# GOFF LECTURE 2021

## "The Complexification of Disputes in the Digital Age"

9 November 2021

The Honourable the Chief Justice Sundaresh Menon*

Supreme Court of Singapore

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## I. Introduction

1. Good evening to all of you. Let me first thank my old friend, Cheng Han, for that generous introduction. Let me also take this opportunity to thank Professor Neil Kaplan and the City University of Hong Kong for inviting me to deliver this year's Goff Lecture. This is certainly a great honour. Few can claim to have made such significant contributions to the law in as many capacities as Lord Goff; first as a scholar, then as a practitioner, and last and perhaps most famously, as a judge. Over the years, the Goff Lecture has become a much anticipated fixture on the international arbitration calendar, and I am deeply grateful for the opportunity to make a modest contribution to this series.

2. Today, as Cheng Han has said, I wish to speak to you about the

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* I am deeply grateful to my law clerks, Desmond Chong and Jarret Huang, and my colleagues, Assistant Registrars Kenneth Wang and Reuben Ong, for all their assistance in the research for and preparation of this address.

"complexification" of disputes, and to discuss the implications that this might have for our approach to dispute resolution. Those involved in the practice of arbitration will, of course, be familiar with the growing complexity of cases and the challenges that this poses to their efficient disposal. Much has already been said about the problems of undue delay and expense, and I do not propose to add to that already saturated discourse. Instead, I would like, this evening, to focus on what appears to be a growing class of disputes that are so factually rich and complex that they may be virtually *impossible* to adjudicate properly.

3. This has been referred to as the "complexity problem".[1] The complexity of such disputes manifests in a number of ways, most commonly in the number of documents tendered, the number of witnesses and parties involved and ultimately in the sheer length of the trial. Consider the *Bell Group* litigation in Western Australia, which was commenced in the wake of the collapse of a massive government-linked conglomerate. The proceedings culminated in a trial that lasted 404 days, in the course of which over 86,000 documents were tendered in evidence and over *37,000* pages of written submissions were filed. The resulting judgment took two years to draft and consisted of almost ten thousand paragraphs.[2] In another large contractual dispute litigated in New

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1 Jörg Risse, "An inconvenient truth: the complexity problem and limits to justice" (2019) Arbitration International 291 ("Risse") at pp 291–307 ("Risse").

2 *Bell Group Ltd (in liq) v Westpac Banking Corporation (No 9)* (2008) 39 WAR 1; [2008] WASC 239 at [956], [960]; see Anna Olijnyk, "Justice and Efficiency in Mega-Litigation" (October 2014):

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South Wales, 160 witnesses were called, who between them produced approximately 280 witness statements.[3] And, in a growing number of jurisdictions, most notably in the United States, class actions involving thousands, and even *hundreds of thousands*, of plaintiffs are not unheard of.[4]

4. To a point, complexity can be mitigated by keeping a firm and steady hand on the evidence or by placing limits on the length of written submissions. But cases like the ones just mentioned arguably go beyond the bounds of complexity that even *robust* case management can properly control. There are, after all, finite limits on an adjudicator's cognitive ability to process complex and voluminous information, and the concern is that some disputes are now so massive and complex that they have become extremely difficult for the adjudicator to fully and properly *understand*, much less decide. If this is the case with at least some disputes, we ought to consider just how serious the complexity problem is, and what might perhaps be done to address it.

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https://digital.library.adelaide.edu.au/dspace/bitstream/2440/91442/3/02whole.pdf ("Olijnyk") at p 40, fn 1.

3 *Idoport v National Australia Bank Ltd* [2001] NSWSC 868 ("*Idoport*").

4 3M faces a suit involving over 229,000 US military veterans with hearing problems which they claim are linked to faulty earplugs produced by the company: Rose L Thayer, Stars and Stripes, "Trials begin for veterans in massive lawsuit over 3M's military-issued earplugs" (29 March 2021): https://www.stripes.com/Migration/2021-03-29/Trials-begin-for-veterans-in-massive-lawsuit-over-3M's-military-issued-earplugs-1518327.htm. See also the Bayer AG 'Roundup' litigation involved nearly 15,000 lawsuits over allegations that the 'Roundup' herbicide produced by the company caused cancer: Tom Hals, Reuters, "Bayer settles thousands of US Roundup cases with trial attorneys" (16 September 2020): https://www.reuters.com/article/bayer-lawsuit-idUSL1N2GC163.

5. This is the subject of my lecture today, and I propose to approach my discussion in three parts:

(a) First, I examine the *origins* of the complexity problem, for before we can assess the scope of the problem and its likely future trajectory, we must first understand what drives it. I suggest that the complexity of disputes is, in part, hitched to the inexorable advance of science and technology, and if this is right, we might expect that the complexification of disputes will only intensify with time.

