs to give explicit direction as to which version of the same law expressed differently is to have the greatest weight.

354. We have also pointed to the way that the insights generated by following a better rules approach can already be implemented by "revising" legislation through a revision programme that incorporates careful constitutional safeguards. One of these reasons for revising the legislation is to enable it to be implemented in digital systems or to take account of changes in technology.

355. Finally, we explained how the idea of "translating the law into machine readable languages" tends to be misleading, and that a better metaphor for understanding is to "model an interpretation of the law".

356. In Part Four, we explain how the notion of "legislation as code", a better rules approach, or rules as code can nevertheless be incorporated into the New Zealand legal system while respecting these constitutional features.

PART FOUR:

USING CODED INTERPRETATIONS IN THE LAW

HIGHLY RELIABLE INTERPRETATIONS ARE VALUABLE

357.   Just because it is difficult for "all law" to be authoritatively coded, this does not mean that some law cannot be reliably represented in a computational model.

358.   Jason Morris makes this point in his LLM Thesis.[113] We adopt Morris' broader argument: that the fact a computational model is only an interpretation of the law does not mean that all coded models cannot be useful.

359.   An important point of difference is that Morris' thesis relates to the use of automated legal reasoning tools by lawyers in order to provide legal advice to clients, and different considerations may apply in a government-to-citizen context (the latter being the focus of this report).[114]

> The use of [declarative logic programming] tools should be understood to involve, as Susskind suggests, not an encoding of a categorically correct representation of the meaning of the relevant law, but an encoding of the internally coherent understanding of the law that a responsible legal professional believes would be appropriate for people receiving automated legal services to rely upon, in all the relevant context. If what we are encoding is not "the law", but one person's understanding of it, all the abstract concerns about whether expert systems can accurately represent the "true" meaning of a law disappear. … Difficulties involved in determining what a law means must be overcome before either the lawyer gives advice, or they encode their understanding. Interpretation is necessary in both circumstances, and so the need for interpretation is not a critique of expert systems at all, but a critique of laws.

360.   Morris expresses confidence that changes in the law that affect whether an interpretation is correct can be dealt with by changing the encoded model: this would be much more challenging if code were to be given the status of legislation.[115]

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[113] Morris, J "Spreadsheets for Legal Reasoning: The Continued Promise of Declarative Logic Programming in Law" LLM Thesis, 2020, University of Alberta.
[114] Ibid at 47-48.
[115] Ibid at 49.

> … if a lawyer is aware of a statutory error, they can encode their corrected understanding of the law as easily as they can advise using it. If they are not aware of the error, they would provide incorrect advice in any case. The encoded version will still meet the "no worse than a lawyer" standard. With regard to changes to the meaning of laws that arise due to changed circumstances, the same thing is true. A lawyer may anticipate that the change in general circumstances will require a change in the meaning of a provision, or they won't. If they do, they can encode that understanding. Legislative error and changes in circumstances are difficulties with statutory interpretation that have no particular impact on the use of expert systems. The fact that the meaning of statutes can change over time, even in the absence of explicit amendment, suggests that the maintenance of automated systems will be an important factor in whether they continue to be reasonable.

361.   By contrast with the situation anticipated by Morris (legal advice in a lawyer client relationship), updating a model is likely to be a much more complex exercise when the model is being used by an Executive government department. The fact that this may be more complex – requiring various levels of sign-off or accountability procedures – is an indication of the importance of having a coded model that is legally correct when in active operational use by a government agency, even if we accept the model is simply an interpretation. Those sign-off procedures exist because of the significant consequences tweaks to a model may entail for the relevant agency and for people subject to coded systems.

362.   Morris acknowledges that there are some situations where automated systems should not be used because of specific legal ambiguities, but he persuasively argues that:[116]

> We cannot justify refusing to use DLP tools for what they can do because there remain things they cannot do. Responsible use of these tools will always include deciding when not to use them, and issues of open-texture, vagueness, or uncertainty may remain good reasons to come to that conclusion.

363.   In a footnote to that statement, Morris notes the potential of a better rules approach, primarily because of its ability to improve the quality of the underlying policy, and its ability to be encoded in computational systems:[117]

> The Better Rules conversation (Better Rules for Government Discovery Report […]) proposes a fascinating possible resolution to this problem: that public rules ought to be drafted with an eye to how easily they could be automated, encouraging the avoidance of open-textured terminology except where the vagueness serves an explicit policy objective. Such a change in how legal rules are drafted would be a sea change for the applicability of DLP tools, and statutory interpretation itself.

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[116] Ibid at p 51.
[117] Footnote 63 on p 51.

364. Morris acknowledges that "the real challenge" is the knowledge acquisition bottleneck:[118]

> The knowledge acquisition bottleneck is the only common criticism left unaddressed. It applies to all possible uses of expert systems. It is not resolved by using modern tools. It cannot be resolved by merely avoiding the standard of perfection. The viability of expert systems as a tool for increasing the supply of legal services may legitimately turn on whether there is a realistic and appropriate solution to this problem. To reiterate, the knowledge acquisition bottleneck refers to the high cost and low reliability of the method of having a legal subject matter expert and a programmer work side by side to develop expert systems.

365. He continues:[119]

> The knowledge acquisition problem disappears entirely when the person who holds the subject expertise and the person who understands the programming language are the same person. There is no risk of anything being lost in translation, missed, or misunderstood when the process of legal encoding involves only one person.

366. By contrast with the approach proposed by Morris (the use of user-friendly coding tools that can be directly used by legally trained people), the better rules approach incorporates this multidisciplinary knowledge through the use of teams and business process modelling approaches. This ameliorates some of the knowledge acquisition bottleneck, but not all, and it is also important to note the way that a better rules approach can be seen to produce policies, regulatory systems and legislation that are more easily implemented in digital systems, thereby reducing the risk of incorrect computational modelling by subsequent actors responsible for implementing the law in computer systems.

367. A persuasive point made by better rules and rules as code advocates is that government departments and other users of legislative and other rules are already engaged in preparing and encoding their own interpretations of the law. If an authoritative interpretation can be made available, then it would limit the variability of interpretations available in the "marketplace for interpretation". So long as the "authoritative interpretation" is understood as being of lesser authority than a legal instrument itself, and still remains open to judicial and legal contest, this raises far fewer fundamental constitutional considerations.

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[118] Ibid at p 52.
[119] Ibid at p 53.

EMULATE SUCCESSFUL RELIABLE INTERPRETATIONS

368.   Given our conclusions, what examples might we emulate where highly authoritative interpretations of legal instruments – whether or not they are in code – have generated public or private benefit?

369.   One useful example we have identified is the Agreement for Sale and Purchase of Real Estate, produced by the Auckland District Law Society. "The Agreement" is now in its Tenth Edition.

370.   We explain notable insights about this agreement in greater detail in an appendix.

371.   The agreement, and other standard form agreements like it:

   a.   are highly reliable instruments that embody a reliable interpretation of multiple primary legal sources.

   b.   They are widely used by the public to conduct legal activities.

   c.   They indicate the value that similar interpretations might have if they are coded and modelled reliably, while retaining the ability to scrutinise them through legal argument.

   d.   Agreements like this also exhibit features worth emulating, like methods to maintain the reliability of the interpretative instrument, and mechanisms to incorporate changes in judicial interpretation, case law, or statutory amendments.

EXAMPLE: ADLS STANDARD FORM AGREEMENT FOR SALE AND PURCHASE OF REAL ESTATE

372.   Our primary interest in the ADLS Agreement is that it illustrates the wider value of exceptionally reliable and reproducible legal instruments which nevertheless are only non-authoritative interpretations of how the law works. Parties attempting to create law as code models should pay particular attention to the following points, which we believe are integral to the success of the ADLS Agreement:

   a.   The Agreement is drafted in natural language, but it reflects a workable operational interpretation of multiple legal instruments that increases the parties' compliance with and knowledge of the law.

   b.   The Agreement draws on a wide range of primary legal sources. It is not only a reflection of land law, but also taxation law (in the way that GST is incorporated into land sales).

   c.   There is wide confidence in the reliability of the Agreement because of the way that it is produced and because of the qualifications of the people who produce it and monitor it.

d. The Agreement is capable of being assessed by the judiciary and updated to reflect statutory amendment, judicial interpretation, and the impact of case law.

e. The Agreement includes its own dispute resolution mechanism. Parties who agree there is a dispute can refer it to experienced property lawyers for resolution.

f. Copyright in this case is an essential legal device for controlling how the agreement is used or modified. It is used to ensure that the utility of the standard form is not undermined. The ADLS publishes software that facilitates legitimate amendment of digital versions of the Agreement.

g. It would be possible for the Agreement to be modelled in computational languages and used, while still preserving the natural language text in case of any interpretive disagreement.

h. A coded model may not be immediately useful for the people who use it, but a similar process to produce the natural language text would confer credibility on the associated coded model produced. The Committee could use a better rules approach to improve the suitability of its drafting for encoding in digital systems.

373. The Agreement creates a reliable and dependable legal environment within which parties can transact. It does not exhaustively state the law, nor is it held up as having greater authority than the other primary legal sources (or even secondary legal sources in the form of academic commentary) that inform its drafting. It is reproducible and scalable in the way that many copies of it can be produced and used rapidly. It avoids the need for bespoke individual agreements to be drafted and negotiated for every new property transaction, which would generate massive cost and legal uncertainty.

374. The Agreement is one of several legal instruments produced by the ADLS. It is drafted and revised by a committee of the ADLS convened for that purpose. Membership of the committee is comprised of legal practitioners and academics with significant authority on the area of land law in New Zealand, including the author of the leading academic text.

375. In a panel discussion on access to civil justice, a justice of the Court of Appeal noted that very few disputes about the sale and purchase of land are heard in appellate courts today.[120] The role of the Agreement in this outcome cannot be overlooked. Interviewees we spoke to

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[120] "How to make the civil justice system more accessible, discussed by a panel of experts", RNZ (6 October 2019): <https://www.rnz.co.nz/programmes/otago-university-panel-discussions/story/2018714651/how-to-make-the-civil-justice-system-more-accessible-discussed-by-a-panel-of-experts>.

estimated more than 90% of sale and purchase of land transactions are conducted using the ADLS agreement.

376. As a result of its ubiquity (which itself is a testament to its effectiveness), the Agreement has become remarkably embedded within the legal system. Notably, some providers of professional legal training teach their property law modules by reference predominantly to this Agreement itself, as much as the original legislation it reflects.

377. As a natural language legal instrument, the Agreement is interpreted using legal interpretive practices. This is one limitation of using it as an illustration of how coded law might work. However, because the legal instrument is drafted by a non-Parliamentary body, the same kinds of constitutional issues that are raised by authoritative coded models do not arise.

378. We also note the way the Agreement highlights the role of the courts in developing a reliable legal instrument. The New Zealand Supreme Court has made comment on the drafting of the Agreement. In fact, judicial comment has led to amendments to the Agreement in revised editions.[121] While making it easier for lawyers to practice in this area of law, the Agreement still benefits from authoritative interpretations provided by the courts in the course of legal disputes.

379. In a recent book, Richard Susskind proposes what we say is substantively similar to a better rules approach to the design of legal, operational, and digital procedures for online courts. Susskind's immediate concern is how to create procedures for online courts in ways that do not limit what someone can or cannot do within a digital system in a way that lacks any legal foundation. His contended solution looks substantially similar to the way we suggest a better rules approach could be combined with the authority of a body such as the Auckland District Law Society committees to produce dependable and reliable computational models of legal interpretations. Susskind's process is set out at p 163:[122]

> … (1) A rules committee should lay down general rules … that conform with an agreed high-level specification of the functionality of the system (agreed amongst politicians, policy-makers, and judges).
>
> (2) The committee should delegate rule-making/code-cutting responsibility and discretion to a formally established smaller group that can work out the detail and proceed in an 'agile' way.
>
> (3) the rules and code that this group create would need to be formally articulated and made explicit, partly for public scrutiny and partly for a periodic, formal review by the main rules committee.

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[121] *Property Ventures Investments Limited v Regalwood Holdings Limited* [2010] NZSC 47.
[122] Susskind, R "Online Courts and the Future of Justice" (2019, Oxford University Press, Oxford, United Kingdom) at 163.

(4) The committee and group should be encouraged to approach the task in the spirit of proportionality and resist the temptation to generate an over-complicated set of rules.

In this way, code is law but it is law whose creation has been formally sanctioned through some kind of delegated authority. This may seem heavy-handed but I do not think we can simply leave the rule-making and code-cutting to a group of developers and judges, no matter how senior and well-motivated. We cannot allow coding to become law-making.

USE OF "AUTOMATED ELECTRONIC SYSTEMS" IN LEGISLATION

380. There is already a method of legislative drafting for the implementation of AES to exercise legal powers. These legal powers are not limited to powers of decision: they also include complying with obligations, exercising powers, and performing legal functions.

381. Below we outline the legislative provisions that shape this authority to use AES for such purposes. We do so to illustrate the way that a coded interpretation of the law produced using better rules or rules as code methods could be operationally deployed within legislative boundaries set by Parliament, and in a way that still permits scrutiny by an identifiable person responsible for the system; anyone subject to the use of the system; or by judicial or regulatory oversight institutions.

382. The simplified pattern of drafting generally includes:

   a. A power to arrange for a system to be used.

   b. Stating the effect of the system and any dispute resolution mechanisms.

   c. Sometimes, a criminal offence for interfering with the system's operation.

383. The phrase "automated electronic system" is not defined.

384. We use the Biosecurity Act 1993 as an example. Below are the statutory provisions empowering a person to arrange for an AES:

142F Arrangement for system
(1) The Director-General may arrange for the use of an automated electronic system to do the actions described in subsection (2) that this Act or another enactment allows or requires the persons described in subsection (3) to do.
(2) The actions are—
   (a)   exercising a power:
   (b)   carrying out a function:
   (c)   carrying out a duty:
   (d)   making a decision, including making a decision by—
      (i)   analysing information that the Director-General holds or has access to about a person, goods, or craft; and

            (ii)   applying criteria predetermined by the Director-General to the analysis:

    (e)   doing an action for the purpose of exercising a power, carrying out a function or duty, or making a decision:

    (f)   communicating the exercising of a power, carrying out of a function or duty, or making of a decision.

(3)   The persons are—

    (a)   the Director-General:

    (b)   inspectors:

    (c)   chief technical officers:

    (d)   authorised persons:

    (e)   accredited persons:

    (f)   assistants of inspectors or authorised persons.

(4)   The Director-General may make an arrangement only if satisfied that—

    (a)   the system has the capacity to do the action with reasonable reliability; and

    (b)   a process is available under which a person affected by an action done by the system can have the action reviewed by a person described in subsection (3) without undue delay.

(5)   A system used in accordance with an arrangement may include components outside New Zealand.

(6)   The Director-General must consult the Privacy Commissioner about including in an arrangement actions that involve the collection or use of personal information.

385.   Below are the statutory provisions concerned with the effect of the use of the electronic system:

142G   Effect of use of system

(1)   This section applies to an action done by an automated electronic system.

(2)   An action allowed or required by this Act done by the system—

    (a)   is treated as an action done properly by the appropriate person referred to in section 142F(3); and

    (b)   is not invalid by virtue only of the fact that it is done by the system.

(3)   If an action allowed or required by another enactment done by the system is done in accordance with any applicable provisions in the enactment on the use of an automated electronic system, the action—

    (a)   is treated as an action done properly by the appropriate person referred to in section 142F(3); and

    (b)   is not invalid by virtue only of the fact that it is done by the system.

(4)   If the system operates in such a way as to render the action done or partly done by the system clearly wrong, the action may be done by the appropriate person referred to in section 142F(3).

386.   An example of a criminal offence related to an AES is s 133A of the Animal Products Act 1999:

133A   Offences involving automated electronic system

(1)   A person commits an offence who intentionally obstructs or hinders an automated electronic system that is doing an action under section 165B.

(2)   A person commits an offence who knowingly damages or impairs an automated electronic system.

(3)   A person who commits an offence against this section is liable on conviction,—

(a)   for a body corporate, to a fine not exceeding $250,000:

(b)   for an individual, to imprisonment for a term not exceeding 3 months and a fine not exceeding $50,000.

387.   The Customs and Excise Act 2018 is a more comprehensive statutory regime and one that has been recently updated since it was originally implemented in 2009.

388.   Section 296 of the Customs and Excise Act 2018 authorises the Chief Executive to approve the use of AES for an expansive range of activities:

296   Use of automated electronic systems by Customs to make decisions, exercise powers, comply with obligations, and take related actions

(1)   The chief executive may approve the use of automated electronic systems by a specified person to make any decision, exercise any power, comply with any obligation, or carry out any other related action under any specified provision.

(2)   The chief executive may approve the use of an automated electronic system only if—

(a)   the system is under the chief executive's control; and

(b)   the chief executive is satisfied that the system has the capacity to make the decision, exercise the power, comply with the obligation, or take the related action with reasonable reliability; and

(c)   1 or more persons are always available, as an alternative, to make the decision, exercise the power, comply with the obligation, or take the related action.

(3)   An automated electronic system approved under subsection (1)—

(a)   may include components that are outside New Zealand; and

(b)   may also be used for making decisions, exercising powers, complying with obligations, or taking related actions under other enactments.

(4)   The chief executive must consult the Privacy Commissioner on the terms and the privacy implications of any arrangements to use an automated electronic system under subsection (1) before—

(a)   finalising the arrangements; or

(b)   making any significant variation to the arrangements.

(5)   A decision that is made, a power that is exercised, an obligation that is complied with, or a related action that is taken using an automated electronic system under this section must be treated for all purposes as if it were made, exercised, complied with, or taken (as the case may be) by a specified person authorised by the

specified provision to make the decision, exercise the power, comply with the obligation, or take the related action.

389.	A "specified person" for the purposes of the Customs and Excise Act 2018 is defined as "means the chief executive, Customs, or a Customs officer (as the case may be) carrying out a function under a specified provision".