(b) Second, I discuss the *consequences* that the complexity problem is likely to have for our ability to properly resolve such disputes, both in terms of its impact on the quality of judicial and arbitral decision-making, as well as the severe strain that it threatens to place or perhaps already places on our justice systems. The point is that these problems arise because there are *finite* limits to the degree of complexity that we – as individual adjudicators and stewards of our justice systems – can realistically deal with. Solutions that enhance the efficiency of court and arbitration processes can help *stretch* those limits, but there will come a point when they cannot be stretched any further, and this will, I think, require that we turn to consider more radical responses which entail re-imagining the way we approach the resolution of complex disputes.

(c) And finally, I offer some suggestions for how we might light our *way forward*. Specifically, we might consider tackling the problem on three fronts: first, by re-examining our *philosophical approach* to the resolution of complex disputes; second, by considering the use of novel *procedures* aimed at containing and downsizing large disputes; and third, by empowering and equipping *people* – stakeholders in the administration of justice – to address the challenges that complexity poses.

## II. The Origins of the Complexity Problem

6. Let me first examine the drivers of complexity in dispute resolution. There are of course more factors at play than I deal with, but in the interest of time, I focus on two related forces driving what I see as two distinct aspects of complexity:

(a) First, *technical* complexity – which is concerned with the increasing technical difficulty of the evidence that judges and arbitrators must today grapple with; and

(b) Second, *evidential* complexity – which is concerned with the sheer volume of both documentary and oral evidence that adjudicators are regularly inundated with.

7. I discuss each in turn.

## *A. Technical complexity*

8. Let me begin with *technical* complexity. We now live in a golden age of scientific discovery.[5] As our understanding of the world and how it works has become more nuanced and complex, so too have our disputes. Scientific advances have progressed our technical understanding of the physical world in a multitude of fields, and this has broadened the potential scope of the factual and legal inquiry that adjudicators must undertake.

9. Take, for an easy example, the impact that advances in the field of psychiatry have had on the complexity of criminal proceedings involving mentally-disordered defendants. As early as the mid-13th century, English law already recognised a category of offenders who, by virtue of what was then referred to as "insanity", had not the "will to harm" and ought therefore to be exempted from criminal punishment. One might draw parallels between the rather rudimentary understanding of mental disorders prevailing at the time and the simplicity of their legal description, which one leading authority described as manifesting in the "furious man… not much above the beasts which lack

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[5] The growth of knowledge has been exponential; in the year 1900, there were 9,000 scientific articles published that year. In 1950, there were 90,000 and by 2000, 900,000 scientific articles published in that year: David A Bray, "Information Pollution, Knowledge Overload, Limited Attention Spans, and Our Responsibilities as IS Professionals" (2007): https://papers.ssrn.com/sol3/papers.cfm?abstract_id=962732.

reason".[6] Legal proceedings involving such defendants were fairly simple and straightforward: declarations of insanity were made by a jury selected for their familiarity with the defendant and indeed with the fact that he was "insane", and the legal result was almost invariably the receipt of a royal pardon and exemption from punishment.[7]

10. Today, nearly eight centuries on, advances in psychiatry have equipped us with a far more nuanced and sophisticated, albeit persistently incomplete, understanding of how the human mind works, and with that, the ability to undertake more nuanced and sophisticated analyses of the effect of different mental disorders on moral and legal culpability. As a result, the *factual* inquiry in cases involving such defendants has become far more complex. Proof of the existence of a mental disorder, for instance, often involves adducing expert testimony from psychiatrists on, amongst other things, diagnoses of any mental disorders that the defendant suffers from and how these might have impaired his judgment,[8] with corresponding nuance in the legal consequences that might

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6 J Higgins, "The Origins of the Homicide Act 1957" (1986) 12 Journal of Medical Ethics 8 ("Higgins") at p 9, citing Bracton, Woodbine ed, *De legibus et consuetudinibus Angliae* (Yale University Press, 1915).

7 Higgins at p 8: "The disposal at this time was therefore, first a decision by a jury, who knew the defendant well, and that he was insane, followed by a royal pardon and exemption from punishment".

8 See *Ho Mei Xia Hannah v PP and another matter* [2019] 5 SLR 978 at [38], where the Court noted that "[a]ssessing the extent and nature of an alleged contributory link between an offender's mental condition and the commission of the offences *invariably* requires that the court consider the expert opinion of a psychiatrist" [emphasis added].

attach to that defendant.[9]