390.	Where the Chief Executive is using an AES, s 297 requires them to publicly identify the legal power being delegated to an AES, as well as to "identify" the AES. It is not clear how this requirement can be complied with, especially given the fact that s 296(3) acknowledges that the "components" of a system may be "outside New Zealand". Publication must be effected "as soon as practicable" but the use of a system is not rendered invalid only by failure to publish those details "as soon as practicable".

391.	A variation or substitution to a decision made by an AES can be made a specified person (s 298). The person may:

(a)	vary, or add to, the terms or conditions of the relevant decision; or

(b)	substitute a decision for the relevant decision if the specified person is satisfied that the new decision—

(i)	could have been made under the same specified provision as the relevant decision; and

(ii)	is more favourable to the affected person.

392.	The Customs and Excise Act states, for the avoidance of doubt, that a decision made through an AES does not deprive a person of rights of appeal, or administrative or judicial review:

**299	Appeals and reviews unaffected**

To avoid doubt, a person has the same rights of appeal or right to apply for administrative or judicial review (if any) in relation to a decision made, power exercised, obligation complied with, or other action taken by an automated electronic system as the person would have had if the decision, power, obligation, or other action had been made, exercised, complied with, or taken by a specified person.

393.	We have identified a number of statutes where some or all of this pattern of drafting is replicated, and where the phrase "automated electronic system" is used.[123] While some legislative instruments seem old, the relevant provisions were generally introduced more recently through amendment legislation from 2010 onward. This repeated

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[123] Drafting around "automated electronic systems" in the Courts Matters Act 2018 was noted in Colin Gavaghan, Alistair Knott, James Maclaurin, John Zerilli, Joy Liddicoat "Government Use Of Artificial Intelligence In New Zealand: Final Report on Phase 1 of the New Zealand Law Foundation's Artificial Intelligence and Law in New Zealand Project" (New Zealand Law Foundation, Wellington, 2019).

pattern of statutory drafting suggests a broader Legislative attitude toward how AES should be governed by legislation. Relevant statutes include:

    a. Biosecurity Act 1993, ss 142F and 142G (Biosecurity Law Reform Act 2012).

    b. Food Act 2014, ss 239, 374, 375 (Food Safety Law Reform Act 2018)

    c. Customs and Excise Act 2018, ss 295, 296, 297, 298, 299. Note that similar provisions were present at ss 274A-274D under the Customs and Excise Act 1996.

    d. Summary Proceedings Act 1957, ss 86DA, 86DB, 86DC (Courts Matters Act 2018).

    e. Immigration Act 2009, ss 28, 29, 29A (Immigration (International Visitor Conservation and Tourism Levy) Amendment Act 2019).

    f. Wine Act 2003, ss 101A, 118A, 118B (Food Safety Law Reform Act 2018).

    g. Animal Products Act 1999, 133A, 165B, 165C (Food Safety Law Reform Act 2018).

    h. Immigration (Visa, Entry Permission, and Related Matters) Regulations 2010, reg 8 (Immigration (Visa, Entry Permission, and Related Matters) Amendment Regulations 2010).

    i. Organic Products Bill (2020, 221-1), cl 121, 122.

    j. Legal Service Act 2011, s 16A (Legal Services Amendment Act 2013).

    k. Biosecurity (Infringement Offences) Regulations 2010, schedule 1, s 154N(20), (Biosecurity (Infringement Offences) Amendment Regulations 2018).

394. There are more references to "electronic systems" across the statute book (including in the internet filters Bill we discuss later) and we cannot identify any reason for why drafting around "automated" electronic systems has been adopted in some situations, and avoided in others. "Electronic systems" are mentioned in:

    a. the Road User Charges Regulations 2012,

    b. Family Court Rules 2002 (related to filing documents in Court),

    c. Victims' Orders Against Violent Offenders Rules 2014,

    d. the Referenda (Postal Voting) Act 2000,

    e. Harmful Digital Communications Rules 2016,

    f. the Supreme Court Rules 2004,

    g. Customs and Excise Regulations 1996,

      h.   Intelligence and Security Act 2017,

      i.   Fisheries (Electronic Monitoring on Vessels) Regulations 2017 and

      j.   the Criminal Procedure (Transfer of Information) Regulations 2013.

395. There are restrictions and safeguards on the exercise of delegating to an automated electronic system. The most significant safeguard is that the relevant individual authorising the system (usually a Chief Executive of a government agency) is "satisfied" of the system's "reasonable reliability".

396. There is specific legislative clarification that decisions made using an AES must be capable of appeal, but otherwise can be treated as if they were made by a relevant decision-maker.

SCRUTINY OF AUTOMATED ELECTRONIC SYSTEMS THROUGH OFFICIAL INFORMATION LEGISLATION

397. The Official Information Act 1982 provides one possible tool for requesting the details of an AES being used to perform legal tasks.[124]

> **22**   **Right of access to internal rules affecting decisions**
>
> (1) On a request made under this section, a person has a right to, and must be given access to, any document (including a manual) that—
>
>   (a)   is held by a public service agency, a Minister of the Crown, or an organisation; and
>
>   (b)   contains policies, principles, rules, or guidelines in accordance with which decisions or recommendations are made in respect of any person or body of persons in their personal capacity. …

398. "Document" is defined widely under the Official Information Act, as is "information" which a requester is entitled to seek. Despite the apparent utility of s 22 for this purpose, there are extensive exceptions to this provision which require further investigation to assess the section's suitability for requesting the specifics of an AES. At a minimum, s 22 provides a sound principled basis for seeking the details of rules (including algorithmic systems) affecting decisions.

399. If AES are to be adopted as a matter of wider government policy, then Official Information access regimes should be bolstered in support.

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[124] This has also been noted by the authors of Gavaghan et al (2019).

CLARIFYING THE "REASONABLE RELIABILITY" OF AUTOMATED ELECTRONIC SYSTEMS

400. Government agencies using AES to exercise powers of decision or other statutory powers are not required to have specific legislative authorisation to do so. Such agencies are Crown Entities with the equivalent powers of a legal person.

401. Despite this, we think that it would be desirable for agencies intending to automate legally significant operations through the use of digital systems to receive greater legislative guidance as to what is required to make that system "reasonably reliable", and what level of "satisfaction" is required.

402. This could be achieved through the inclusion of more specific legislative guidance as to what makes an AES "reasonably reliable", which is currently left (perhaps ironically) to statutory interpretation.

403. We think the "reasonable reliability" of AES can be understood in various ways.

   a. At a glance, the "reasonable reliability" of electronic systems might be taken to refer to purely technical matters related to the system's operation, ie, will it work, can it handle sufficient numbers of applications, etc.

   b. When expanded to automated decision-making tools, reliability could also be taken as referring to reliability of factual inputs to the system. In rule-based systems, this would include the accuracy of data inputs to the system if they are drawn from pre-existing datasets. In more complex machine learning systems, factual reliability may include considering variable risks of false positives and false negatives (which can affect a system's reliability in the sense that it must operate on correct facts. Issues of factual or technical reliability do have significant impacts on individuals subject to ADM systems), as well as the impacts on operational processes for the users of ADM systems who are using them to make decisions and perform statutory functions.

   c. To take the notion of "reliability" one step further, we say that, without stretching the plain and ordinary meaning of the statutory wording, a system's legal reliability can also be made an essential part of the system's reliability. However, it would be preferable for that to be stated explicitly, rather than left as a matter of implication.

404. It is possible to leave these requirements unstated and implicit in relevant legislation. One benefit of this approach is that it preserves greater flexibility for the agency to decide how it achieves compliance with the law and for the "reasonable reliability" standard of a system to

change according to context, over time, and as technological methods develop. A related shortcoming is that people with any concerns about the lawfulness of an AES are not able to point to a specific list of legislative criteria against which the system can be measured.

405. Alternatively, if the specifics of what makes an AES "reasonably reliable" are left to be a matter of implicit interpretation, these criteria may have to be tested through litigation. This approach could be taken at any time by anyone seeking to test the lawfulness of an AES. Relevant arguments would include that Parliament did not intend that the power to delegate a legal task to an AES would be used to perform that task unlawfully.

406. An AES that is used to exercise a decision-making power, or a power of similar legal effect, should indisputably be categorised as an "automated decision-making system". Automated decision-making systems are the subject of significant attention and investigation, primarily because of the increased usage of artificial intelligence techniques to assist (or entirely automate) aspects of decision-making. The modern focus on automated decision-making systems stems from the increasing use of machine learning techniques, which are usually driven by statistical modelling. This can mean that bias in datasets or algorithmic training can lead to perverse or discriminatory outcomes. But that does not mean that simpler rule-based systems cannot also have substantial negative outcomes, and they should be treated with similar care.

407. At the point where coded models of the law ("rules as code") are operationalised in digital systems, advocates must engage with the wider academic and policy discussions about the impact of algorithmic decision-making. In New Zealand, key documents and investigations in this area include:

    a. The principles for safe and effective use of data, prepared by the Privacy Commissioner and Stats NZ.[125]

    b. The Algorithm Charter.[126]

    c. Algorithm assessment report.[127]

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[125] See the Principles of Safe and Effective Data and Analytics (May 2018) prepared by the Office of the Privacy Commissioner and Stats NZ: https://www.stats.govt.nz/assets/Uploads/Data-leadership-fact-sheets/Principles-safe-and-effective-data-and-analytics-May-2018.pdf.
[126] See the Algorithm charter for Aotearoa New Zealand: https://www.data.govt.nz/use-data/data-ethics/government-algorithm-transparency-and-accountability/algorithm-charter/.
[127] See Algorithm Assessment Report, Department of Internal Affairs and Stats NZ, October 2018: <https://www.data.govt.nz/assets/Uploads/Algorithm-Assessment-Report-Oct-2018.pdf>.

408. In summary, coded models of an agency's interpretation of the law may be useful in some operational situations. Where Parliament intends that these systems be used with greater public and Executive government confidence, Parliament should include better guidance around system requirements. We think the use of better rules approaches and adherence to isomorphic development practices will help make AES easier to assess for their compliance with the law.

JUDICIAL OVERSIGHT OF AUTOMATED ELECTRONIC SYSTEMS

409. One concern we have is that automated decisions could be subject to appeal, but that the jurisdiction of the Court on appeal may not deal directly with the system's lawfulness. Instead, the system's output may be simply put aside, and the decision made again based on evidence at the time of the decision, or available on appeal. In that situation, there would be no judicial scrutiny of the accuracy of the coded interpretation of the law being used within the AES. It could nevertheless be treated as having been judicially approved.

410. We also note the risk of strategic litigation practices by government departments to avoid judicial scrutiny of a computational model used in an AES. Where a government agency is using an AES, that system will be giving effect to a particular interpretation of the law. Government agencies may wish to preserve their ability to operationalise that interpretation at scale, even where there is a risk that it is wrong in law. As a result, agencies may choose to settle individual cases rather than risk that judicial scrutiny of an AES's coded model determines that it is wrong in law. It will therefore be important for both judicial and non-judicial auditing and scrutiny processes to be incorporated into the use of coded models in AES.

411. We also note there is a risk that, because of the jurisdiction of the court on appeal, the judiciary declines to consider a computational model of the law as a whole, instead only considering the relevant statutory provisions to the dispute at hand. This would be consistent with the Court's general reluctance to comment on academic matters or matters of general interpretation without the benefit of full argument. This is a risk because the model as a whole may be treated by government agencies or by others as having received judicial approval, when only the provisions relevant to the facts of that individual case have been considered.

"CODE AS LAW" WILL BECOME MORE PERVASIVE

412. Code is frequently given legal status without making the code itself 'the law.' Code can also be given delegated authority to perform tasks which have legal status.

413. This is one reason why better rules and rules as code advocates, as well as scholars such as Hildebrandt, Brownsword, Lessig, Susskind

and Diver argue that it must be clear when a coded system performing legal tasks is acting with the force of law, and when it is imposing restrictions that have no legal foundation.

414. This is a core aim of some advocates of better rules and rules as code approaches. We briefly indicate the way these scholars have considered this topic below.

   a. Brownsword writes about concepts of techno-regulation and technological management. He argues that digital systems will be given greater authority to perform regulatory tasks in the future for a variety of reasons and, like others, points to the way that digital systems deny individuals the ability to choose not to comply with an immoral or unjust law.[128]

   b. Hildebrandt has written comparing "legal by design" approaches to "legal protection by design" approaches. The former incorporates law into the rules governing user behaviour within a digital system, such that the system is said to be lawful "by design". The latter emphasises the development of digital systems that incorporate the same sorts of legal protections that are incorporated in the wider legal system. [129]

   c. In a highly influential text, Lawrence Lessig pointed to the normative effects of computer code in online environments. He compared the effects of code to achieving legal objectives as if law were architecture – or a prison, where non-compliance is impossible – by comparison with the way that written law relies on a process of identification of breaches and discretionary enforcement. He also pointed to the way that digital environments have characteristics such as the trackability of users behaviour in them that can be seen as inherent to digital systems, but may also have legal implications.[130]

   d. Richard Susskind has long explored the concept that digital systems will come to play a significant role in every aspect of the law. He is well known for his text "the End of Lawyers"[131] and his consideration of technology and access to justice. In his most recent text about online courts he, citing Lessig, points to the way that coded systems may introduce limitations on how a user can behave in ways that have no legal foundation.[132] We have

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[128] Roger Brownsword "In the year 2061: from law to technological management" (2015) 7(1) Law, Innovation and Technology at 1-51.
[129] Hildebrandt, M "Legal protection by design: objections and refutations" (2011) 5(2) Legisprudence 223 at 234.
[130] Lawrence Lessig "Code 2.0" (2006, Basic Books, New York, USA).
[131] Richard Susskind "The End of Lawyers?: Rethinking the nature of legal services" (2008, Oxford University Press, New York).
[132] Susskind, R "Online Courts and the Future of Justice" (2019, Oxford University Press, Oxford, United Kingdom).

pointed above to similarities between his suggested solution for this problem and the better rules approach as we define it.

e. Laurence Diver has examined the normative similarities and differences between code and law and asked how processes which confer legitimacy on the law could also be used to confer legitimacy on code. [133] He conducts close theoretical comparison of the way that code and law generate influences on human behaviour based on their different characteristics or affordances.

415. All of these authors have considered this issue because of a perception that digital systems will be used in more and more situations by governments and non-government actors seeking to perform legal tasks or to influence behaviour.

416. In support of this conclusion, it is useful to briefly name some examples of the way that digital systems are already given legal status, legal authority, are used for legal tasks, or are intended to have legal effects.

a. Internet and email filters – employers and other organisations (like schools, for example) who are responsible for network user behaviour frequently impose computational limitations on what people within a network can do on that network, including the kinds of websites that can be accessed or communications that can be sent and received. A decision to avoid or breach these computational mechanisms can lead to legal consequences.

b. Digital rights management – for a time, computational methods were in use to protect copyright holders from unauthorised breach of copyright in digital artefacts (ie, DVDs). These should be seen as computational methods of giving effect to legal rights and obligations. While DVDs have given way to other technologies, like streaming, the rights and obligations between copyright holder, user, and streaming platform are equally constrained by computational systems.

c. Smart contracts – in some situations, parties might agree that a contractual relationship between them will be determined in whole or in part by a computational system. There is ongoing debate about the extent to which such arrangements should really attract the status of legal contracts,[134] but regardless, they are part of a clear pattern of parties managing legal or pseudo legal relationships between them using computational systems.

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[133] See Diver "Digisprudence" (2019), above. See also Laurence Diver "Law as a User: Design, Affordance, and the Technological Mediation of Norms" (2018) 15(1) Scripted 4.
[134] See for example: Nataliia Filatova "Smart contracts from the contract law perspective: outlining new regulative strategies" (2020) 28(3) International Journal of Law and Information Technology 217.

d. Cryptocurrency and/or distributed ledger technologies (including blockchain) – the New Zealand Courts have recently been called upon to consider the question of whether cryptocurrencies can be property. The Cryptopia case includes detailed discussion of the way that distributed ledger technologies work and the role of cryptography and ultimately concluded cryptocurrencies can be property in certain legal contexts.[135] The Cryptopia case is also an example of the way that the original act to hack Cryptopia was an unlawful act attracting legal consequences. It further illustrates the way that non-cryptographic protocols that shape the way distributed ledger technologies work can attract legal status, and legal consequences if they are used in particular ways.

e. Cryptography generally is a way that people use computational techniques to exclude others from accessing a computer system or taking particular actions within that system. In this way, cryptography is used as a kind of "code as law", particularly if the consequences of deliberately circumventing that cryptographical protection lead to legal action.

f. Criminal law statutes about crimes involving computers – there are a range of crimes in the Crimes Act 1961 that criminalise the use of computers in particular ways. While some of these offences focus on user intent while accessing a system,[136] there are other offences which make it a crime to take steps to access a system without authorisation, regardless of intent.[137] In a way, this gives any kind of computer system a protected legal status, and criminalises users for the ways they interact with that system.

g. One kind of code as law to consider is the use of widely adopted protocols and standards, and the refusal to acknowledge computational systems that do not comply with those standards. An obvious example is the way the world wide web is structured, and a similar example is the way that some online services may only recognise particular file types, such as PDF, which are actually technical standards.

h. Consumer-facing digital products used for compliance – in New Zealand, it is possible to file tax returns entirely through the Xero platform and it interfaces directly with other Government

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[135] Ruscoe v Cryptopia Limited (in liquidation) [2020] NZHC 728 (8 April 2020).
[136] Crimes Act 1961, s 249: accessing computer system for a dishonest purpose.
[137] Ibid, s 252: accessing computer system without authorisation. The mens rea of the offence is knowledge or recklessness as to the absence of authorisation.

services such as RealMe and IRD. Overseas, companies such as TurboTax perform a similar function.

i. Globally and domestically, online marketplaces are in common use – sites such as TradeMe or Amazon are used to create binding legal agreements for the sale and purchase of goods. There are a range of associated legal and digital restrictions on how such transactions can occur, including contractual restrictions imposed by the online marketplace on users, through terms of service, that may lead to users' access being terminated, or binding public consequences being broadcast (for example, through feedback or star ratings).

j. Apps with legal consequences – consider the way that use of apps such as AirBnb or Uber create binding legal agreements between parties providing a service in exchange for legal consideration. The entirety of the legal relationship, for most purposes, is captured within the digital platform, even if the arrangement might be ultimately governed by orthodox commercial or contract law.

k. Calculators and legal guidance systems – central and local government agencies include all kinds of online calculators that allow a user to enter data and be provided with an indication about their entitlement to benefits or rough calculations of their tax obligations. The Inland Revenue Department in New Zealand, for example, has property tax calculators on its website which function by interacting with coded versions of the law as created in Oracle Policy Automation software, a kind of rules as code approach.

l. Local Governments in New Zealand publish online interactive maps that illustrate the zoning controls applied to particular areas.[138] These are commonly accompanied by a disclaimer as to their reliability and lawfulness, but they are an example of how digital systems can be used to interact with the law and understand one's obligations. This work is being progressed further by the Wellington City Council through the use of rules as code techniques that allow users to check online whether they need to apply for a resource consent, with the intent that resource consent applications are improved in their quality and completeness.[139]

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[138] For example, see Auckland Council Unitary Plan Geomaps: <https://unitaryplanmaps.aucklandcouncil.govt.nz/upviewer/>.
[139] See "Find out if you need a resource consent", Wellington City Council: <https://wellington.govt.nz/property-rates-and-building/building-and-resource-consents/resource-consents/find-out-if-you-need-a-resource-consent>. For transparency, we note one of the authors was involved in the production of this tool.