11. Putting advances in *existing* science aside, the advent of completely *new technologies* – which concern *novel* science and create entirely new spheres of knowledge – is another engine of technical complexity. Take, for example, the leaps that science has made in the fields of biogenetics. These have opened the doors to entire fields of new technological possibilities, such as genetic modification and cloning; and with them, minefields of thorny ethical and legal issues.[10] Likewise, our increasing reliance on artificial intelligence and computer algorithms for decision-making seems yet another potential source of technically and legally complex questions. With computer algorithms, for instance, there are on the one hand *deterministic* algorithms, which produce output according to a programmed, pre-determined path,[11] and for which legal responsibility may therefore be ascribed to a human programmer, and on the other hand, *non-deterministic*, machine learning algorithms capable of autonomously developing their own decision-making processes, which present a litany of potential

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9 See section 84 of the Singapore Penal Code (Cap 224, 2008 Rev Ed). For example, the difference between *cognitive* impairment, which affects one's ability to tell right from wrong, and *volitional* impairment, which affects one's ability to control or choose her actions

10 Some years ago, the Singapore Court of Appeal heard an appeal concerning a claim for damages arising from an in-vitro fertilisation procedure gone wrong where the couple involved realised only after the baby had been born that the wife's ovum had been fertilised using sperm from an unknown third party instead of sperm from the husband: *ACB v Thomson Medical Pte Ltd and others* [2017] 1 SLR 918.

11 *B2C2 Ltd v Quoine Pte Ltd* [2019] 4 SLR 17 at [82], defining deterministic algorithms as software which "produces the exact same output when provided with the same input".

complications pertaining to causation, intentionality and remoteness.[12]

12. Our increasing reliance on expert witnesses is a sure sign of the technical complexification of disputes. The technical depth of seemingly simple and everyday disciplines has significantly expanded the scope of matters which require specialised knowledge lying beyond the professional experience of judges and arbitrators. Today, expert witnesses are increasingly called upon to give evidence on a whole range of disciplines, from accident reconstruction to statistics, and even social media.[13]

13. Besides being called upon to give evidence in legal proceedings, experts are also regularly tapped to brief advocates and adjudicators on technically challenging subjects. In the United Kingdom, the Judiciary, in partnership with the Royal Society, publishes primers aimed at getting judges up to speed on the technical aspects of various relevant technologies, including forensic DNA

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12 See Zhao Yan Lee, Mohammad Ershadul Karim & Kevin Ngui, "Deep learning artificial intelligence and the law of causation: application, challenges and solutions" (2021) 30 Information & Communications Technology Law, noting that the "cognitive process of the deep learning AI… is not decipherable. This presents a fundamental legal / constitutional problem for most jurisdictions across the world, where any errors or mistakes made by the concerned AI algorithm, are attributable to none other than itself".

13 In 2017, a US court allowed a *social media* expert witness to testify on how information is disseminated through social media and its potential impact on a person's reputation: Sean Topping, Norton Rose Fulbright Social Media Law Bulletin, "Expert Witnesses May (Still) Be Used in US Litigation to Explain Basic Social Media Use" (31 May 2017): https://www.socialmedialawbulletin.com/2017/05/expert-witnesses-may-still-used-u-s-litigation-explain-basic-social-media-use/. In Singapore, an expert witness was relied on to advance arguments concerning the scope and speed of the onward transmission on social media of defamatory material in a recent case: *Lee Hsien Loong v Leong Sze Hian* [2021] SGHC 66.

analysis.[14] And in Singapore, in the Court of Appeal, we recently convened a "technology tutorial" in an appeal involving highly specialised and technical questions pertaining to a diamond manufacturing process.[15] A written primer on the technical issues was prepared by the parties, after which the parties' experts, in the presence of counsel, orally addressed the court on the technical issues and their significance to the dispute.

14. Some of this pertains to what Professor Mirjan Damaška refers to as the "scientization of proof".[16] This is the observation that testimony derived directly from sensory perception appears to have declined in importance in favour of expert testimony based on scientific methods and analysis. This is so not just because disputes increasingly concern technical issues outside the ordinary experience and expertise of judges and lawyers, but also because we now have access to tools capable of augmenting and even supplanting human sensory perception. We see this, for instance, in motor accident cases where expert

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14 The Royal Society, "Courtroom science primers launched today" (22 November 2017): https://royalsociety.org/news/2017/11/royal-society-launches-courtroom-science-primers/. Similar efforts have been undertaken in Argentina, China, Canada and the US: David Baltimore, "Science primers in the courtroom" (2016) 532 Nature 313.

15 CA/CA 41/2020 and CA/CA 96/2020 (*Ila Technologies Pte Ltd v Element Six Technologies Limited*).

16 Mirjan R Damaška, *Evidence Law Adrift* (Yale University Press, 1997) at pp 143-144, 151: "To consider the future, in the closing years of the twentieth century, is largely to talk about the creeping scientization of factual inquiry. In the wake of stupendous scientific and technological advances made over the past fifty years, new methods of establishing facts have begun to compete with traditional fact-finding… With increasing frequency, then, courts are confronted with complex scientific and technical information… Let there be no mistake. As science continues to change the social world, great transformations of factual inquiry lie ahead for all justice systems."

testimony on perception-reaction timings and frame-by-frame analyses of traffic camera footage are used to supplement (or even to correct) the motorist's account of what transpired.[17] In these ways, the "scientization of proof" seems certain to further complexify the evidential process.