417. Finally, we note that there are strong indications that the New Zealand government too intends to make greater use of digital systems to achieve highly sensitive legal and regulatory outcomes. The AES drafting pattern, as well as policy initiatives such as the algorithm charter, show this is already the case, and we deal with a specific example related to proposed internet filters in more detail next.

418. As more and more policy issues take on a digital dimension, this tendency toward the use of code-as-law systems will only increase.

CONCLUDING EXAMPLE: INTERNET FILTERING LEGISLATION – AN AUTOMATED ELECTRONIC SYSTEM

INTERNET FILTERING LEGISLATION IN NEW ZEALAND

419. During its previous Parliamentary term, the New Zealand Government introduced the Films, Videos, and Publications Classification (Urgent Interim Classification of Publications and Prevention of Online Harm) Amendment Bill (268—1). The Bill had its first reading on 11 February 2021.

420. The Bill is part of a suite of reforms following the 15 March 2019 terror attacks in Christchurch, New Zealand. Among other things, it creates a statutory regime that authorises the use of "electronic systems" to prevent access to "objectionable material" (a defined term).

421. It is noticeable that the Bill lays the foundation for a future framework without ever making the case that a framework is needed now. The Bill's explanatory statement includes the following explanation:

> In New Zealand, the only current government-backed web filter is designed to block child sexual exploitation material (the Digital Child Exploitation Filtering System). This filter is voluntary and operates at the Internet service provider (ISP) level. It currently applies to about 85% of New Zealand's ISP connections.

> The Bill facilitates the establishment of a government-backed (either mandatory or voluntary) web filter if one is desired in the future. It provides the Government with explicit statutory authority to explore and implement such mechanisms through regulations, following consultation.

422. We deal with this Bill in some detail here for a number of reasons:

a. First, it is an example of the way the New Zealand government intends to use digital systems to achieve regulatory objectives.

b. Second, the Bill's subject matter is a national internet filter. This is a digital system with serious human and civil rights implications for privacy and freedom of expression if it is not used carefully. Equally, there is an undeniable public interest in preventing the intentional spread of objectionable material, particularly in the case of the Christchurch shootings, where

content was circulated in order to enhance the intended impact of terrorist acts of violence.

c. Third, the legislation sets down extremely loose parameters for how the system would operate and what it would apply to. It is essential that this legislation, when enacted, should impose a much greater degree of control on the way Executive than it currently does. This includes how the Executive government designs, implements, and audits the system, as well as what mechanisms of appeal exist, and whether they are effective.

d. Finally, the Bill presents an obvious use case for the application of a better rules approach, given that the purpose of the Bill is is to operationalise a coded model of the law.

423. We believe this Bill to be part of a broader trend across different jurisdictions that aims to expand the scope of what kinds of information may not be published or accessed on the internet. For example:

a. Legislation described in the Online Harms White Paper in the United Kingdom.[140]

b. The recent Digital Services Act being investigated for introduction in the European Union.[141]

c. Australian legislation criminalising the sharing of "abhorrent violent material" among other things.[142]

ANALYSIS OF BILL

424. The Bill delegates all the specifics for how the web filter will work to secondary legislation (regulations). While there are consultation obligations imposed on Executive agencies before regulations are made, the incorporation of insights from consultation are left largely to the judgment of that Executive government actor.

425. Matters to be dealt with in regulations also include mechanisms of review and appeal, which are separated from the existing appeal mechanisms under the Films Videos and Publications Classification Act 1993. As it is, the Bill provides for no appeal process.

426. The explanatory statement to the Bill repeatedly uses the word "clarify" to describe what regulations will do. It would be more accurate to say that regulations will "create" the regime, given the way that the principal Act provides little guidance as to how such a filter should operate. Regulations would, apparently, do the following:

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[140] See: <https://www.gov.uk/government/consultations/online-harms-white-paper/outcome/online-harms-white-paper-full-government-response#executive-summary>.
[141] See: <https://ec.europa.eu/digital-single-market/en/digital-services-act-package>.
[142] See: <https://www.ag.gov.au/crime/abhorrent-violent-material>.

clarify the criteria for identifying and preventing access to objectionable content that the filter would block

clarify governance arrangements for the system

specify reporting arrangements for the system

clarify the review process and right of appeal should an ISP, online content host, or other individual or entity dispute a decision to prevent access to a website, part of a website, or an online application:

clarify the obligations of ISPs in relation to the operation of the system:

provide detail of how data security and privacy provisions would be addressed.

427. Clause 119M of the Bill provides for the establishment of the system. However, it leaves the overall "design and form" of the system entirely up to regulations.

119M   Establishment of electronic system

(1)   When establishing the electronic system to be approved for operation under section 119N, the Secretary must consult the following on the design and the final form of the system:

   (a)   service providers; and

   (b)   technical experts and online content hosts to the extent the Secretary thinks necessary; and

   (c)   the public.

(2)   When deciding on the design and form of the system, the Secretary must consider—

   (a)   the need to balance—

      (i)   any likely impact on public access to non-objectionable online publications; and

      (ii)   the protection of the public from harm from objectionable online publications; and

   (b)   any likely impact on performance for all other network traffic; and

   (c)   departmental and technical capacity to operate the system; and

   (d)   likely compliance costs.

(3)   However, each of the factors in subsection (2) needs be considered only to the extent that it is relevant in the Secretary's view.

(4)   The system—

   (a)   must have the capacity to both identify and prevent access to a particular online publication with reasonable reliability, based on criteria set out in regulations made under section 149; and

   (b)   is subject to governance arrangements required by regulations made under section 149; and

   (c)   is subject to requirements for administration and technical oversight prescribed by regulations made under section 149, including relating to data security and privacy; and

   (d)   is subject to reporting requirements required by regulations made under section 149.

(5) Obligations of service providers relating to the operation of the system may be prescribed by regulations made under section 149.

428. Leaving aside the question of whether a State-enforced internet filter is desirable from a policy and human rights perspective, we make the following observations from a law-as-code perspective, which we think makes the Bill an essential candidate for a transparent and open application of the better rules approach *before* it is enacted as legislation.

  a. The process for classifying material as being objectionable under the principal Act is generally accepted to be robust and exercised cautiously by the Office of Film and Literature Classification. The filter would be limited, as a matter of law, to material already classified as objectionable under the Act following a classification process. This narrow scope is desirable, but it is not clear whether, from a digital systems perspective, it is possible to target only that content without also targeting incidental content. Clause 119L(4) of the Bill allows not just denial of access to an online publication, but also to any website on which that online publication is available.

  b. In accepting that the filter should only apply to objectionable material under the Act, the Bill provides no mechanism for addressing situations where the filter breaches that legal requirement.

  c. The standard of "reasonable reliability" is adopted in cl 119M(4)(a), and the standard of reasonable reliability will be elucidated via criteria set out in regulations. In line with our wider recommendations, the question of what "reasonable reliability" means should be clarified and it should be clear that the reliability of the system includes its lawfulness.

  d. The departmental disclosure statement states that the intention is to limit the filter only to publicly available websites, and not to messaging services or similar communication technologies. Despite that, cl 119L(4)(b) permits denial of access to an "online application, or similar" where objectionable publications are available. An "online application or similar" could easily cover messaging services and apps.

  e. It is doubtful whether it is legally desirable to delegate the design and form of an electronic system that limits rights of privacy and freedom of expression to secondary legislation. The Bill will create a statutory regime for limiting the right to freedom of expression, including the right to seek information, using computational systems acting with legal authority. Further, the Bill recognises that such a computational system is also likely to infringe upon individual privacy because of the way it will monitor and track identifiable individuals seeking to access material blocked by the filter.

f.   It is constitutionally significant that the agency responsible for the "design and form" of the system is left to an Executive government agency, rather than to the Legislature.

g.   There is some recognition that introducing an electronic system of this kind will have computational effects on other systems, including impact on network performance. This suggests the multidisciplinary better rules approach might have merit.

h.   The Bill is an excellent example of the way that commentators say legislatures will inexorably be drawn to the use of technology to achieve legal or regulatory tasks. Legislative bodies will be required to do so because of a perceived need to protect citizens; but also because digital systems provide a desirable regulatory tool that can operate automatically and at scale.

i.   It is not clear why the wording of an "electronic system" has been preferred when the filter would nevertheless be "automated" and self-executing.

j.   The need for the electronic system is described as being contingent: it creates a power to impose a system only if required in the future. This suggests the need for the system is not urgent. The Bill clarifies that existing voluntary systems are already capable of being operated. On this basis, there can be little argument for urgency, and this creates an opportunity to use better rules approaches to ensure any Bill is workable for implementation in digital systems. It also means that there is sufficient time available to consult very carefully with non-government organisations.

k.   Section 119N and 119O make it essential for review and appeal processes to be established in regulations before the filter can be approved, however we are unaware of any other legal situations where rights of review and appeal about matters of freedom of expression are delegated to secondary legislation.

CONCLUSIONS ON BILL

429.   If there is one thing that might be universally agreed about a legislative proposal to implement a digital censorship system, it is that the proposal should have sufficient detail to be scrutinised by members of the public and Parliament before it becomes law.

430.   As drafted, the Bill defers all of the important detail about how the system would operate to regulations, meaning Members of Parliament are not required to take responsibility for how this system would operate. Equally, in more than one of the speeches in support of the Bill at first reading, it was suggested that Select Committee is the appropriate place to work out any extra detail in the Bill. We think this approach of consistently pushing the detail of the internet censorship system is suboptimal and can be avoided by the adoption of a better

rules approach which more holistically develops the policy at the outset from a multidisciplinary perspective.

431. There was some parliamentary support for this proposition from Green MP Chloe Swarbrick:[143]

> [L]eaving all of this stuff to the regulations, is the equivalent of me handing you a piece of paper and saying, "Please draw the rules," and then enforcing those rules without having had any parliamentary oversight of what those rules actually are. … We are centralising far too much control with the progression of this legislation.

432. Despite the decision not to use the word "automated" in relation to the electronic system, this filter will be a self-executing system acting with legal force and legal consequences. It is an example of self-executing code-as-law of the kind scholars indicate should be approached with extreme caution, especially because of the way that such a filter will deprive citizens of the shield and tools provided by the ambiguity of natural language. The filter breaks down the constitutional space between the written language used by Parliament and the Judicial interpretation of that language in specific cases. This makes the absence of any legislatively provided dispute resolution mechanism even more concerning: by omission, the judiciary's role in relation to this filter has been completely removed, other than by judicial review or other inherent powers.

433. The Bill if passed would confer the power of algorithmic regulation (discussed by Hildebrandt) onto the New Zealand government in relation to matters impinging on freedom of expression and rights to privacy to some degree. There may be an argument that such limitations can be demonstrably justified, but where are these to be made? The Bill delegates review and appeal mechanisms to secondary legislation to be devised by the same agency responsible for operating the algorithmic system.

434. The algorithmic system will generally act solely based on data inputs with little opportunity for human intervention once the initial parameters of the system are set. Presumably, a register of banned content will be created, but once that has been set, there are no clear mechanisms to challenge the operation of the system.

435. Where someone believes the electronic system has strayed beyond the bounds of its legal authority, there are not clear standards against which the system can be assessed. We urge extreme caution in the progress of this Bill through the House and advise that the electronic system of filtering web access be developed in close consultation with non-government actors using a better rules approach before it is enacted as legislation.

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[143] First reading, Films, Videos, and Publications Classification (Urgent Interim Classification of Publications and Prevention of Online Harm) Amendment Bill (10 February 2021) Volume 749 NZPD.

PART FIVE: Recommendations and Actions

Distinction between better rules and rules as code / law as code

436. The distinction between better rules and rules as code is not clear cut: it is also not clear whether high profile advocates of either approach consistently see or maintain any distinction between them.

437. Even in the original better rules discovery report, it is clear that one of the main goals was to produce coded rules for use in automated decision-making systems and that there would be little if any gap between the coded version of the legislation and the legislation itself.

438. Nevertheless, we think the better rules and rules as code distinction can be adopted more consistently going forward. Broadly, a better rules approach has many significant advantages, but rules as code approaches require significant care and attention to avoid negative implications for the rule of law. To summarise:

    a. where one is using a better rules approach to produce superior policy and better express policy intent, this can have a beneficial impact on a drafter's ability to improve legislative drafting. There is little to concern us about the use of a service design approach to the point where a natural language legal instrument is approved democratically. We also agree that following a better rules approach will help to minimise the extent to which interpretive gaps are left to the judgement of executive agencies. As a result, the risk that incorrect interpretations of the law are encoded by executive agencies in service delivery can be minimised.

    b. At a certain point, most advocates of better rules and rules as code then make a further jump and conclude that the coded interpretation of the law produced through the policy process can be deployed immediately in automated and semi-automated systems. Further, they conclude that there will be no significant risk of an interpretive gap at all between the coded rule set and the natural language legal instrument. Some even suggest that the coded instrument should take priority over the legal instrument, or its effects be preferred. To that extent, the approach is better described as "rules as code". At this point, we conclude there has been an uncritical failure to acknowledge that there will always remain a gap between code and law, and that law as expressed in natural language should retain its primacy.

439. With that high level conclusion in mind, we express executive level conclusions and recommendations as follows.

CONCLUSIONS ON THE EQUIVALENCE OF LAW AND CODE

440. Coded systems are and should remain legally subordinate to natural language legal instruments passed with legislative or Parliamentary authority. The law itself – primary legal materials – should be the instrument from which interpretations are developed. Computational models are at best non-judicial interpretations of primary legal materials. Where they are developed through co-drafting, they may help to illustrate the drafter's intent at the time they were made, but the text and purpose of any subsequent legal instrument (and the associated case law) should remain dominant.

441. There should generally be mechanisms that allow people to contest the accuracy or reliability of a coded interpretation of the law. New Zealand's constitutional system relies on a relationship between Parliament and the Judiciary, where Parliament expresses its will in legislation using natural language, and the Judiciary ascertains the meaning of that language through statutory interpretation. When law is represented in code, this relationship is disrupted, because code cannot be subject to statutory interpretation in the same way as natural language and lacks the features of natural language to shift in meaning over time in response to context.

442. We are not persuaded that it is possible to directly translate natural language rules into machine readable languages without any loss of semantic meaning. We think this is justified based on decades of scholarship. This is true even where parallel drafting of legislation and coded rules takes place simultaneously. While some contend one-to-one translation between natural language and code may be possible in the future, we have not come across any situations where it is possible during the course of this research.

443. While the phrase "legislation as code" appears to suggest that a single statute can be translated into a single computational model, this is incorrect. In nearly every situation where legislation is being modelled, a computational model of the law will need to draw from more than one primary source of law.

444. There are some situations where a reliable interpretation of the law can be turned into computational rules, which can be used to model the law's effect in computer systems. This holds promise, insofar as the computational model is reliable and its reliability can be tested. If it is unreliable, then the consequences of relying on that model are significant.

445. The process of creating models of legal instruments (like legislation) requires time and multidisciplinary expertise. As a result, this process is difficult to upscale and cannot be automated: it is not possible to set a computer program to extract all the relevant rules from a piece of legislation in any reliable fashion. It takes human judgement, time and effort. There is an extensive research history of attempts to

automatically extract norms from written documents and we have not seen any successful attempt in the course of our research that can account for the principled issues we have raised.

446.   There are obvious benefits to processes such as a better rules approach which provide detailed ways of enhancing the coherence and consistency of government policy development, and the accompanying rule sets (whether expressed in computational or natural languages).

447.   There is obvious benefit to adopting processes such as better rules that result in greater conceptual coherence and logical consistency in policy development, and consequential improvements in legislation giving effect to that policy intent. More effective, logical and coherent policy makes for better legislation, and consequently makes it easier for people to model the effect of that legislation in computer systems, based on their interpretation of it.

448.   The risks and benefits of "code as law" applications may be understood by comparison with the use of standard forms in law. A useful example of this is the Auckland District Law Society's standard forms for sale and purchase of real estate, among other standard forms. These forms are reliable tools informed by persuasive interpretations of a range of different legal instruments (both legislation and case law). They are the foundation for repeatable processes which minimise transaction costs. Their widespread adoption has made the transactions for which they are designed much more efficient. Moreover, they have reduced the cost and skill barriers to accessing justice, and have helped improve legal certainty in a constitutionally sustainable way.

449.   If coded models or AES are to be used more frequently, it is likely that expert evidence will be required to assist the judiciary to understand the nature and effect of a coded system wherever these systems are used to give effect to the law. The operation of the model should be treated as a matter of fact. The question of what the proper interpretation of the law is in a particular case, and whether or not the system accurately reflects that interpretation, should be treated as a question of law.