15. And aside from the increasing complexity of proof, the complexification of legal regulations and rules, as seen in the sheer number of laws and regulations that are promulgated, is yet another engine of technical complexity. Professor Richard Susskind wrote nearly 25 years ago that the advent of technology may be driving *regulatory* complexity, a phenomenon he referred to as "hyperregulation". There seem at least two forces driving this. First, the *need* to regulate and address the legal and ethical concerns arising from these new and emerging spheres of activity enabled by technology. And second, the fact that the practical constraints that once existed on the *quantity* and the *complexity* of the law, and the regularity with which it could be changed, have gradually been eroded in this digital age. In other words, technology has enabled the easy creation, revision and dissemination of rules and regulations, and there is a sense that this might at least in part be responsible for the proliferation of regulatory content.[18]

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[17] See, for example, *PP v Tubbs Julia Elizabeth* [2001] 2 SLR(R) 716. The motorist faced a charge of criminal negligence, having knocked over and killed a pedestrian. Expert evidence was led on, amongst other things, the normal perception and reaction time of a driver under those circumstances (see at [12(d)]).

## *B. Evidential complexity*

16. The second aspect of complexity I touch on is *evidential* complexity, which has exploded following the development of technologies that make data cheaper and easier to generate and obtain. This has significantly expanded the universe of potential evidence that advocates and adjudicators alike must consider and review.

17. Moore's Law posits that computer processing capacity will double about every two years.[19] Our appetite for information and data seems to have kept pace with – if not outstripped – that growth in capacity. In 1999, the world generated as much as 1.5 billion gigabytes of data in a year; today, that same amount of data is produced about every 18 hours;[20] and, by 2025, it is estimated that that quantity of data will be created approximately every 5 minutes.[21] The popularity of email and instant messaging have resulted in the creation and

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19 David Rotman, "We're not prepared for the end of Moore's Law" (24 February 2020): https://www.technologyreview.com/2020/02/24/905789/were-not-prepared-for-the-end-of-moores-law/.

20 A 2000 study found that the world produced in 1999 about 1.5 exabytes of unique information: R Devakunchari, "Analysis on big data over the years" (2014) 4 International Journal of Scientific and Research Publications at p 4. By 2018, more than 2.5 quintillion bytes of data – or just over 2 exabytes – were produced every day: Bernard Marr, Forbes, "How Much Data Do We Create Every Day? The Mind-Blowing Stats Everyone Should Read" (21 May 2018): https://www.forbes.com/sites/bernardmarr/2018/05/21/how-much-data-do-we-create-every-day-the-mind-blowing-stats-everyone-should-read/?sh=3a4a6a8460ba.

21 By 2025, the world will create 463 exabytes per day: Amanda Greenwood, Webbiquity, "Big Data: What It Is, Why We Need It, and How to Use It" (19 January 2021): https://webbiquity.com/marketing-technology-big-data-what-it-is-why-we-need-it-and-how-to-use-it/.

archival of an almost exhaustive documentary record of written communication. Even video and audio calls can be recorded and saved. Added to this is the data that is constantly generated by all manner of 'smart' gadgets connected to the 'Internet of Things'.[22] There is also the data about the data – or metadata – such as information as to the size of an electronic file, or when it was created. Today, nearly everything is recorded, almost nothing is deleted, and anything can be shared with anyone with a click or two.

18. The ease with which data can be electronically generated, stored and shared has meant that the volume of potential evidence available is now far beyond anything that existed in the 20th century, when records were predominantly created and stored on paper.[23] This surge of cheaply available information and data has been dubbed the "information explosion" and has driven an increase in the evidential complexity of disputes in at least two ways.

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22 Some forecasts estimate that 'Internet of Things' devices will generate close to 80 zettabytes of data in 2025 (a zettabyte is $10^{21}$ bytes): Eden Estopace, FutureIOT, "IDC forecasts connected IoT devices to generate 79.4ZB of data in 2025 (22 June 2019): https://futureiot.tech/idc-forecasts-connected-iot-devices-to-generate-79-4zb-of-data-in-2025/.

23 Ronald Sackville, "Mega-litigation: towards a new approach" (2008) 27 CJQ 244 ("Sackville") at p 248, citing Judge Shira A Scheindlin, "E-Discovery: The Newly Amended Federal Rules of Civil Procedure" in *Moore's Federal Practice* (2006) at p 2. It is estimated that more than 90% of new information is created in an electronic format: see David Earnest, *et al*, "Four Ways to Sharpen the Sword of Efficiency in International Arbitration", Young ICCA Group Paper: https://cdn.arbitration-cca.org/s3fs-public/document/media_document/four_ways_to_sharpen_the_sword_of_efficiency_yicca_group_paper.pdf at p 28, citing the Sedona Principles, 2nd Edition, "Best Practices Recommendations & Principles for Addressing Electronic Document Production" (2007) at p 1.Electronically-stored information now accounts for 95% of all information stored by businesses in the US: Sackville at p 248.

19. First, it has led to an unprecedented expansion in the scope of the available evidence that could be considered. Evidence may now be found everywhere, whether in the form of message logs, call logs, GPS location data, connections to wireless networks, and the like, so long as one knows where to look and is inclined to look hard enough.[24]

20. Second, advances in technology have effectively removed the physical and logistical limits to the quantity of documents and other evidence that can be produced in court.[25] And the increasing use of eDiscovery, that was intended to ameliorate the problem can instead exacerbate it. One 2011 decision of the US Federal District Court concerned the predicament of a party which had inadvertently taken on the obligation of reviewing and producing some *65 million* documents dredged up by eDiscovery search terms that it had agreed to. The court ultimately relieved the party of its ill-advised agreement, citing concerns over the cost of such an exercise, which would have run into the millions of

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24 The ubiquity of potential electronic evidence is illustrated by the practice of some divorce lawyers in the United States who subpoena electronic toll-booth records in the hope of finding relevant (and potentially incriminating) information relating to the opposing spouse's whereabouts: Richard L Marcus, "E-Discovery and Beyond: Toward *Brave New World* or *1984*?" (2006) 25 Rev Litig 633 at p 659.

25 Information that would once have required reams of paper to print can now be handily stored in thumb-sized drives or even invisibly in the cloud. As early as 1997, one case filed in the Supreme Court of Victoria involved the production of an estimated *1.5 million* electronic documents. It is doubtful if the parties would have been able to assemble such a formidable evidential record were it not for the availability of e-filing technology; indeed, one lawyer involved in the case estimated that the documents would have required approximately *400 metres* of four-level shelving to contain if printed: Olijnyk at p 195, referring to the *Estate Mortgage* case.

dollars.[26] But this illustrates the sheer volume of evidence that adjudicators, counsel and the parties can potentially be called upon to consider.

21. Clearly, technology plays a significant role in the complexification of our disputes. But I do not suggest at all that we should therefore reverse our course on the integration of technology within our legal and judicial processes.[27] Technology, after all, holds tremendous potential in enhancing efficiency and access to justice.

22. My narrower point is that rapid advances in information and communications technology appears to be driving – even supercharging – the complexity of our disputes. If this is right, and the pace of technology's advance is showing no signs of slowing down, then we must expect that our disputes will, over time, only get even more complex. And if we are therefore nowhere near the crest of the wave of complexity, then surely we should at least *begin* to consider the consequences that this emerging reality is likely to have on our justice systems, and what we ought to do about it.

## III. The Consequences of Complexity

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26 Cloudnine, "eDiscovery Case Law: Plaintiff Not Required to Review Millions of Pages of Unallocated Space": https://cloudnine.com/ediscoverydaily/case-law/ediscovery-case-law-plaintiff-not-required-to-review-millions-of-pages-of-unallocated-space, citing I-Med Pharma, Inc v Biomatrix Inc, No 03-3677 (DRD), (DNJ, December 9, 2011).

27 See, for example, Sundaresh Menon CJ, "Technology and the Changing Face of Justice", speech at the Negotiation and Conflict Management Group (NCMG) ADR Conference 2019 (14 November 2019) ("NCMG Speech").

23. I turn to consider these potential *consequences* on our ability to administer justice fairly and efficiently at two levels: (i) first, at the level of the *individual* adjudicator; and (ii) second, at a broader, *systemic* level.

### *A. The individual adjudicator: justice as between the parties*

24. I begin with the impact that complexity has on the quality of individual decision-making, and therefore, on our ability to do justice as between the parties.

25. In a fascinating article, Professor Jörge Risse described the complexity problem in the following way. Consider an arbitration in which 10,000 pages of written submissions are filed. Assuming the arbitrator takes six minutes to read a page, and therefore reads 10 pages an hour; it would take her 1,000 working hours, or, by Professor Risse's reckoning, some *six months* of concentrated reading just to read the submissions *once* through.[28] And this does not account for the time she would need to refresh her memory of what had been read perhaps weeks or months earlier, to verify what had been said against the mountain of transcripts and documents, and to weigh it all against the equally hefty material on the other side before coming to a decision.