450.   In many situations, a Court may not be called upon to assess a computational model itself, particularly in cases of a general right of appeal where the original decisions is put aside and made afresh. Some models may never be scrutinised for their lawfulness by the judiciary. Therefore, there is some risk that models are treated as having been judicially approved even if they have not been examined in any meaningful detail.

451.   We do not anticipate significant problems arising from the fact that "code as law" models are subject to copyright, subject to the usual debates about the merits of open source software. Because coded models are not and should not have the status of law, it remains that they are only interpretations. The law has not therefore been copyrighted. By contrast, robust copyright helps to promote and

incentivise the development of instruments, while also providing a mechanism for preserving the integrity and reliability of those instruments. An example of this is the success of the ADLS Sale and Purchase Agreement.

452.   By contrast, we firmly believe that copyright should not present a justifiable barrier to the scrutiny of code-as-law AES. This is particularly important if the coded system is being used by a government entity or similar. It should generally be possible to disclose the code behind an AES without infringing copyright in order to scrutinise its legal reliability. This should be taken into account at the procurement and development stage of adopting a model. If authors of coded systems are not prepared for their work to be scrutinised, it should not be used in legal settings where scrutiny might be required.

RECOMMENDATIONS FOR EXECUTIVE GOVERNMENT

453.   For government agencies considering using a law as code approach:

a.   We endorse the use of a better rules approach that aims to simultaneously develop policy programmes, service design, natural language rules in legal instruments, and machine-executable models in parallel using multidisciplinary teams. We believe this has promise for producing policy programs and legal instruments that are conceptually coherent and logically consistent. We make that endorsement subject to the following two points.

b.   Our first caveat is that in any situation where natural language legal instruments are going to be created and deployed, it is vital that traditional checks and balances on the constitutional and democratic process are maintained. If this circumscribes the operationalisation of a given policy via computational modelling, so be it.

c.   Our second caveat is that before operationalising any computational model (coded rule set) of a regulatory system, policy programme or natural language legal instrument, it is vital that the usual safeguards in policy, operational and legislative processes are applied. There can be no assumption that a computational model is always legally correct, as it is only a single interpretation of the primary natural language materials that comprise the written law. Ultimately, a court or a regulator may conclude that a computational model used in developing a legal instrument is an erroneous interpretation of the legal instrument it has interpreted. The natural language legal instrument will always prevail as "the law", not the computational model.

d. Taking a better rules approach is a beneficial way of generating public trust and confidence in automated decision-making systems.

454. We strongly advise caution when deploying coded models of the law in any way that confers legal authority on those models to act with the force of law. There is a well-developed literature examining how "automated decision-making" systems can create risks and benefits for various people creating, using, and subjected to those systems. These risks exist whether or not machine learning algorithms are incorporated into ADM systems. They also exist regardless of how closely an AES is thought to reflect relevant legal instruments,

455. New Zealand utilises a repeated statutory drafting scheme for the implementation of "automated electronic systems" that can be used to make decisions or exercise lawful functions. This pattern of statutory drafting should be bolstered to provide more detailed Parliamentary guidance on how the "reasonable reliability" of a system should be assessed. It is appropriate that an identified person be made accountable for the reasonable reliability of any code-as-law system.

456. If AES are to be adopted more widely as a matter of government Policy, then Official Information access regimes should be bolstered in support.

457. Regardless of whether Parliament bolsters its guidance as to "reasonable reliability" of AES, Chief Executives of government agencies should proactively consider and state how the reasonable reliability of such systems is to be assessed in a transparent way. The question of what "reasonable reliability" means should be assessed as a matter of statutory interpretation by reference to the text, purpose and context of the relevant enactment, and other enactments such as the Privacy Act 2020 and the New Zealand Bill of Rights Act 1990.

458. Where Government agencies are proposing to create coded interpretations of legislation, it is vital that they consider how significant it is to confer the power on an agency to stipulate a binding conclusion as to how the law will be interpreted. Government agencies in particular should be alive to te Tiriti o Waitangi and the way that different communities may have different understandings of core concepts and the way they are expressed in natural language. The history of the two versions of the Treaty are an important reminder of how "translating" natural language can lead to miscomprehension between groups, and the way that interpretation has the power to stipulate whose comprehension will be authoritative.

BETTER RULES APPROACHES TO CURRENT LEGISLATIVE PROJECTS

459. Finally, we note that this report is directly relevant to a bill before the New Zealand House of Representatives which would formalise the use of new automated internet censorship systems ("filters"). If enacted, the legislation would regulate the use of computer systems by means of computer systems, so as to achieve the will of parliament expressed in the legislation. In this case and in others, it is obvious that law as code has direct implications on important constitutional and democratic freedoms, such as freedom of expression and association in the New Zealand Bill of Rights Act 1990 and associated international human rights instruments. As presently drafted, too much discretion is left to executive agencies to develop this AES.

   a. As drafted, the empowering framework for the legislation should be separated from the wider initiatives in the Bill. It leaves too much legislative power to executive agencies in setting the final design and form of the system.

   b. If the Executive wishes to proceed with legislation to empower and constrain the use of internet filtering, it should adopt a multi-disciplinary better rules approach to developing the policy behind the filter and introduce a dedicated legislative instrument.

   c. The empowering legislation for the filter should include a set of minimum requirements for the software system and a model of how the regulatory system is intended to work. Key statutory concepts should be clarified using a better rules approach. This may include a rules as code model that can be operationalised.

   d. A better rules approach could incorporate service design approaches and operational insights, which is the exact detail lacking from the Bill presently.

   e. We urge extreme caution before proceeding with this policy initiative.

460. We also note that New Zealand is about to embark on a process of re-writing its Resource Management Act 1991. A significant goal of the legislation is to facilitate development of the urban environment including the processing of applications under the Act. It is highly likely that part of this approach will involve the implementation of the Act in digital systems.

461. We endorse the use of a better rules approach early on in the legislative drafting process for the re-written Resource Management Legislation to ensure that whatever is being drafted is capable of being delivered from a service design perspective. The ability to model such policy is also likely to be extremely useful.

A MULTI-STAKEHOLDER INCUBATOR SHOULD BE FOUNDED AND FUNDED

462.   We concluded that "law as code" approaches offer substantial benefits if effectively understood and implemented. Parties with an interest in the successful development of better rules and rules as code approaches can collaborate to foster effective growth of such initiatives.

463.   We say law-as-code approaches can be fostered in New Zealand by taking the following steps.

   a.   Fund a New Zealand centre of expertise that fosters collaboration on law as code and incubates developments. This will facilitate the growth of practical experience and theoretical confidence in law as code approaches.

   b.   Anchor the development of law as code to specific use cases and be transparent with whatever process is followed in the parallel drafting or subsequent conversion of law into code. This will improve reliability in the outputs, as well as trust and confidence.

   c.   Explore optimal ways for multidisciplinary teams to work effectively and in a way that reduces the impact of "knowledge bottlenecks" in modelling law in code. There is a need for potential members of those teams to be identified and trained not just in the way their own disciplinary methods apply to the topic, but also in the way that others outside of their discipline think about the topic and approach it.

   d.   Build bodies of best practice on how to demonstrate to lawyers, judges, policymakers and potential litigants that a coded model is a reliable interpretation of all relevant law. This is a precursor to having such models implemented in government or by people dealing with government.

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APPENDIX:

EXCERPTS FROM BETTER RULES AND RULES AS CODE PUBLICITY MATERIALS

PURPOSE

464.   It is difficult to comprehensively define what a better rules or rules as code approach is about. In this appendix, we collect notable statements about better rules and rules as code as drawn from selected promotional and publicity materials about those concepts. We do this to provide some basis for the way we describe them in Part Two and illustrate what we have in mind when we have stated our conclusions about the merits of those approaches.

465.   It would be unfair to take a video or a website as being a comprehensive and exhaustive expression of the Better Rules programme as a whole, let alone the views of various proponents of better rules or rules as code approaches.

466.   With that limitation in mind, such videos and promotional materials do give some sense of what people associated with such approaches may think are appealing benefits of it. Further, they are important guides to the kinds of messages that senior policymakers and Ministers might be receiving about the better rules approach which may require critical examination.

467.   We emphasise at the outset that we are only including selective statements that go to our core subject of investigation: the extent to which law and code can have equivalent meaning and effect such that "machine consumable legislation" could be more widely adopted.

468.   We have not included comments that go to the way a better rules approach merely improves policy development in order to produce higher quality natural language legislation: this is because we think the benefits of this approach are uncontroversial and we have articulated why in Part Two.

469.   It is only when it is suggested that machine-consumable and natural language legislation should have the same legal status, or that their meaning is identical, that our concerns are engaged. The following statements are illustrative of those concerns.

EXCERPTS

BETTER RULES DISCOVERY REPORT (2018)

470.   The first significant articulation of what a "better rules" approach involves is documented in a discovery report from 2018.

471. One point we also note is that absence of any translation gap can be understood at two points in the better rules process: first, at the policy development stage, as a policy project moves between different government siloes; second, at the point of policy delivery, where machine-consumable and natural language rules are taken to express identical intent as well as identical effect. It is the latter of these two stages that we are examining.

472. We think the core promise of the better rules approach is summarised as:

> "We believe that co-creation of software and legislation is possible today, and with the addition of the right software tools, there is an opportunity to have an isomorphic output that can generate the knowledge assets which convey the policy intent and legislative meaning to all interested and affected parties."

473. It is not clear how "isomorphism" is intended in the better rules discovery report. At times, it appears that isomorphism is understood as referring to an absence of any translation gap, or the presence of equivalent meaning, between the code and the sources of the rules. By contrast, in the academic literature, isomorphism is better understood as traceability or correspondence, which acknowledges that users of a coded system will need to trace coded rules back to their primary source materials in order to assess whether an interpretation is acceptable, and how to interpret the coded rule for themselves.[144] At times, bare traceability is apparently envisaged. At other times, absolute equivalence between machine and natural language rules is touted as a benefit.

474. In the report, the authors summarise the value not of a better rules approach, but instead of "machine consumable legislation". Within the list itself, values are described as relating to either "legislation or business rules" being machine consumable "at the creation of rulesets". Along with "faster implementation of policy" and modelling of policies before they are implemented, one value is to:

> remove the "translation gap" that currently exists between policy and legislative intent, and the software that is developed to support service delivery

475. While the risk of incorrect translation might be minimised, it is too far to suggest it can be removed entirely. We also note the way that policy intent and legislative intent are merged, despite the way that policy intent derives from the executive, and legislative intent is inferred from the text and purpose of Parliamentary instruments.

476. At the outset, we note that the discovery report proceeded by adopting the methods used by the Inland Revenue Business Rules team. Core to the better rules approach is the influence of business rules modelling

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[144] See for example Bench-Capon and Coenen (1992).

approaches and the core knowledge assets – the concept model, decision/flow model, and rule statements – are drawn from business rules processes.

> Approach to experiments – Each team followed the approach the IR Business Rules team takes when mapping out rules by creating a concept model that describes the discrete concepts of the Act (or part thereof) and the relationships between the concepts, … Then we developed decision models where the eligibility or entitlement criteria are clearly mapped. The concept and decision models were iterated as the teams either refined the rules (in the case of the Holidays Act) or better understood the rules and their logic (in the case of the Rates Rebate Act). Each team used the models they had created as a basis for common understanding and from which they could generate: 1. pseudocode, or rule statements that detail the logic of the rules in a human readable format; 2. human readable legislation; 3. software code.

477. Notable statements in the rest of the report include:

   a. "Increasingly policy and legislation need to be interpreted and transformed into business or operational rules that are then programmatically coded to support service delivery. This rework is inefficient and allows misinterpretation and error to creep in."

   b. "However, we must remember that ensuring human and machine consumable rules have equivalence and are openly accessible is essential for transparency of government and algorithmic decision-making."

   c. "Key questions: ... How do we ensure we have consistency between human-readable rules and their machine consumable equivalent? ... How do we effectively and genuinely enable interested and affected people to help shape these rules? What would a set of principles for the development of human and machine consumable legislation for effective and efficient service delivery look like?"

   d. "We explored the issues around the work of translating rules so they could be used by business systems to deliver services. It became apparent that all the different groups involved in the policy to service delivery process use a structured language, have standards and frameworks and use manuals and guidelines. However, the language and the tools and materials are unique to each of the different groups and are largely not shared. The different groups work more or less in silos. This means that each group next in the production and consumption chain has to translate the output from the previous step without full knowledge of that step, and without having had input into that step. The translation process is inefficient, opens up the process for errors and there is limited sharing of knowledge and experience across the groups … Inefficiencies are amplified as business systems with embedded, or hard coded, rules rely on

being notified of upstream changes and must replicate the change process."

e. "We believe that co-creation of software and legislation is possible today, and with the addition of the right software tools, there is an opportunity to have an isomorphic output that can generate the knowledge assets which convey the policy intent and legislative meaning to all interested and affected parties." (p 21)

f. At p 26: "Making legislation or business rules machine consumable at the creation of rulesets would enable: ... remov[ing] the "translation gap" that currently exists between policy and legislative intent, and the software that is developed to support service delivery".

478. We note here the references to "machine and human consumable rules that are consistent, traceable [and] have equivalent reliance" and the "use of machine consumable rules by automated systems" to provide feedback into the policy development system.

> We concluded that the initial impact of policy intent can be delivered faster, and the ability to respond to change is greater, with:
>
> - Multidisciplinary teams that use open standards and frameworks, share and make openly available 'living' knowledge assets, and work early and meaningfully with impacted people.
>
> - The output is machine and human consumable rules that are consistent, traceable, have equivalent reliance and are easy to manage.
>
> - Early drafts of machine consumable rules can be used to do scenario and user testing for meaningful and early engagement with Ministers and impacted people or systems.
>
> - Use of machine consumable rules by automated systems can provide feedback into the policy development system for continuous improvement."

479. We recommend the method of setting out translations in the tables on p 22 that clearly illustrate how the natural language has been interpreted into pseudocode, and allows scrutiny of whether those interpretive steps are justified. Then, the software code sits alongside the pseudocode. Clearly, performing this exercise for an entire Act would be complex.

480. We also note that groups of users of "rules" are set out. The following entities are all grouped under the heading of "regulators", despite the important constitutional differences between, for example, parliamentary, executive, and judicial actors:

> Regulators (including government departments, judiciary, policy analysts, legislative drafters, select committees, Treasury, and international groups) who use the rules when: monitoring compliance with the rules; understanding how the rules are being used; developing, testing and modelling changes to the rules, and validating the quality of this modelling."

481. Finally, under the conclusions section, we note the following statements:

    a. "Making government rules machine consumable so they can be integrated directly into service delivery systems is fast becoming a key component in the digital transformation of governments, particularly as we seek to automate information exchange and some decision making while ensuring government transparency and accountability."

    b. "Co-designing rules with policy and service design increases the chances of the policy being implemented effectively and as intended, and can reduce the time it takes to deliver on the policy intent."

    c. "Machine consumable legislation that is co-developed: enables legislation, business rules, and service delivery software to be developed in parallel, ensuring consistency of application, …; increases the opportunities to automate and integrate service delivery (including through the use of artificial intelligence)."

    d. "Common frameworks, reference points and data points (like concept and decision models and ontologies … once developed, can be used as blueprints for the development of human and machine consumable rules without the need for further translation of the intent and logic (which, in turn, reduces the time and resources required and the chances of errors).

BETTER RULES WEBSITE (2019, 2021)

482. A website for Better rules accessed in June 2019 includes the following statements.

    a. "[Better rules] is about re-imagining regulation as an open platform based on logic, decision models and rules – also known as 'legislation as code'. We are reframing the regulatory design process using an end-to-end system design approach to enable regulation to be more easily implemented as part of NZ government's digital services for citizens and businesses."

    b. "The problem[:] The traditional models of creating, managing, using and improving the 'rules' of government (policy, legislation, regulations and business rules) were developed for use in a non-digital environment, and can result in a mismatch between policy intent and implementation."

    c. "Better Rules is about policy-makers, regulators, legislative drafters, service designers, software developers and impacted people working closely together to clearly articulate the rules underpinning the regulation and how those rules will actually work in practice."

d. "If we consider the future state, the code/machine consumable version of the regulation would be available from a single source."

e. "It ensures that regulation is developed to be machine-consumable – in parallel with the (current) human-readable version."

483. An updated version of the same site, accessed January 2021, includes the following statements:

a. "Better rules – better outcomes is a New Zealand initiative that will enhance the way our government develops and implements regulatory systems "

b. "Rules govern the way we behave and operate. The rules are set out in legislation which consists of Acts of Parliament and regulations. Simply put, Better Rules produces legislation in a digital format."

c. "As legislation is developed we make sure it can be understood and translated in the digital environment. This makes it easier for business to understand and apply the rules in their own context."

d. "It's a methodology that enables us to reflect the logic of legislation, expressed as a concept model, decision models, and rule statements."

e. "Together these [concept model, decision models, rule statements] create a blueprint of the legislation, which then sets out the rules of a regulatory system."

f. "Using the blueprint we can write legislation in any language. For example English words and software code."

g. "That software code can then easily be used in our devices and systems to assist people and businesses to understand, benefit from, and comply with legislation."

h. "Nowadays we interact with legislation through digital devices and it's important that we get it right."

i. "More and more we interact with legislation through our digital devices and, the systems that work out our entitlements and obligations when interacting with government. Digital devices and systems assist us to apply for the correct things, and help ensure we don't miss a payment or fail to meet our compliance requirements."

j. "The difficulty with legislation is that it is not written in a language that our digital devices can understand. Currently, for legislation to be used by a device or digital system, humans need to translate and re-write the legislation into software languages. Incorrect translation is a high risk for everyone. The Better Rules

methodology gives us the opportunity to develop legislation in written language and software code right from the start of the policy development process."

k. "Bringing together all of the people invested in developing and implementing a regulatory system – the policy analysts, the lawyers, the legislative drafters, the service designers, the software engineers, end users and more… [sic] Together, they design the overall regulatory system to ensure it focuses on the needs of the end users of that system."

BETTER RULES PROMOTIONAL VIDEO

484. A promotional video for the Better Rules approach includes the following statements of note:

a. "Better rules better outcomes … will enhance the way our government develops and implements regulatory systems."

b. "Rules govern the way we behave and operate. The rules are set out in legislation which consists of Acts of Parliament and regulations. Simply put, better rules produces legislation in a digital format. That is, having particular types of legislation available in a code or code-like form that software can understand and interact with."

c. "Over the last decade we have seen a significant advance in software and digital technologies. More and more we interact with legislation through our digital devices and systems that work out our entitlements and obligations when interacting with government. Digital devices and systems assist us to apply for the correct things and help ensure we don't miss a payment or fail to meet our compliance requirements."

d. "The difficulty with legislation is that it is not written in a language that our digital devices and systems can understand. Currently, for legislation to be used by a device or digital system, humans need to translate and rewrite the legislation into software languages. Incorrect translation is a high risk for everyone."

e. "Consider the Holidays Act for example. The policy intent is for employees to have four weeks of paid leave each year. It can be really difficult for business owners to calculate accurate pay for employees working different hours and days each week. This is usually managed via payroll systems operated through software. Dozens of businesses produce those payroll systems and each is independently translating the Holidays Act legislation into software. A government report in 2016 showed that more than 24,000 people in the public and private sector have been underpaid since 2012. There are a number of reasons why this happened. A key reason is that legislation wasn't designed to be implemented through payroll software. It is also not clear how annual leave and pay should be calculated

for employees working different hours and days each Week. As a result, leave and pay entitlements can't be calculated in accordance with the Holidays Act in a number of situations."

f. "So what if legislation could be developed in English words and software code right from the start during the policy development process?"

g. "Better rules is a methodology that enables us to produce better logic, expressed as concept models, decision trees, and rule statements. Together these create a blueprint of the legislation which then set out the rules of a regulatory system."

h. "Using the blueprint, we can write legislation in any language, for example English words and software code. That software code can then easily be used in our devices and systems to assist people and businesses to understand, benefit from, and to comply with legislation."

i. "The better rules approach involves working in a multidisciplinary team using human-centred design techniques bringing together all the people invested in developing and implementing a regulatory system: the policy analysts, the lawyers, the legislative drafters, the service designers, the software engineers, end users, and more."

j. "Together they design the overall regulatory system to ensure it focuses on the needs of the end users of that system. Meeting those needs is the central focus of the design approach. The whole regulatory system is taken into consideration before any legislation is written."

k. "With the software code, we can test the overall legislative framework to identify gaps in the logic and the rules and testing reduces the risk of regulatory failure. It enables the Public Service to respond to a fast changing world where technology driven changes are reshaping the world we know. The policy-making process becomes more agile and responsive to the needs of citizens."

l. "We avoid translation risks by developing in two languages from the beginning. The software code is made publicly available reducing duplication of effort and reducing the translation risk."

m. "So who benefits? Those who create regulatory systems, those who interpret them, and those who experience them. In essence better rules is about reimagining the way we develop and express the rules of regulatory systems ensuring they work for us in a digital world. And remember: the rules of our regulatory systems are still developed by humans for humans."

485. The project is described as relating to legislation as code as well as rules as code and better rules. The first subheading is: "What are Better Rules and Rules as Code (aka Legislation as Code)?" The summary of the work is:

> This important work started when looking at Rules as Code as part of the Lab's reusable components workstream. The team soon realised there was a systemic issue that other agencies were interested in exploring how to ensure government rules could be accurately delivered as Rules as Code without creating yet another siloed version of the rules (which is essentially what happened with the coded legislation behind the SmartStart financial help tool).

486. In more detail, the work is explained as follows, and we note the reference to "unambiguous" rules, the focus on "what the government really intended when creating … rules", the reference to business rules and use in the IRD:

> Imagine if the creation and implementation of government 'rules' (i.e. legislation, regulation, policy) was multidisciplinary, more open, participatory and robust. What if these rules were unambiguous, and understandable and usable by both people and digital government services from the day they are enacted?
>
> Better still, what if the wording and logic of the rules was drafted by a multidisciplinary and multi stakeholder team to better capture what the government really intended when creating or amending rules?
>
> The practice of making business rules directly available to digital systems as software code has been around for decades, e.g. for tax calculator tools on the IRD website, or internal business systems within government departments.

487. The Service Innovation Lab does articulate a clear distinction between: Rules as Code – a "reinterpretation" of the rules after they have been written; and Better Rules, being testing implementation logic and service design impacts during the drafting process.

> This approach [in the immediately preceding quote] can be thought of as Rules as Code. This is usually done after the rules have already been written and requires a reinterpretation of the rules by service delivery people and software developers. This has proved a risky approach where implementation by government and non-government organisations are out-of-step with either the intent or the actual rules.
>
> What is new is testing the implementation logic and service design impacts alongside the policy development process, utilising approaches from other disciplines such as human centred design and test-driven software development. This opening up of the drafting process to include other ways of thinking and testing the rules has been coined 'Better Rules'.

488. Along with this much clearer emphasis on the distinction between Better Rules and Rules as Code, there is a clearer articulation of the benefits of a better rules approach, independently of whether the

coded model of the rules is ever implemented, let alone treated as "the law":

> [Better Rules] brings multi-disciplinary teams together to look at what's proposed in a Bill or Amendment: People from policy and operations, software developers and those working on the delivery side: working together to virtually model and test the draft rules, using real data and likely scenarios, to ensure the rules are implementable and more likely to achieve the intended outcome. This represents a real sea change for governments, allowing simultaneously for more complex and more comprehensible rules that can better adapt to edge cases. This is not only about harnessing the speedier benefits of digital. There's less risk of misinterpretation. It means more issues and errors are identified before the legislation is passed through the rapid iteration of the rulesets during their development. The approach is also more democratic, supporting open, transparent government and enabling NGOs, communities, social enterprises and the private sector to be part of the government services ecosystem.

489.   What is significant is the emphasis on "less risk" of misinterpretation, rather than the absolute removal of any interpretation exercise.

490.   This resource also outlines a history of how the better rules approach, its demonstration internationally, and how it has shifted into its "rules as code" incarnation. Reference to the OECD primer in May 2020 suggest the site has been revised since 2018:

> At the end of 2018, the Lab collaborated with counterparts in Israel and Uruguay to build a small Legislation as Code demonstrator to explain the concept using pension eligibility as the example. This was shown to the D7 (now Digital Nations) Ministerial Summit in Israel. Global interest in the Better Rules and Rules as code approaches accelerated after the OECD's Observatory for Public Sector Innovation selected the Better Rules approach from over 500 public sector innovation case studies to be included in the Embracing Innovation in Government Global Trends Report 2019. The Governments of New South Wales, Canada and the US have since conducted their own Better Rules and Rules as Code experiments. In September 2018 a global Better Rules online discussion forum was launched. Lively discussion is ongoing in this forum as well as on Twitter (#rulesascode, #legislationascode, #betterrules) and LinkedIn (#rulesascode, #legislationascode). By 2019, Better Rules had become its own programme led by MBIE and supported by the Lab. The OECD released a draft rules as code primer in May 2020 as a way to collate everything that is currently understood about Better Rules and rules as code at this time

491.   The site includes a link to a video by Brenda Wallace, an original participant in the Service Innovation Lab and the Better Rules discovery. It was recorded in 2019 and is a useful contemporaneous record of how better rules was perceived at the time.[145]

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[145] Brenda Wallace ""When software and law are the same thing" 4 August 2019 (PyCon AU 2019) <https://www.youtube.com/watch?v=_IUOgen7VjI&feature=youtu.be>.

492.   We were given access to some speaking notes in relation to an address given in July 2019 from a legislative drafter who had been involved with advocating for better rules.

493.   The speaking notes illustrate the way that a very narrow definition of a better rules approach can nevertheless morph into an argument in favour of direct implementation of rules as code instruments, as if they have equivalent meaning to the legislative instrument. The notes also suggest that the role of interpretation can be minimised and it would be desirable for end users if interpretation could be completely avoided.

494.   The notes begin by articulating how legislation is increasingly implemented in software systems and poses the proposition that software systems themselves are "users" of the law. It also notes the way that software can have normative effects in influencing human behaviour.

> Technology is an integral part of the way we live our lives, answer our questions, and access our goods and services. As many of our rules are set out in legislation, the software that drives that technology needs to reflect relevant rules set out in that legislation. This has created both a new audience for legislation, and a new way in which it is used— legislation is "consumed" by machines. Software, and the algorithms within it, are like an invisible level of law – they operate things that provide our day-to-day interface with the law, but are not currently seen, or visible in legal terms.

495.   The speaker suggests that legislation is inaccessible to humans, and therefore legislation should instead be prepared to provide clear answers through software systems.

> Let's be honest – the general public doesn't particularly care about legislation itself, and they don't want to have to read it, and understand its meaning and implications. What they want, is an answer to a question about something real that is going on in their lives. How do a I get a fishing licence?   Am I eligible for financial assistance?   Can my neighbour build a fence that high? Increasingly, people find the answers to those questions directly from a computer. So, we can no longer assume that the primary audience for legislation is a human one – many of our rules are now primarily consumed and used by machines, and those machines are then used by humans.

496.   The speaker notes a distinction between machine readability and machine executability, and the way that New Zealand legislation is already published in machine readable forms.

> New Zealand's legislation is currently published in human readable formats (PDF and HTML) and a machine readable format (XML). XML by itself cannot be directly integrated into a digital system, however, because XML is simply a way of presenting human readable text in a more structured way. It is not executable, or directly usable, by a digital system.

497.   The speaker acknowledges the role of interpretation in taking natural language and representing it in "software languages" and the risk that interpretation of legislative rules may vary, stating that this is "inefficient and high risk":

> In order for it to be able to be used by a digital system, humans need to read, interpret, and re-write it into software languages. Further, this happens individually, independently, and repeatedly every time a person wants to reflect legislative rules in a digital system. It is inefficient and high risk. This is exactly what happened, and what went wrong, with the Holidays Act in New Zealand.

498.   The proposed solution is to produce "legislation in 2 formats", including a "machine executable software code version of that legislation". The intent is that the code "version" is reliable such that it "accurately reflects the requirements of the Act". This is said to be an intention of "Rules as Code", by contrast with a better rules approach.

> But, what if we could produce legislation in 2 formats from the outset? What if we could provide human readable legislation like we do right now, and a machine executable software code version of that legislation? That would have enabled those payroll companies to produce their payroll systems using the machine executable software code version of the Holidays Act, with the confidence that the software accurately reflects the requirements of that Act. That is exactly what Rules as Code aims to achieve.

499.   From discussing Rules as Code, the speaker transitions to the terminology of a better rules approach, clearly stating that it is a "policy development methodology", as we do.

> Better Rules is effectively a policy development methodology. It was developed in New Zealand ... We developed it because [we] tried converting legislation into software code using the 3rd option I just described, using a particular piece of technology. Frankly, it was a terrible experience and raised all manner of issues and difficulties. That led to the Better Rules discovery. It was established to answer the question, if the output we are seeking is machine consumable legislation, what inputs do we need to produce it? And what process would we use to produce it? Better Rules works by getting all the people who are developing the policy, and all the people who will write and implement the legislation, and the software code that will give effect to that legislation, in the same room together at an early stage of the policy development process, to help shape the policy. That enables the most effective implementation model and the end use of the policy in the real-world to be identified and used as a key input into the development of the policy from the outset. This enables an end-to-end, system-design approach for policy development. The knowledge, experience, and needs of the people who will be implementing the legislation and writing the software to give effect to it are built in from the beginning. I want to emphasise that this is only a part of the policy development process. All of these people don't need to be involved throughout the policy development process.

500.   If that paragraph is read in isolation we find little to disagree with. The speaker continues by noting the influence of other professions on the

use of concept models, decision models and rule statements, which are used as a blueprint for drafting. Importantly, the blueprint sets out the policy, not the law.

> Under the Better Rules approach, 3 document sets are produced. A concept model, a decision model, and rules statements. … The 3 sets of documents are effectively blueprints that are produced using logical, analysis techniques. These techniques aren't new. They are already used in many different professions, and by numerous businesses. We are simply applying the techniques used by other professions, in a policy development context. These blueprints collectively set-out the policy. Just like the blueprints for a house, you can look at them, and then describe them in narrative form in any language. In our case, we can use them as drafting instructions for writing legislation, and for software developers to write code. The advantage of this is that we don't have to first write legislation, and then translate it into a software format. That is where that translation gap creeps back in again. Instead, the legislation and software can be developed and produced in parallel, following the blueprints, with the legislation and the software shaping and assisting the development of the other, simultaneously. If something doesn't work, then you go back and adjust the blueprints. And both the legislation and the software code are adjusted to reflect that change. This is an agile methodology, which we hear so much about. But applied to a policy and legislative drafting context.

501. The speaker suggests that, in some situations, there should be no potential for differing interpretations of the law, including when it is implemented in software code. At this point, the kinds of constitutional considerations we address in Part 3 become relevant. Further, the speaker clearly begins to anticipate that the software "version" of legislation will be directly implemented in high stakes situations such as piloting a motor vehicle, with the intent that code directly limits human conduct.

> In some situations, there is no room for mis-translations, or differing translations of legislation in software. For example, there are likely to be multiple manufacturers of driverless vehicles in the future, each of which will have software that sets out what a vehicle does when driving itself on our roads. That software has to accurately reflect our land transport rules. It is critical that there is no translation gap between our land transport rules and the software in those vehicles, or between the software produced by the different manufacturers of those vehicles. The obvious need is to ensure that all vehicles do the same thing when they are on the road together. The best way to achieve this would be to provide an official, machine consumable version of the land transport rules so each manufacturer is using exactly the same software version of the rules in their vehicles.

502. It is not clear what legal status the software "version" of the legislation is intended to have, but it is clear that it will be directly relied upon for compliance reasons. Later, in relation to international trade rules (and not legislation), the speaker refers to the prospect that no natural language version of the rules is required, and only the software version of the rules should be operative. Despite that, it is anticipated that trade rules will be "implement[ed] … at all vertical levels within a country",

thereby apparently being used to influence behaviour within domestic jurisdictions.

> An interesting use case for Rules as Code is international trade rules. Software code is a universal language, and is also the language that will be used in a real-world sense to implement the trade rules at all vertical levels within a country, as well as horizontally between trading countries. There are suggestions that it would be better to draft these rules directly as software, instead of a natural language. As long as everyone agrees that the software does what it needs to do, then countries can sign-up to an agreement that simply sets out the software, rather than natural language statements of what the rules are, and how they will be implemented – they can shift straight to implementation. The agreed text of the trade rules would be the software code itself – there is no need for a human-readable version of the rules.

503. The speaker proposes that a distinction can be drawn between answering legal questions, and giving effect to legislation but provides no further detail. There is no proposed limitation on how code that gives effect to legislation can be used.

> Next, the purpose for producing machine consumable legislation is not to answer legal questions, per se. It is to provide software code that gives effect to legislation. People can then use that code for whatever purpose they choose; which may well include a digital system that answers legal questions. But it can also be used for all manner of other things. There is no limit or restriction on it.

504. Finally, in concluding remarks, the speaker proposes that people only really want legislative effect, and not legislation itself.

> Many of you will have heard Professor Theodore Levitt's observation, that "People don't want to buy a quarter-inch drill. They want a quarter-inch hole." That's what this is all about—people don't want legislation in and of itself. They want the results of the legislation. These days, achieving those results usually involves a computer—Rules as Code is about enabling that use.

505. We understand this to suggest that modelling the legal effect of legislation in code is an adequate substitution for legislation itself. The speaker is never clear on what the formal status of the software version of the legislation should have, but it is clear that the software version will be used in limitless ways to give effect to the legislation itself. In context, this must be understood as giving effect to an interpretation of the legislation, one which has been embedded in the software version by Executive government during the policy development process.

506. The speaker's remarks have to be read in context, in an oral address aiming to sketch the dimensions of the developing Better Rules and Rules as Code approaches. It would be unfair to assess the remarks too closely, and it would be wrong to suggest that the speaker does not have a close and detailed understanding of legal and constitutional theory. That is why we have not named the speaker.

507. Our purpose in including these notes is to provide an illustrative example of the way that advocates for better rules approaches

frequently transition away from advocating purely for the beneficial policy effects of taking a better rules approach and instead shift toward full advocacy for implementing a non-interpretable authoritative software version of legislation for direct implementation in computer systems, in some cases even suggesting natural language legal instruments can be avoided entirely. The stated intent of these initiatives is to influence human behaviour through software systems, even where those software systems control dangerous machinery (self-driving cars), and cover areas potentially attracting criminal penalties, or leading to significant damage to people and property.

LOOMIO EXPORT

508.   Early on in the Better Rules Programme, a discussion forum was convened on a platform called Loomio. The platform hosted extensive discussion. After some time, the Loomio forum was deactivated, but a PDF export of the forum was collated, which is available online and provides useful insights into how discussion of the topic has developed.

509.   The PDF version of the discussion forum removed the names of the people posting. We include some points of note here, and recommend keyword searching the document for the word "interpret" (found on 26 pages), "legislation as code" (found on 30 pages), and "rules as code" (found on 32 pages) to gain some idea of how the topics we discuss in this report were treated by commenters.

510.   On 21 September 2018, a poster stated:

> [Commenter's company] has spent the last 17 years codifying other people's rules, including legislation, that are defined in legalese or some variation of logical English. I can assure you that no matter how experienced or careful the authors, matter how many peer reviews, no matter what checks and balances, using natural language to define rules always fails to define rules that have only one possible interpretation. That is why we have Courts. The problem is the idiom – what do the words mean in this exact context? And all of that is before you factor in discretionary input, which is endemic in legislation. You can refute the above – no problem. But if its correct, then the issue is that the algorithm must actually be the legislation, not a representation of it. The algorithm in this context is the first order predicate logic, the algebra, and the rules (constraints) that convert the re world data into the useful outcomes that the legislators require. If true, it follows that natural language description of the legislation must be derived from the algorithm, not the other way around. How long before legislators start passing laws that are defined by algorithms and proven with the myriad of test cases that any normal system would require?