26. Professor Risse's point is that the demands that complex cases like these

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[28] Risse at pp 292-293: On the footing that many major law firms tend to expect 150 billable hours per month from their lawyers, Professor Risse calculates that 1000 "billable" working hours would amount to six months of work.'

place on the adjudicator are next to impossible to meet. This is not for want of trying or lack of competence; the reality is that there are physical limits to our ability to process voluminous amounts of complex information. We can try to stretch those limits, but there will come a point where the quantity or difficulty of the material exceeds that which the human brain can properly process. What happens thereafter is what psychologists call "information overload",[29] and studies have found that this may have at least three consequences for decision-making.

27. The first is that the difficulty and quantity of the evidence in complex cases can render it extremely difficult to understand, as Professor Risse's examples show. There is some evidence that judges do in fact feel this way about complex litigation. Speaking extra-judicially, a former judge of the Federal Court of Australia observed that "*[o]ne of the problems with [complex cases] is the feeling… that it is big, and that it can't be mastered*".[30] This is a very real problem. To decide a case, the adjudicator must be able to follow the evidence and understand it, in order to be able to weigh it and forensically assess it. Extreme complexity threatens the adjudicator's ability to do each of these things

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29 See, for a quick overview, Interaction Design Foundation, "Information Overload, Why it Matters and How to Combat It": https://www.interaction-design.org/literature/article/information-overload-why-it-matters-and-how-to-combat-it.

30 Olijnyk at pp 34-35. As part of her study, Dr Olijnyk conducted interviews with former judges on their experiences dealing with what she terms "mega-litigation". The source of the first quote cited is Robert McDougall of the New South Wales Supreme Court. The source of the second quote is Malcolm Lee QC, a former Federal Court judge.

properly such that the biggest cases may become *impossible* to humanly comprehend, much less decide.

28. The second consequence of information overload is that decision-makers may become more prone to error. When useful and relevant information is buried in a mass of other information, that increases the chance that the relevant information is overlooked.[31] Take, for instance, electronic health records (or "EHRs"). These provide physicians with quick and easy access to a wealth of detailed information on the patient, ranging from past test results to detailed medical histories. In the belief that greater access to relevant information would increase the quality and efficiency of clinical decision-making, much was invested into developing EHR systems in hospitals and clinics in the United States. Yet, several studies have found that EHRs have failed to meet those objectives, and worse, they might even be contributing to errors in clinical decision-making.[32] For instance, one 2013 study found that over a third of physicians reported that they had missed test results while looking at the EHR system because they were "simply overwhelmed by the amount of information

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31 See Jonathan B Spira, *How Too Much Information is Hazardous to Your Organization* (Wiley, 2011) ("Spira") at p 103, noting that "when something is harder to find, our accuracy in identifying it drops significantly".

32 Lauren F Laker, *et al*, "Quality and Efficiency of the Clinical Decision-Making Process: Information Overload and Emphasis Framing" (2017) 27 Production and Operations Management 2213 ("Laker") at p 2214.

[there]".[33]

29. Other studies have found that information overload can decrease the accuracy of decision-making in many other contexts, from detecting dangerous items at a baggage check,[34] to making purchasing decisions in a supermarket aisle.[35] What these studies demonstrate is that the *most*-informed decision may not necessarily be the *best*-informed decision. The availability of relevant information is a crucial ingredient in good decision-making, but an *overload* of information, even *relevant* information, can result in poor decision-making.

30. Judicial decision-making is of course different in many important respects.

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33 See Laker at p 2214, citing a study that found that "over one-third of physicians reported missing test results in an HER system because they are simply overwhelmed by the amount of information contained in these systems", thus highlighting a "significant problem facing physicians today: information overload": citing Singh H, *et al*, "Information overload and missed test results in electronic health record-based settings" (2013) 173 JAMA Internal Medicine 702.

34 In one study, subjects looked at X-ray scans of checked baggage and tried to identify the presence of guns and knives. In the first trial, a gun or knife was present in 50% of the bags, and subjects missed the weapons only 7% of the time. In the second trial, guns and knives were in only 2% of the bags, and the subjects missed the weapons 30% of the time. The conclusion drawn was that when something is harder to find, perhaps because relevant results are buried in a mass of irrelevant results, our accuracy in identifying it drops significantly: Spira at p 103.

35 Jacob Jacoby, Donald E Speller and Carol Kohn Berning, "Brand Choice Behavior as a Function of Information Load: Replication and Extension" (1974) 1 Journal of Consumer Research 33 ("Jacoby"), finding that consumers who were provided with more information felt more satisfied and less confused, but made poorer decisions than did consumers given less product information; and that providing substantial amounts of package information can result in poorer purchase decisions. Research subjects were asked to rank pre-packaged rice dinner product characteristics (*eg*, price, container size, nutritional components) according to those characteristics most important to them, and later asked to select the "best" product out of a range of options, given information as to the various product characteristics. The accuracy of the subjects' decision-making was assessed in relation to their stated preferences.

Unlike physicians, for whom decisions might have to be made in the span of minutes or even seconds, judges and arbitrators will *generally* have more time to make a more considered decision. But judicial decision-making can also be more complex, and I do not think that we have any basis for thinking that judges and arbitrators will somehow be immune to the effects of information overload.

31. A third, related consequence of information overload is that decision-makers, especially when pressed for time and overwhelmed by data, may come to rely more heavily on heuristics and mental shortcuts. Human beings have an inherent need to simplify the complex world around them, and we do so every day through cognitive heuristics.[36] These mental shortcuts help us filter out some things and focus on others and they are essential to navigating the avalanche of information with which we are bombarded each day. But the problem with the mental frames we adopt is that they can also distort reality.[37]

32. One study found that jurors faced with complex cases tended to take mental shortcuts to reduce the cognitive load of the decision, for instance, by assessing the merits of a position based on the attractiveness of the communicator, or the communicator's credentials, or the *number* of arguments

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36 Paul JH Schoemaker, "Forecasting and Scenario Planning: The Challenges of Uncertainty and Complexity" in Derek J Koehler & Nigel Harvey, eds, *Blackwell Handbook of Judgment & Decision Making* (Blackwell Publishing, 2004) ("Schoemaker") at p 278.

37 Schoemaker at p 278.

rather than their quality.[38] Other studies, albeit not in the context of *judicial* decision-making, have found that decision-makers tended to react to "too much" information by ignoring a lot of it.[39] In short, when faced with more information than we can evaluate in an allotted time, human decision-makers tend to try and find various ways to get by, thereby compromising the quality of the decision-making involved.[40] And this can be a dire concern in adjudication where accuracy is surely greatly valued.

33. Judges and arbitrators are of course trained to resist such impulses, but these mental frames can operate subconsciously, and may influence our decision-making without our even realising it.[41] This, I think, is the real danger we face in pushing ourselves beyond the limits of human cognitive capacity. For when confronted with an extremely difficult or even impossible case, the natural

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38 Joseph Sanders, "Scientifically Complex Cases, Trial by Jury, and the Erosion of Adversarial Processes" (1998) 48 DePaul Law Review 355 at pp 363-364.

39 See Jacoby at p 40. One study observed that students, having pulled up hundreds of articles in response to a Google search, often simply print out the first several articles – making no effort to evaluate their quality: David M Levy, "Information Overload" in Kenneth Einar Himma and Herman T Tavani, eds, *The Handbook of Information and Computer Ethics* (New Jersey: John Wiley & Sons, 2008) ("Levy") at p 510. "A choice which involves… many comparisons is likely to be regarded as hopelessly complex. When a choice is that difficult, there may be a tendency to give up trying to compare the alternatives. Instead, the choice may be made impulsively."

40 Levy at p 510. See also Jeffrey J Rachlinkski, "Heuristics, Biases, and Governance" in Derek J Koehler & Nigel Harvey, eds, *Blackwell Handbook of Judgment & Decision Making* (Blackwell Publishing, 2004) ("Rachlinski") at p 568.

41 Astrid Groenewegen, "Kahneman Fast and Slow Thinking Explained": https://suebehaviouraldesign.com/kahneman-fast-slow-thinking, explaining Daniel Kahneman's concept of fast and slow thinking in *Thinking, Fast and Slow* (Farrar, Straus and Giroux, 2011).

(and seemingly noble) thing to do is not to give up, but to do one's best and soldier on. But in doing so, and though we may not realise it, we run the risk that because of the complexity of the material we cannot properly grasp it; that we miss important issues in the deluge of evidence and argumentation; that forensic analysis and logic give way to heuristic biases, and consequently, that decision-making devolves into what is, at best, informed guesswork.

34. I suggest that those of us who hold a stake in our systems of justice must be alive to these possibilities. The old assumption that the most-informed decision is necessarily the *best*-informed decision needs to be reconsidered. In a world where impossibly large quantities of evidence can be obtained and adduced cheaply, the most valuable commodity in a court or tribunal may no longer be information, but adjudicative *time, focus and attention*. Inundating adjudicators with evidence, even conceivably *relevant* evidence, may serve to hinder rather than help them decide the case justly if they just cannot make sense of the flood of material.

### *B. Our justice systems: public justice and efficiency*

35. I turn to the second point on the consequences of complexity – which is its impact on our *systems* of justice.

36. I have argued that extreme complexity can, in some cases, make it impossible or at least very difficult for the adjudicator to properly decide the dispute and therefore do justice as between the parties. Yet, one might argue

that *impossibly* complex cases are rare, and that the vast majority of complex cases can be resolved, if only the requisite time and effort were put into resolving them. Leaving aside the correctness of this premise, let me make two points.

37. First, even those complex cases which are not impossible but merely very *difficult* to adjudicate will place an increasingly unsustainable strain on the system as a whole because adjudicative resources are limited. This may take various forms.