511.   In reply, a user said:

> I disagree, though maybe only slightly. I don't think it's necessary that either the natural langue or encoded versions of the law be primary, and the other secondary. Both can be primary, like in Canada where we have legislation that is written in both English and French, and both languages are authoritative. …

512. On 24 October 2019, a user replied to a question about the distinction between existing policy automation engines or business rule systems. The reply is instructive for the way that user regards the role of interpretation:

> … business systems that use rules are not the right place to provide authoritative management, provision and access to rules, as those applied usage of the rules create too easily a pressure to encode the rules bespoke to purpose. OPA/RaaP are tools largely for the applied use of rules where they are already provided in a human readable form and need translation into a machine form, but you get variance of interpretation this way, whether it is a machine translating it (OPA, RaaP, etc) or a human interpreting it. If you had just the rules available as machine consumable code, consumable by business systems that then apply the rules according to the specific context, then the translation gap is avoided, the rules are applied consistently across very different use cases, and everyone is using the same version of those rules.

513. On 24 October 2019, a user wrote:

> … we can use coded rules to build automated or semi-automated systems that deliver a result, an explanation of the rules applied to get to the result, and all inputs and evidence considered. It's essential that decisions be transparent and explainable, especially for governments, whether those decisions are made by a person or a machine. Rules as Code would eliminate needless duplication. Secondly, it would be far more efficient. Currently, we have numerous businesses each coding their own version of the same laws. This creates the risk that translations will be incorrect or misinterpreted. In contrast, a single government-provided and assured translation, made available via Application Programming Interfaces ('APIs', which make it possible for machines to speak with one another and transact) would cut down on this needless duplication. Regulators would be able to see the rules being consumed, and the community would have certainty that the rules being used by automated systems were the correct interpretation (or even certiTed to be correct). A single set of government-assured coded rules would also be a boon to the private sector. They wouldn't have to devote resources into translating the rules into a form their systems could use — saving money, increasing productivity and proTts and, therefore, increasing the tax base.

514. The user continued:

> As our Kiwi colleagues are currently ably demonstrating, effective test driven regulation and legislation means firstly assembling a multidisciplinary group of policy, drafting and rules consumers (service designers and developers) to understand and agree the purpose, concept and logic behind a piece of legislation with an accompanying coded ruleset. By collocating with drafters and coders, this group can then simultaneously co-draft human and machine readable versions of the rules for testing — with humans and machines. This allows for more holistic modelling of impacts, and provides and the opportunity to test the coded rules with end users (regulated entities, service providers, etc.) before publication. Ideally, if dealing with a legislation ruleset, the draft legislation would be published for consultation together with an API enabling access to the draft coded rules, and stakeholders could test the rules and use the code to inform their submissions. Once enacted by

Parliament, the machine readable form (the API) could be publicly available immediately. Regulated entities could link their systems to the ruleset instantly, reducing the time and cost to implement and reducing the risk of mistranslation or variability in interpretations. We still need human-readable rules Of course, this doesn't mean that we should only write legislation or policy rules in code. Humans still need to be able to read and interpret rules. Further, machines can't do nuance or interpretation. They only deal with absolutes. The rules we can currently code effectively are prescriptive — black or white, yes or no. Many of our laws are not prescriptive, but require subjective perspectives and nuance, consideration of the various circumstances of the case. That is, we need humans — administrators, regulators, lawyers, judges — to interpret and apply them. Even in those scenarios, coded rules can help — by automating the black and white aspects of the question, we can escalate the parts that require nuance for human consideration. This will allow us to dedicate our human resources to the difficult and complex work, leaving the process-driven drudgery to our robot friends.

515. Another user on the same date replies:

It's definitely been our experience that when you build code/products off previously drafted legislation, it really limits how customer-friendly you can make it. So if we can do service delivery at the same time as policy/legislation development, and make the service the law rather than an interpretation and simplification of the law, that will be transformational.

516. On 25 October 2019, a user wrote the following paragraph as part of a wider reply:

Here's my point. "Rules as Code," as I understand it, is the idea that the legal logic, and only the legal logic, can be made machine usable, and more reliable than the interpretations we have now because we choose to write the natural language laws in the same semantics the encoded version uses, or a very similar one. So we know the two representations mean the same thing, and the interpretation only needs to be done once. THEN you build applications with it.

517. In reply, the original poster said, as one paragraph of a wider reply:

People quickly get into what the tool should then be for the rules, and I would suggest we don't need to solve that problem immediately, but we do need to ensure this model of rules provided by gov and consumed by others is maintained, because the alternative is where we are now, which is myriad and variable interpretations of the rules applied in myriad (and often non compliant) ways, often with no traceability or explainability of authority for the decisions or actions taken on the back of the applied rules.

518. On 26 November 2018 a user wrote, in relation to the question of what is meant by "authoritative" rules as code:

- authoritative v government-endorsed. The distinction is about the way that in Commonwealth countries (and in USA primary legislation), the government may drive the process but the Parliament does the enacting and the court interprets what the Parliament enacted, not what the government thought it was getting the Parliament to enact. So the government's view of what a piece of legislation actually means is just

one view, with no more legal force than anyone else's, even if the government sponsored the legislation. By authoritative I mean forming part of the enactment itself, as passed by the Parliament and then independently interpreted by the court (so it does have legal weight) - whereas by government-endorsed I mean something that could be wrong. A schedule is part of the legislation, on an equal footing with the main text, and that is why you need to know the status of the "executable item" in the schedule. It is a principle of drafting that you don't say the same thing twice unless there is a good reason, and that if you do then you make clear what the relative status is of the 2 versions. You cannot be certain no errors will creep in, so you cannot assume the code part will perfectly match the natural language part. So I think you mean the code is subordinate to the natural language - if there is a discrepancy the natural language version is the law and the code is just a faulty explanation.

In theory it could be set up the other way around - the legislature could say the natural language is subordinate to the code. Then if there is a discrepancy the code is the law and should be followed, with the natural language being treated as just a faulty explanation (in the way that Explanatory Notes currently are). But as you say, it is unrealistic to expect the legislature to be able to understand code (or perhaps we should just say it is much more unrealistic than expecting them to understand legislative "natural" language).

Equally in theory the natural language and the code could be given equal status - as is often done with legislation enacted in 2 natural languages (as in Canada or Wales) or in one brave case (EU) 23 languages - but again there are drawbacks (especially if there is complete uncertainty as to which of 2 a court will follow). Coming back to the coding being subordinate - in Commonwealth drafting traditionally we would not put merely explanatory material in an enacted piece of legislation at all, not even in a Schedule. It would go in a separate document, like an Explanatory Note, that has no legal status and is not voted on by the Parliament (but can in some circumstances be used by a court as one source of help to resolve ambiguity in the enacted natural language, along with statements in Parliament by the enactment's sponsor and so on). I was just trying to see whether anyone is looking at making the code part of the enactment, as then the legislative drafter is more directly involved, or whether it is running in parallel through the policy development, into the instructions given to the drafter, then as a supplement to the explanations given to the Parliament, and then out the other end as a supplement to the legislation as enacted.

I will post a reply in a minute, but what I think he is talking about is a model in which the code is subordinate to the legislation and is separate from it.

519. In reply, a user states on 28 November 2018:

Traditionally, we have drafted legislation and then published it so as to make it available for the world to interface with as they wish. In the past, the main users were lawyers and the courts, who are trained to interpret legislation.

Now, with advances in technology, the rules in legislation are integrated into tools - primarily computers - to assist people to do all sorts of things. This may simply be a website that sets out information, or may be a

company's business rules which it uses to ensure regulatory compliance, or by a government department to work out people's eligibility for a benefit, or enforcement officers to determine whether people have complied with the rules, and so on. The uses are endless.

The one thing that all of the above have in common, however, is that they operate using software. So, the question is, what is the best way of replicating legislative rules in software? How do we do this easily, and ensure there are not gaps between the legislation and the software?

It seems to me that fundamentally there are 4 options (some of which have variations, but let's keep it simple): … 4. take the Better Rules approach in which we take a different approach to the development of policy and legislation. The primary outputs of the Better Rules approach are concept, decision and flow diagrams. These are in effect a common language that are then used as the instructions used by legislative drafters, business rules folk, and software developers, all of whom can then draft their particular outputs using their current, usual tools and processes. The outputs all need to be checked and validated against each other, but as all parties have contributed to the development and creation of the concept, decision, and flow diagrams, everyone should be speaking the same language - conceptually and literally - from the outset. For a whole bunch of reasons (which I am happy to expand on in another post), I believe that option 4 is the most viable, the best, and the most forward-looking approach. At least for the foreseeable future.

OECD PRIMER

520. The OECD has published a primer on Rules as Code.[146] The OECD primer does not purport to offer an authoritative definition of Rules as Code:

> … Being a new concept, debate continues over the concept's precise definition and scope. Accordingly, while the following section does not seek to provide a conclusive definition of RaC, it does suggest a definition that best captures the focus of this primer and RaC in the public sector context. This is intended as a working definition.

521. The primer also notes that actual application of the techniques will better illustrate some of the ambiguities in the concept. It notes that law-as-code applications as well as automated compliance have "featured in the conversation".

> Like many innovative approaches, it draws and builds upon considerable thought from a diverse and wide range of thinkers and practitioners. As a result, many terms have been used in connection with the RaC concept. Computational law, digital legislation, digital regulatory reporting, automated compliance and model driven regulation have all featured in the conversation. … It should be noted that there is a long history of related efforts in the concept's broader domain, with a commensurately large amount of research and insights (see Other

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[146] J. Mohun and A. Roberts, "Cracking the code: Rulemaking for humans and machines," OECD Working Papers on Public Governance, No. 42, Paris: OECD Publishing (2020)

preceding and related efforts). At the same time, how RaC is conceptualised is changing rapidly as teams and individuals experiment with, and test, various approaches. Consequently, the following discussion should be regarded as trying to set some parameters without prescriptively defining every component, something that will only come as the concept is more widely explored and adopted in a public sector context.

522. It is clear that the interpretation of rules is anticipated as an aspect of the topic being discussed:

> RaC envisions a fundamental transformation of the rulemaking process itself and of the application, interpretation, review and revision of the rules it generates.

523. The OECD primer adopts a useful distinction between Rules as Code as an output, and Rules as Code as a process, however subsequently, it blurs these distinctions by analysing the benefits of rules as code as a process primarily in terms of the ability to implement rules as code as an output.

> This definition of RaC, i.e. as an output, can encompass, for example, business rules written in software code, such as those that firms use to comply with regulation governing their commercial activities. Indeed, many software companies already exist to take rules written in natural language and convert them into code for use as operational business rules by specific entities. … Understood in this way, RaC as an output is not completely new and has been subject to significant and extensive examination, something that will be explored later in the primer.

524. Rules as code as an output is contrasted with rules as code as a process:

> There is a second and additional component of RaC, however, which is where the focus of this primer lies. This dimension has been opened up by the work of several public sector teams, often with private sector or academic involvement. Pioneered by the New Zealand Government, especially through the Better Rules work (see Box 2.4), RaC is increasingly seen as representing a strategic and deliberate approach to rulemaking, as well as an output. Taking de Sousa's definition from the Rules as Code Handbook (2019a), RaC can therefore be understood as: 'the process of drafting rules in legislation, regulation, and policy in machine-consumable languages (code) so they can be read and used by computers.' RaC, conceptualised in this way, is about changing when, how, by and for whom rules are made. It moves beyond enhancing existing workflows and processes, and requires deeper and deliberate examination of the rulemaking process.

525. One of the benefits of rules as code is said to be that publishing rules as code will mean that end users are not required to form their own interpretation of the law prior to encoding it in machine languages.

> Currently, rules are made available in human-readable form; that is, they are presented in natural language in the form of legislation, regulation or policy documents. End-users of rules, such as regulated entities or government agencies, take these rules and interpret them into 'machine-consumable' versions (see Box 2.2). That is, they take rules written in

natural language and translate and reformulate them into code that can be used by the machines (i.e. computers) in a way that is relevant for their specific context and allows them to be enacted at scale (e.g. across the welfare system or ensuring compliance with taxation requirements). By contrast, RaC proposes that governments create an official and machine-consumable version of coded rules from the outset, which compliments and mirrors the natural language version, and which can be published and consumed by interested third parties.

526. The OECD primer proceeds on the basis that "rules" and "rule-making" can act as umbrella terms for describing all forms of law and rarely fails to stop and consider the way that different kinds of "rules" (better understood as laws or regulation) require to be treated differently. The following is an example of the way that all legislation, a very specific kind of rule with constitutional significance, is reduced to "rule-making" (p 26):

> For the OECD (2019b: 211), public sector 'governance' refers to the 'exercise of political, economic and administrative authority'. This authority gives governments the power and ability to create and enforce rules. In turn, these rules, which are manifested in various forms including laws and regulations, shape the societies over which governments have jurisdiction. These rules not only govern the actions of people, businesses and societies, but also how governments themselves operate. This is a central and long- established aspect of democratic systems and is most explicitly linked to Magna Carta (1215). This document, issued by King John of England, placed constraints upon the governing executive and thus 'established for the first time the principle that everybody, including the king, was subject to the law' (Breay and Harrison, 2014). Crucially, the example of Magna Carta underlines that governments are not only creators of, but also subject to, rules. These rules are perhaps the most fundamental, in that they place limits on government and its ability to act, and help to reduce the risk that citizens will be subject to the arbitrary exercise of the coercive power of the state.

> The nature of rules and laws has evolved over time, becoming more refined as legal systems have become more sophisticated. Moreover, at an ever-increasing pace, digital technologies are requiring widespread changes to the rules themselves (for example, the modification of aviation law to account for the use of drones). Governments have also been long engaged in deep, extensive examinations of what and how many rules to make. In the wake of crises, this trend typically becomes pronounced. Following the Global Financial Crisis of 2007-08, for example, many governments assessed to what extent the regulatory frameworks and compliance measures governing the financial sector were sufficient. Many countries have also made changes to the ways they make certain rules, for instance, through the introduction of regulatory impact statements into the law-making process. Yet, despite all these changes, the basic, most foundational methods by which governments design, create and implement rules have remained largely immune to comprehensive transformation.

527. In the next paragraph, there is some recognition of the way that these "rules" can include taboos and customs which are unwritten, but this obscures important differences between particular rules: (p 26)

Rules are part of a constellation of components that shape and govern society. For North (1991: 97), institutions are 'the humanly devised constraints that structure political, economic and social interaction'. They constitute 'informal constraints (sanctions, taboos, customs, traditions, and code of conduct) and formal rules (constitutions, laws, property rights)' (North, 1991: 97). In this way, rules can be both specific things but also embodied in structures and processes. A democratic government functions on the basis of rules – i.e. the non-arbitrary use of the state's coercive power. Formal rules particularly, such as those contained in constitutions, enable the state to govern for or on behalf of its people.

528. Later, it becomes clear that "rules" in the primer should be interpreted as "law" or even "regulation" or "norms" in the broadest possible sense (pp 27-28):

Governments are simultaneously administrators of, and subject to, rules. Once in force, government rules, for example those contained in legislation, need to be interpreted and implemented by non-elected members of the government, such as public servants. In such cases, governments may adopt operational guidelines that public servants must follow. An example would be operational guidelines for the application of eligibility criteria to determine if individuals can access state-funded grants or loans. Public sector leaders can also be required to comply with internal budgeting rules, created by government, for the purpose of administering and managing agencies. Rules can therefore be legal obligations or formalised accepted or expected practices.

As the ultimate form of rules in a nation, a constitution establishes the obligations, freedoms and powers of a government. One of these powers is the ability to create, modify and enforce rules. Typically, the rules created by governments are thought of as residing primarily in legislation. Indeed, while legislation often houses a significant portion of the rules created by government, many are also contained in regulation, policy documents and operating guidelines. While these and other instruments seek to set out precise and unambiguous rules, their implementation will often require interpretation or the exercise of discretion as to how a rule should be implemented in specific circumstances. In this regard, the application of rules by individual public servants can be affected by the depth of their knowledge and expertise, among other things. It can be further influenced by the degree to which the rules are established and enforced and the extent to which parameters and guidance are detailed and meaningful.

While not the focus of this primer, the judiciary and courts are another key actor in the creation, interpretation and enforcement of rules. Their role differs across countries depending on a range of factors, including the type of legal system in place (across OECD countries, civil law, common law and mixed systems predominate (see Box 3.1)). The judiciary and courts' role may be relevant when considering RaC for a number of reasons and the differences between them can matter because of their impacts on the nature, effect and operation of rules made by governments. The level of detail in various forms of government rules might vary from country to country, as may the extent to which the courts shape the rules after their adoption. Even in cases where the role of the courts in this regard is more limited or where government rules do not require the exercise of discretion (for example,

in some instances of sentencing), courts will still play a crucial role in interpreting how and to which cases the rules apply, thereby shaping how government rules are implemented in practice. It is therefore important to consider the role of courts when determining how and where RaC could be most effective. In this, rule makers should also consider the types of rules to which RaC is best suited (see What rules should be coded?).

529. Later, the role of interpretation in relation to "rules" (which can be understood as including legislation and case law, as well as every other form of rule embraced in the earlier definition) is identified as one of "three related problems" which rules as code approaches can help to, presumably, solve. Notably, translation here is used both in relation to internal policy development processes (in the way understood in our discussion of a better rules approach), but also in "implementation", meaning enforcement outside of a policy development process: (p 31)

> Interpretation and translation of intent: In requiring repeated interpretation multiple times and in multiple stages throughout rule creation and implementation, the current process risks misunderstanding. This can create a gap between policy intent and implementation, as well as uncertainty and costs for consumers of the rules. This is magnified when happening at speed, as the ability to compare a rule's intent with feedback about its in-practice implementation and its application to unanticipated contexts is hampered by ongoing, often irregular change.

530. Finally, on p 32, the circle is closed completely between "policy intent", ie original executive intention, through to implementation and enforcement, again, by framing the crucial constitutional role of interpreting natural language as a problem to be solved through "rules", including "legislation", "as code": (p 32)

> Interpretation and translation of intent: The current way of creating, distributing and consuming rules carries an inherent risk of discord between the original policy intent and the eventual effects of the policy. In the model outlined above, each stage of the policy-to-implementation process can occur almost independently from the others, with distinct groups of actors responsible for specific aspects. Policy professionals and subject matter experts, along with elected politicians, may cooperate to create an initial policy document. This is then communicated to legislative drafters, for example, via drafting instructions, who transform the policy into the form required by the parliament. If there are implications for people, the policy will also be passed to agencies responsible for implementation, who create operational guides and business rules.

> Even in this simplified example, there are multiple opportunities for the misinterpretation of the original policy intent. … The disintegrated nature of the process can thus result in misunderstanding and gaps between policy intent and implementation. This is suboptimal for the creators of policy, as well as for those who are subject to the policy's effects.

> The current process also necessitates translation and makes certain actors crucial in the processes of rule-creation, implementation and use. As NZ's Better Rules team noted, once a law is enacted, the current model positions 'lawyers as modems' who, along with other types of

advisors and analysts, are necessary to interpret and translate the law into operational policies and business rules (Andrews in OPSI, 2019: 106). Subsequently, these outputs are again expressed by others, including technologists, in a variety of information systems. This requires translation that, in turn, requires human judgment and therefore has the potential to skew the original intent of the rule through misunderstanding and errors. Such (mis)interpretations are often not explicit and may be operationalised, for example, by coding workflows, decision models and calculations into software."

531. Subsequently, one of the main benefits of "rules" (including legislation) as code is the removal of interpretation, exclusion of the requirement for lawyers and legal advice on what the law is, removal of variability in the way law is interpreted, operationalising those coded non-interpretable rule sets at all levels of government (and internationally): (p 39)

Better policy outcomes and enhanced service delivery: By reducing the need for interpretation and translation of rules between their human-readable and machine-consumable forms, and by making these interpretations more visible and explicit, RaC could minimise the gap between policy intent and implementation. This could deliver better policy outcomes and enhance service delivery.

Disintermediation and agile government: RaC extends the trend towards disintermediation enabled by digital technologies into the domain of the law and, by extension, public administration. By making rules more accessible and comprehensible (for both humans and machines), users of rules will have less need to rely on (costly) experts (such as lawyers) to understand their rights and responsibilities

Improved consistency and fairness: An official set of machine-consumable rules, made available to be consumed by third parties, is likely to increase the consistency of their application. This could improve fairness and confidence in the rules.

Interoperability and efficiency: Creating a set of shared and consumable rules could drive greater interoperability between all levels of government (and potentially even between nations). Additionally, the reduced need for manual translation of rules by individual actors, manual updating of rules and time between policy development and service delivery could deliver efficiency gains for governments and third parties alike.

532. The role of lawyers and interpretation is clarified subsequently, but it still proposes that the increased use of non-interpretable laws is desirable: (p 42)

By reducing the need for lawyers, policy experts, software developers or government officials to interpret and translate laws, RaC could also enhance the ability of people, businesses and delivery partners to understand and navigate relevant government rules. Of course, RaC does not presume that the elimination of experts and intermediaries (such as lawyers) is possible, nor even preferable. Rather, it suggests a different role, where their expertise is redirected to those instances of the highest value. beta.gouv.fr observed that instead of eliminating the role of mediators, the availability of RaC tools to solve basic problems

opens up more time for experts to solve more complex edge cases (Quiroga and Denoix, 2020). RaC could enable the largest possible number of individuals to understand (or at least be able to act upon) their rights and obligations, while freeing up resources (government or otherwise) to direct attention to more complex cases.

533. Further, the complete removal of interpretation comes to represent one of the most significant benefits of rules as code because "the best policy is not a good policy at all if it fails to realise its stated objectives in practice" (p 39), which takes for granted that the policy in question is lawful and democratically supportable. The goal is to implement executive intent through "rules" (including law and legislation) as code as rapidly as possible with as little interpretation or institutional separation between intent and implementation. (p 39 and 40)

> The gap between identification of rapidly emerging issues and an appropriate set of responses must be reduced. A vital component of this will be ensuring that actions taken – the policy implementation – accurately meet government objectives and citizen needs. This depends upon reducing the interpretation and translation gap that can emerge between policy intent and outcomes. By reducing the number of opportunities for misinterpretation between the designers and implementers of policy, RaC can deliver policy outcomes more true to their original intent. This should mean better outcomes for people, businesses and governments themselves. An ability to 'push' updates to machine- consumable rules delivered via API is just one example of how RaC could help achieve this. By minimising the opportunity for misinterpretation, it will not only be easier to see if the rules are having the desired effect, but also if or where any implementation issues with those rules may lie.

534. When law is expressed as code, conversely, the authors claim it will be *more* contestable and accessible than natural language legal instruments are now. Instead of "code" being presented as the unknowable black box, a term traditionally used in relation unexplainable neural networks or incomprehensibly complex machine learning algorithms, natural language legal instruments and regulation are framed as being the inscrutable black box. The authors adopt the view that rules as code outputs are superior because they will allow people to know exactly what their obligations are, but there is no recognition of the way that people may wish to contest the precise boundaries of these obligations, or the legal justification of a government's authority to impose them (whether in a digital self-executing system, or at all).

535. The Primer goes on to explain how there could be greater citizen input into drafting of rules as code, but only use examples of machine-readable natural language rules, not machine consumable code-as-law, thereby obscuring the crucial difference between law that is interpretable and contestable, and law that is incapable of interpretation and self-executing.

> Greater transparency: RaC has the potential to drive greater transparency in terms of the laws, rules and regulations of government. By making rules available in a way that is open, accessible and

contestable, rather than in a 'black box', RaC may serve to enhance the transparency associated with the development and use of government rules. The provision of official, machine-consumable rules may also better facilitate the development of new or improved tools and services that assist individuals to understand their entitlements and obligations in relation to government rules. Some reforms are always likely to be resisted (even while others are welcomed or demanded). Ensuring rules are more visible could also encourage more objective public debate and help reform efforts attain a greater degree of legitimacy when implemented.

536. To be fair, there is occasional recognition of the way that legislation has a superior role, over, for example, operational requirements, but these recognitions do not sit comfortably with other comments as previously quoted above. (p 43)

> …the simultaneous design and creation of legislation and the rules could significantly decrease the time required for service implementation and delivery. By designing the rules concurrently, both parties can be sure that they meet operational requirements. To note, this does not mean that the intent or legislation should become subservient to operational requirements, which would place undemocratic and unsatisfactory restraints on the policy and/or legislative process. Instead, it is about creating the opportunity for upfront and shared dialogue that enables the policy to be implemented rapidly and in the way most true to its original intent. Determining the extent to which efficiency gains can be realised from this process at scale could be a focus of future research.

537. It is clear that one benefit from rules as code outputs is the direct provision of "interpretation" as a coded rule-set. After discussing business rule systems, fintech and regtech, the authors discuss the way that coded rule sets are implemented in software systems. (p 59)

> Some companies are also working on solutions that ensure, for example, 'Compliance by design' at the code level. Compliance by design seeks to embed legal, regulatory, ethical principles directly into entities' software. Nonetheless, it should be noted that this remains possible only through the repeated act of interpretation and translation from the natural language version of government rules. As Andrews (2020a: 15) identifies 'most products in this space were interpretation engines that assume legislation is drafted only in human form'. A key problem with this is that the independent creation of distinct rule sets risks 'creating new translation mistakes, or of perpetuating existing mistakes if elements are copied' (Waddington, 2019: 24). Many of these solutions, then, do not appear to overcome the issues associated with the absence of a single provider of official, machine-consumable rules.

538. It continues by clearly anticipating that governments would be responsible for creating "interpretation as code" that is applied as law: (p 59)

> Overall, while such approaches may go some way to addressing the issue of replication of rule sets, there are legitimate questions as to how they might work when viewed from a whole-of-system level, where having numerous, presumably different, approaches may add to, rather than reduce, complexity. As conceived of here, RaC suggests that the actor best placed to provide a single and official source of rules is the

government. This represents more than the development of a new technical approach or technocratic 'fix' to an existing problem. It represents a potentially paradigmatic shift in the way the governments design, implement and provide rules.

539. The role of interpretation is covered by reference to comment by McIntyre, [147] although the role of the judiciary and the concept of statutory interpretation does not feature strongly.

> This concern should not be ignored. Protecting the correct function of the law and the role of the judiciary as a vital pillar of the democratic system of government is of crucial importance. What it also exposes, however, is the need to clearly define the RaC concept and when it should be used: both goals of this primer. To reiterate, RaC (as understood here) does not aim to replace judges or legislators. Instead, its goal is to augment the rule-development process through the government's creation of a machine-consumable ruleset that mirrors its existing, human-readable counterpart. In this sense, RaC would be an improvement of a process that already exists, but with the potential for greater transparency and openness.

> This currently happens, but it is not done well. Every business rule system designed and employed by businesses or government agencies has interpreted and coded aspects of the law. RaC proposes to rethink this process and, in so doing, make these renderings more consistent, transparent and consumable by all people. Not only that, early efforts seem to suggest that in the development of legislation which supports service delivery, the experience of creating machine-consumable rules actually brings greater rigour to the drafting of the laws themselves. In other words, the rules created are better able to fulfil their intended function. In this sense, while RaC does aim for 'legislation [that] could be directly applied by machines', it more precisely seeks a better application of the law by machines. By assigning the responsibility for machine-consumable rule sets to government, the function and effectiveness of the laws created may therefore be enhanced, rather than eroded.

540. The OECD primer notes that errors in interpretation incorporated into a coded model will exist. It also acknowledges that some jurisdictions may treat the code as having "the force of law":

> Of course, errors will inevitably arise in the coding of rules. Accordingly, there also must be mechanisms that allow the coded version to be corrected or appealed. Further, to the extent that a jurisdiction chooses to treat the coded version as having the force of law, the importance of mechanisms that allow the subject of the decision to seek a review (undertaken by a human actor) will rise. Options and mechanisms for people to contribute a correction of a faulty rule may also be beneficial. For example, this may be because an error has been made in the interpretation of a rule and its subsequent application. In instances where coded rules are used to support straight through processing or automated decision making, this may also be a legal requirement. For example, the GDPR only allows for fully automated decision making

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[147] Cracking the code, Mohun & Roberts, at p 24, 80.

without human involvement in limited circumstances. Ensuring that a RaC approach is appropriate and that there are avenues for appeal should enhance trust in machine-consumable rules and reduce concern over potential misuse.

541. At other points, there are indications that the pervasiveness of interpretation is not fully considered. Focusing on prescriptive rules does not remove the need for interpretation, it only increases the chance that the interpretation is reliable on the text's plain and ordinary meaning:

> Requiring little discretion, **prescriptive** rules leave little ambiguity about the course of action that must be taken. The prescriptive criterion naturally lends itself to certain types of rules, such as those relating to eligibility and calculation. Such rules are also conducive to the development of IF-THEN statements. While some initiatives are now challenging the encoding of only (or mostly) prescriptive rules, most RaC experimentation to date has focused on this type. Focusing on prescriptive rules may also help reduce concerns about automated decision making, that is, by avoiding the codification of rules that substantively require subjective (and therefore human) interpretation.

542. The suggestion that it is possible to "[avoid] the codification of rules that substantively require subjective (and therefore human) interpretation" anticipates that there are rules where no interpretation is required. We do not agree that any such rules in natural language exist.

543. It also mistakes interpretation as being subjective, rather than being a highly tailored, constrained and specialised exercise performed by lawyers and the judiciary according to principles and practices that lend greater predictability and certainty to interpretation than the word "subjective" fairly captures.

544. In a summary table on p 69, "potential considerations for Rules as Code" are identified:

> Legal implications: Creating an official set of machine-consumable government rules raises a number of legal questions that must be carefully considered by governments.

545. The authors do acknowledge: (p 94)

> Appropriateness and Appealability – Appropriateness requires that consideration be given to the question of if a RaC approach is suitable for a given area or problem. This will include determining if generating machine-consumable rules will create value, as well as if available technology solutions possess the required capability. Of course, errors will inevitably arise in the coding of rules. Accordingly, there also must be mechanisms that allow the coded version to be corrected or appealed. Further, to the extent that a jurisdiction chooses to treat the coded version as having the force of law, the importance of mechanisms that allow the subject of the decision to seek a review (undertaken by a human actor) will rise. Options and mechanisms for people to contribute a correction of a faulty rule may also be beneficial. For example, this may be because an error has been made in the interpretation of a rule and its subsequent application. In instances where coded rules are used

to support straight through processing or automated decision making, this may also be a legal requirement. For example, the GDPR only allows for fully automated decision making without human involvement in limited circumstances. Ensuring that a RaC approach is appropriate and that there are avenues for appeal should enhance trust in machine-consumable rules and reduce concern over potential misuse.

546. The orientation of the report toward Executive government actors is exemplified by the inclusion of a checklist toward the end of the report that relates to the needs of policymakers and regulators, "those involved in the legislative process", service design and delivery experts, and technologists, but not lawyers or citizens. Further, the actual checklist created only anticipates the inclusion of these four groups (pp 95-98).

547. The authors acknowledge that many legal or jurisprudential questions raised by RAC are outside the scope of their report. They identify the following questions as requiring investigation and resolution:

> If compliance by third parties is undertaken on the basis of the coded regulations delivered by government, but a mistake has been made in their drafting, is the government liable?

> How would the treatment of mistakes made in machine-readable legislation differ from mistakes made in human-consumable form?

> Is it appropriate to use coded rules to make decisions about all topics?

> Is the misuse of rules coded by government possible and, if so, what could be done to guard against it?

548. Toward the conclusion of the report, the authors include the following anecdote:

> In the course of the research for this primer, an individual with experience in the legislative process described an almost unthinkable situation. He painted a picture of a Minister seeking to develop amendments to a complex law (relating to digital topics), who was hidden behind mountains of paper scattered across a gigantic table. With her, a group of advisors stood discussing the merits of the proposed changes and desperately trying to work out their potential implications for other national and international pieces of legislation. To achieve this, they were physically searching for relevant clauses across documents, that is, across literally hundreds of pieces of paper. Her question: 'How can we possibly still be doing it like this?' When we have the technologies available to improve the effectiveness of the rulemaking process and the rules themselves, remaining wedded to incumbent ways of working seems wasteful or even irresponsible.

549. The answer to this scenario is not for that Minister to create coded interpretations of legislation, which may be incorrect, simply making the task more difficult. If the policy area cannot be understood, that would suggest it also should not be being amended without careful scrutiny. It is not at all clear how requiring that Minister or those advisors to conduct the same exercise in (potentially legally incorrect) machine-executable languages would be any improvement: this is because it substitutes language that is accessible to those groups with

language which is not; but further, not just one language but a practically limitless array of machine-executable languages. The answer is to do what has already been done, which is to use keyword searching and other forms of sophisticated indexing through extensible markup languages to identify "the right piece of paper" using digital computers.

550. Other notable statements include:

   a. "RaC suggests that, if government were to assume the role of digital rule maker, it could create stronger alignment between rule intent and implementation." (p 7)

   b. "RaC, in effect, forces and demands that more government rules (and their interpretations) be made with greater clarity and precision. It requires that rules – if their implementation is going to be routine and digitally encoded in some way – be drafted in a manner that is explicit about their intent and interpretation, as machines are as yet unable to engage in a fully nuanced interpretation of ambiguity. RaC thus offers a structural driver for insisting that government rules are drafted with greater clarity, including as to identifying where nuance and interpretation are expected or not." (p 21)

PIECE BY PIM WILLEMSTEIN AND RONALD ROSS

551. In a diagram explaining "the chain of reasoning behind Rules as Code", the following quotes are notable.[148]

   a. "Regulation is the core part of government and therefore needs to be part of the government digital infrastructure."

   b. "RaC makes regulation part of the government digital infrastructure by creating a digital twin of the regulation."

   c. "RaC uses an iterative, human-centred, multi-disciplinary, test-driven approach to support the development of regulation and the rules."

   d. "Rules are created simultaneously in natural language and in a language that can be consumed by software and machines."

   e. "Through better concept and decision models that inform rules making up regulation. Better rules leads to better outcomes."

   f. "Rules expressed in natural language and computer language need to be the same (isomorph)"

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[148] Pim Willemstein and Ronald G. Ross, "The Distilled Principles of Rules as Code (RaC): How to Produce Better Rules" Business Rules Journal Vol. 22, No. 2, (Feb. 2021): <https://www.brcommunity.com/articles.php?id=c059>.

552. The authors articulate six "fundamental principles, or core notions". Within those six principles, we point to the following statements:

   a. "Currently, rules are already codified as part of digital services and software systems, though often not by the issuing government itself. Transparency, avoiding translation problems, and reducing duplication of effort are key objectives for RaC."

   b. "RaC assumes human-consumable rules will be inherently better (more readable, more complete, more fit for purpose) if simultaneously drafted or interpreted along with a machine-consumable version. The traditional model of rules creation can cause challenges for digital service delivery. The rules can be difficult to understand or navigate, and their logic not robust. These shortcomings can make it difficult for designers and developers to build good digital services so people can easily understand their rights, obligations, and entitlements."

   c. "Disambiguation: … Clarity and reduction of ambiguity are the focus during development of the concept model, which assists in the same regard during modelling of decision and development of rules. The iterative process of developing the models and rules in a multidisciplinary team drives clarity and precision. The ultimate test is using working code and automated test cases to clearly prove high quality. Running automated test cases will identify any remaining areas of ambiguity or lack of clarity or precision."

   d. "Isomorphism. RAC prescribes that every machine-consumable rule should remain tightly coupled with its human-consumable counterpart throughout its lifetime so that changes can be effectively synchronized at all times. With RAC, a machine-consumable rule isn't a translation of a rule by separate people at a different point in time but is developed in parallel and at the same time. This digital twin remains closely tied to its human-consumable counterpart so that the meaning of the two don't diverge over time."

   e. "Citizens, entrepreneurs, social innovators, software developers, and the systems they develop should be able to "consume" the rules without having to translate the rules."

   f. "The fundamental goal of RaC is to eliminate the costly and counterproductive chasm between policy development and its implementation as part of digital services …"

APPENDIX:

FURTHER NOTES ON THE ADLS AGREEMENT

553. We spoke to two practitioners with experience in the drafting of the ADLS agreement and relevant processes to better understand how the agreement came about, how it is drafted, how it is amended, what public input is possible, and its relative benefits and shortcomings.[149]

554. Our key insights are recorded below and any errors are attributable to the authors.

   a. The Agreement has been in use since the 1960s or 70s. It is now in its tenth edition. One of the early versions of the Agreement was only six pages long. It was limited to six pages because it was printed on specific paper imported from the United Kingdom, because of the way it could be folded. Over time, the agreement has had to account for a wider number of legal instruments and greater prescriptiveness in dealing with the rights and obligations of the parties.

   b. The Agreement draws on a wide range of primary legal sources. It is not only a reflection of land law, but also taxation law (in the way that GST is incorporated into land sales).

   c. The Agreement is produced by the Auckland District Law Society, not the New Zealand Law Society. The ADLS is the sole remaining regional law society after a period of consolidation, although it has members from across New Zealand and is not limited to the Auckland region. The NZLS has regulatory functions, whereas the ADLS does not.

   d. The ADLS agreement was originally drafted only by the ADLS. Subsequently, the Real Estate Institute of New Zealand became involved in the production of the agreement based on the experiences of its members and its members' interests in a useful document. This partnership – between various non-government organisations – is notable because it could be emulated for interpretation-as-code instruments.

   e. When interviewees were asked why anyone treats the agreement as being legally reliable, they pointed to the reputation and qualifications of the members of the committee. They also emphasised that the agreement has been reviewed judicially in disputes between parties to a transaction over the years. We draw special attention to this for the light it casts on

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[149] Our thanks to Tim Jones and Joanna Pidgeon for sharing their extensive experience with the ADLS agreements and committee procedures including history, usage and drafting.

the role the courts must have in rendering coded instruments reliable. Again we state: there is no substitute for the generative process of legal dispute, which is the only pathway to an authoritative judicial interpretation.

f. The Agreement is subject to copyright jointly held by REINZ and ADLS. The copyright is enforced. It is not clear how the revenues generated by this copyright interest are used, but members of the Real Estate Institute of New Zealand gain access through their membership in the Institute.

g. Copyright in this case is an essential legal device for controlling how the agreement is used or modified. It is used to ensure that the utility of the standard form is not undermined. As noted above, utility is derived primarily from widespread agreement that the committee with oversight of the Agreement is exceptionally qualified and endorse all of its contents. We note that there was a case recently where a real estate agent used software to illegitimately modify the terms of the copyright agreement in a way that was not obvious to other parties to the transaction. The modification was only noticed by a lawyer shortly before the agreement was signed and led to disciplinary consequences for the agent.

h. The ADLS publishes software that facilitates legitimate amendment of digital versions of the Agreement. This software replicates the way amendment would occur with a paper copy. In other words, an amended term is struck through with a line and the revised text is included alongside the original text. This makes it obvious to the reader when the original document has been amended.

i. The core benefit of the Agreement is that it makes it possible for users (including lawyers representing clients) to immediately know the contents of the agreement being contemplated by the parties. This saves time for the practitioner, and money for the client. It also allows bodies of practice and expertise to be developed around that specific agreement, including seminars and lectures, or commercial products. The predictability of the agreement also flows through into organisational workflows in legal practice.

j. Around 2008-2009, REINZ formed the view that the Agreement could be improved by re-drafting it using plain language drafting techniques. The intent was that non-lawyers would have a better understanding of the Agreement. There have been similar attempts over the years to produce a plain language version of the Agreement. Ultimately, even where they have been completed, the plain language re-drafts have never been widely adopted. Interviewees also noted that there had been some suggestion that the fundamental general clauses in the

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Agreement could be adopted or acknowledged in legislation. This has not been pursued.

k. The Agreement includes its own dispute resolution mechanism. Parties who agree there is a dispute can refer it to experienced property lawyers for resolution. This mechanism is designed to allow property transactions to settle without parties relinquishing their rights to pursue a remedy for any breach, and to resolve disputes without litigation. It reflects the complex transactional environment in which the Agreement is used, where chains of transactions might settle all at once, and a disruption in one of these may affect the ability for settlement to occur on a wholly unrelated transaction.

l. The Agreement is updated and amended according to the procedures of the Committee. The Committee periodically seeks input from members of the profession and the public. There have been instances where members of the public or their legal representatives have suggested issues caused by the Agreement, or improvements for subsequent editions. Academic members of the committee have also produced papers on proposed revisions to the agreement. REINZ also has input based on the experience of its members in using the agreement.

555. We also note that conveyancers have status as a separate class of professionals who, along with lawyers, can effect changes to the title of land in New Zealand's land registration system. It is interesting to consider how predictable coded interpretations of the law might enhance the ability of non-lawyers to become specialists in legal tasks traditionally reserved for legal practitioners.

556. We also note that no individual or agency carries any legal liability for the accuracy of the document. The responsibility for providing legal advice and meeting client obligations still lies with legal practitioners. Any person who transacts using the Agreement without taking legal advice risks contractual dispute. Equally, it is possible for additional clauses to be added to the agreement that might do undermine the integrity of the agreement as a whole: for example, an additional clause might contravene one of the standard clauses in a way that does not clearly indicate how that inconsistency should be resolved.

SUMMARY

557. Our primary interest in the ADLS Agreement is that it illustrates the wider value of exceptionally reliable reproducible legal instruments, which nevertheless are only non-authoritative interpretations of how the law works. Parties attempting to create law as code models should pay particular attention to the following points, which we believe are integral to the success of the ADLS Agreement:

a. The Agreement is drafted in natural language, but it reflects a workable operational interpretation of multiple legal instruments

that increases the parties' compliance with and knowledge of the law.

    b. There is wide confidence in the reliability of the Agreement because of the way that it is produced and because of the qualifications of the people who produce it and monitor it.

    c. The Agreement is capable of being assessed by the judiciary and updated to reflect statutory amendment, judicial interpretation and the impact of case law.

    d. It would be possible for the Agreement to be modelled in computational languages and used, while still preserving the natural language text in case of any interpretive disagreement.

    e. A coded model may not be immediately useful for the people who use it, but a similar process to produce the natural language text would confer credibility on the associated coded model produced. The Committee could use a better rules approach to improve the suitability of its drafting for encoding in digital systems.

558. The Agreement creates a reliable and dependable legal environment within which parties can transact. It does not exhaustively state the law, nor is it held up as having greater authority than the other primary legal sources (or even secondary legal sources in the form of academic commentary) that inform its drafting. It is reproducible and scalable in the way that many copies of it can be produced and used rapidly.

559. Though noteworthy for its effectiveness and widespread adoption, the Agreement is only one example of legal 'models' in current use. There are a range of other, similar devices for use in legal context, including government-authored forms like the standard residential tenancies agreement produced by tenancy services. We were informed that the Drafting and Precedents Committee of the ADLS has developed proficiency in drafting standard form legal agreements in the same way that we imagine better rules practitioners would develop greater expertise over time.

560. There is a competing standard form commercial lease agreement produced by the Property Council. This illustrates the way that differing legal interpretations can be codified in different ways for different groups, depending on their interests and the operational context of the instrument.

561. There is some recognition that the way such standard form agreements have been drafted leads to a particular balance of power in a legal relationship: specifically, the ADLS lease was perceived in the past to have favoured landlords' interests to a greater extent than tenants' interests.

APPENDIX:

INTERNATIONAL RESEARCH PROGRAMMES TO FOLLOW

PURPOSE

562. Here, we point to international research initiatives we have identified in the course of this research. We identify them for policy makers for two reasons.

   a. First, because the findings and progress of these research initiatives will have important insights for how New Zealand progressively adopts law-as-code approaches; and

   b. Second, because they represent opportunities for international collaboration in connection with our core recommendation, which is that a multi-stakeholder centre or incubator should be set up to advance law as code research and practice.

EXAMPLES

POTENTIAL RULES AS CODE SANDBOX IN AUSTRALIA

563. A group of academics with experience in "law as code" research pre-dating the present rules as code renaissance have advocated for a regulatory sandbox to be established in Australia.[150] There is little detail at this stage about what that would entail, but we imagine it to be similar to the multi-stakeholder incubator we describe in our recommendations.

564. In oral comments, Prof Casanovas summarised as follows in a manner similarly framed to our own recommendations:[151]

   In short, we need a bold government framework for collaborative public private rule coding innovation. In this space there are things we can do, things we cannot do and things we should not do. The framework, by direction [inaudible]forward for the next steps. The framework should also allow more challenging projects to be undertaken in order to expand our rule coding knowledge. The

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[150] A submission was made to the Australian Parliament's Select Committee on Financial Technology and Regulatory Technology: <https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Financial_Technology_and_Regulatory_Technology>.

[151] Hansard: Select Committee on Financial technology and Regulatory Technology, Senate of the Commonwealth of Australia, Thursday 11 February 2021 at p 30: submission by Prof Pompeu Casanovas, Dr Mark Burdon, Prof Louis de Koker, Dr Guido Governatori, Dr Anna Huggins.

more challenging questions relate to coding of complex legislation. Pilot projects in this space require, for example, the collaboration of members of parliament and parliamentary council, and government departments and agencies too. Ideally, a regulatory sandbox should be created to support rule coding projects, evaluate the results and eventually support implementation. Having a framework for innovative collaborative pilot projects planned, and support for resources to implement the plan, will help position the government as a global leader in digital law and regulation, strengthen Australia's law-tech industry and facilitate legal compliance by companies, government agencies and citizens. But much more is at play. By getting it right we will make law more accessible to citizens and enhance the transparency and accountability of our legal system as a whole. In short, it will foster trust. On the other hand, delaying or getting it wrong can do damage.

AUSTRALIAN CENTRE FOR AUTOMATED DECISION-MAKING

565. Australia has had significant experience of the negative consequences that can be caused by automated decision-making systems through the "robodebt saga".[152]

566. The Australian Research Council has funded a Centre of Excellence around Automated Decision-making and Society. It "brings together universities, industry, government and the community to support the development of responsible, ethical and inclusive automated decision-making."[153] The centre has 79 total members and funding of approximately $70 million AUD from the Australian Research Council and Australian University and Industry Partner Funding. It has an extensive number of partners in industry, academia and civil society, both domestically and internationally.[154]

COHUBICOL PROJECT

567. Prof Mireille Hildebrandt is a leading scholar in the area of law, philosophy and technology systems. She leads a research project funded from 2019-2024 by the European Research Council (ERC) under the HORIZON2020 Excellence of Science program. Dr Laurence Diver, another leading scholar on the topic of "Digisprudence" is also a member of the COHUBICOL team.

568. The COHUBICOL project is split into two streams. A data-driven law stream focuses on data-driven computing technologies such as machine learning. Another stream is "code-driven law", which focuses on the representation of law in code, and the use of code to implement law. The existence of this code-driven law stream is an important

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[152] Whiteford, P "Robodebt was a policy fiasco with a human cost we have yet to fully appreciate" 16 November 2020: <theconversation.com>.
[153] https://www.admscentre.org.au/about-us/
[154] https://www.admscentre.org.au/partnerships/

indicator of the volume of scholarship that already exists and is also still being written.

569.   The project's orientation and situation within the EU will generate interesting conclusions about the way that "code-driven law" systems interact with article 22 of the General Data Protection Regulation ("GDPR"), which imposes controls on automated decision-making systems.

570.   Policy-makers wishing to implement coded models of the law would benefit from engaging closely with work associated with the COHUBICOL project.

SINGAPORE MANAGEMENT UNIVERSITY

571.   Singapore Management University has received a $15m research grant for a program investigating the use and development of computational law.[155]

572.   Two prominent voices in the rules as code space with significant practical and research experience in law and computer science (Meng Wong and Jason Morris) are conducting research within the Singapore programme. Work is being done to develop machine executable languages that can closely reflect natural language drafting (Legalese). Work is also being done to develop tools that lawyers and others can use to create coded representations of legal instruments and interpretations (Blawx).

573.   Some of the work being done by this program focuses primarily on private law applications, for example in contract law or the development of legal advisory tools. This is a point of contrast from better rules and rules as code approaches which sit primarily in the domain of public law, governing the relationship between State and citizen, including the passing of legislative instruments.

574.   Work produced by the Singapore programme is likely to be highly influential and instructive for New Zealand.

STANFORD CODEX

575.   Computational law has been a central focus for Stanford University's CodeX programme for some years. The program is based in the Stanford Law School.[156]

> At CodeX, researchers, lawyers, entrepreneurs and technologists work side-by-side to advance the frontier of legal technology, bringing new levels of legal efficiency, transparency, and access to legal systems around the world. CodeX's emphasis is on the research and

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[155] https://news.smu.edu.sg/news/2020/03/11/smu-awarded-15-million-grant-computational-law-research
[156] https://law.stanford.edu/codex-the-stanford-center-for-legal-informatics/

development of computational law — the branch of legal informatics concerned with the automation and mechanization of legal analysis.

576. Rules as code and better rules advocates would benefit from close scrutiny of the Centre's work over the years.

DENMARK AND THE LOKIN METHOD

577. During the course of this project, and prompted in part by the OECD primer, we became aware of a method attributed to Dr Mariette Lokin in Denmark. We spoke with Dr Lokin to assess the extent to which a better rules approach mirrors her own approach and concluded there was striking similarity.

578. Denmark has an "Agency for Digitalisation", which is responsible for ensuring that legislation is suitable for implementation in digital systems. This is a core benefit attributed by advocates to the better rules process.

579. The Dutch Ministry of Interior commissioned a report by Hooghiemstra & Partners on "the supervision of the use of algorithms by the government".[157] The report identifies Lokin's method as one way of ensuring that algorithms giving effect to legislation conform with the provisions of that legislation and recommends it is investigated further.

> Legislative process: the transformation of laws in computer programs so that they can be executed automatically is now concealed from the view of the House of Representatives or the City Council. This can be improved by trying out the Lokin model in which legislative texts are written in a very structured and precise manner to make the programming more easy. The discretion on how to interpret the law, will then (again) be part of the democratic checks and balances (Lokin 2018).

580. The Lokin method is described in a PhD Thesis from Lokin. Only the abstract is available in English. The core problem as described by Lokin is more or less the same as identified by the Better Rules discovery report (2018). Lokin examines five applications for digitising legislation and states:

> Striking in these five cases is that knowledge modeling is not yet based on a direct analysis and interpretation of the legislation. Where it is based on analysis of legal sources, no tools for unambiguous interpretation of the legislation are available. Furthermore, law drafters are rarely directly involved in the conversion of legislation into IT-applications. The approach proposed in this thesis could fill these gaps. The underlying assumption is that agile execution of legislation also requires agile legislation and that the role of the legislator as

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[157] Prof Valerie Frissen, Dr Marlies van Eck, Thijs Drouen "Research report on supervising governmental use of algorithms" (Hooghiemstra & Partners, 2 January 2020): < https://hooghiemstra-en-partners.nl/wp-content/uploads/2020/01/Hooghiemstra-Partners-rapport-Supervising-Governmental-Use-of-Algos.pdf>.

the administrator of the legal system nowadays expands to 'technical' system management. This leads to the central research question of this thesis: To what extent and in what way can digital execution of legislation by national government agencies be taken into account in the legislative process?

581. The approach advocated by Lokin, like better rules, focuses on the use of knowledge assets that are used across various systems, one of which may be

> The essence of this approach is that knowledge from legislation (rules, data, process steps), required for automated decision making, is no longer 'locked up' in the system, but is shaped into knowledge models outside the system, forming the basis for modular IT services to execute processes. In doing so government agencies aim to increase the agility of their IT systems and thus of the implementation of legislation. In recent decades, a great deal of research has been carried out to find ways of sup porting knowledge-based working, for example by displaying knowledge in a formalized way, supporting the conversion to automatically executable specifications. However, a method for clarifying the meaning of the legislation on which the specifications are based is still lacking. This thesis elaborates an approach for this; it focuses on the creation of legislation and is based on three pillars:– clarifying the meaning of legislation;– improving insight into the legal rules relevant for the task performance by government agencies;– a different way of cooperation between actors in the legislative process.

582. Lokin effectively advocates for the use of multidisciplinary teams using agile approaches to the policy process, including the use of specialists from business process analysis, developers and legislative drafters work together.

> Therefore, the next question is how to bridge the gap between language and technology, by establishing a different way of working among the various actors in the administrative-political legislative process. In answering this question, a distinction has been made between the ministerial and political phase of preparation of legislation. With regard to the ministerial phase of preparing legislation, an analysis has been made of several agile working methods in systems and software development, such as Scrum, Lean and DevOps. The main characteristics of these methods are that projects are carried out in an iterative manner (in small subprojects with a short turnaround time) and in multidisciplinary teams (in which representatives from the business processes, IT developers and managers sit together). Elements from these working methods have been combined in an approach that is referred to as LegOps, a composition of legislation and operations. This approach aims to achieve agile legislation by viewing the legislative process as part of the chain of policy making, legislation and execution and by using an iterative and multidisciplinary way of working.

583. Lokin also considers the long-term implications of increased digitalisation of the law:

> For the long-term, a more fundamental reflection on the relationship between government and parliament is required. For a properly functioning parliamentary democracy, not only the relationship

between citizens and representative bodies is key, but also the relationship between (co-)legislative and executive power. The latter determines the legitimacy of government: the extent to which the execution of legislation leads to legitimate and just decisions and has the intended effects. In this regard, research could be conducted into extending the LegOps approach to the parliamentary phase of the legislation process, integrating this phase in the chain of policy making, legislation and execution. Of course the research should keep an open mind for the values and guarantees that are (and must remain) anchored in the legislative process.

584. Lokin also raises a question about the role of the judiciary, but again, the thesis is an example of the merits of international academic cooperation so that teams can learn from each other and avoid making the same mistakes.

Another research theme concerns the impact of the application of the language model and linked data for the judiciary: to what extent can or will a judge be bound by the meaning given to legal provisions by means of annotations of the legislator? The aforementioned themes deserve a place in a broader discussion on the consequences of technological developments for legislation, governance and the judiciary, enabling them all to fulfil their role as system administrator adequately in the long-term.