(a) First, there is the financial cost. In the *Bell Group* litigation, additional funding in excess of $4m had to be provided solely to handle the *appeals*. Such expenses carry heavy opportunity costs. Discussing the *Bell Group* appeals, the then-Chief Justice of the Supreme Court of Western Australia remarked in an interview some years later that electronic filing could have been introduced for a fraction of the amount spent dealing with those appeals.[42]

(b) Then, there is the systemic cost in terms of judicial time. During the life of a complex case, the judge in charge will usually have very little time for other matters, and this reduces the aggregate amount of judicial time

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[42] Olijnyk at p 43. In a subsequent interview, the then-Chief Justice of the Western Australia Supreme Court, Chief Justice Wayne Martin, remarked that the injection of funds for the *Bell Group* appeal was "money that I could have spent very usefully elsewhere in this system. For example … for a fraction of that we could have got full electronic filing."

available across the system, for other cases and litigants.[43] This is true not just for the duration of the trial, but also the usually lengthy pre-trial process, and the considerable time that will be needed to write the judgment. In this way, a single complex case may displace many hundreds of other smaller matters, thus becoming an impediment to access to justice for the numerous others who must, as a result, wait in the queue.

(c) And there is, also, the personal toll that complex cases take on adjudicators. The prolonged stress, isolation and the weight of responsibility that adjudicators shoulder when dealing with such cases should not be underestimated.[44] This affects not just the individual adjudicator, but can also have system-wide effects if judicial burnout leads to the early retirement of experienced adjudicators,[45] thus further compounding existing shortages of such resources.

38. In sum, complexity can result in real costs being imposed on our justice

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43 Olijnyk at p 44, citing Justice Steven Rares, "What is a Quality Judiciary?" (2011) 20 Journal of Judicial Administration 133 at p 143: "[I]f these enormous cases continue to enter the court system, judges will become dedicated, sometimes for years, to hearing them while other litigants must wait for that case to be decided before the judge will become available again for other work".

44 Olijnyk at p 42: As Justice Neville Owen, who spent over five years devoted almost exclusively to the *Bell Group* litigation, recalled in a subsequent interview: "You get this feeling of oppression, that you're locked in and you can't escape. … You're there, you're trapped, there's no way out, you've just got to finish it."

45 See Olijnyk at p 42, noting that one interview participant had said that one of the biggest challenges of hearing mega-litigation was "not to burn out".

systems, even where that complexity does not cross the notional threshold of *impossibility* in the individual case.

39. Beyond these costs to the system, there is a second, more fundamental reason why we must consider the consequences of complexity. Even if one takes the view that complexity is not *yet* of existential concern to our justice systems, that cannot mean that we should wait until it has become so. If, as I have argued, complexity is hitched to the inexorable advance of science and technology, then we must expect that the category of complex cases will continue to grow, and that these cases will become ever more complex. There are already examples of such cases, and we should surely consider how we might best address them *before* they impose a debilitating burden on our justice systems.

## IV. Looking Ahead: Reimagining our models of justice

40. Let me pause to take stock of what we have covered.

(a) We began by discussing the sources of complexity in modern dispute resolution. I argued that technical and evidential complexity has largely been driven by advances in science and technology. Those driving forces are not slowing down, and this must mean that complexity is likely to increasingly feature in dispute resolution. In short, the complexity problem is set to get worse.

(b) We then examined the consequences of complexity. I argued that, at a *systemic* level, complexity can place a heavy strain on adjudicative resources, while at the level of the *individual adjudicator*, the complexity problem in some cases is threatening our ability to properly and fairly decide such disputes.

41. Together, these present what one might call a problem of *finite limits*: there are finite limits to the adjudicator's cognitive ability to understand and grasp complex issues and evidence; and there are finite limits to the resources that can be allocated to dispute resolution. We can try to *stretch* those limits, but, taken together, it seems likely that it will only be a matter of time before the degree of complexity reaches the *absolute* limits of what our justice systems can accommodate.

42. This has, I suggest, two implications at least for how we think or ought to think of the way forward. First, it means that responses which focus on stretching those limits cannot offer a lasting response to the complexity problem. Take, for example, tools and techniques which improve the *efficiency* of legal proceedings, such as encouraging the use of written statements,[46] setting strict procedural timetables,[47] and employing the use of videoconferencing or other

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[46] See Olijnyk at p 178.

[47] ICC Commission on Arbitration and ADR, Commission Report, "Controlling Time and Costs in Arbitration" (2007): https://iccwbo.org/content/uploads/sites/3/2018/03/icc-arbitration-

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remote methods of hearing,[48] to name a few. These are undoubtedly helpful, but they can only take us so far. The use of Scott Schedules, for instance, make the parties' cases easier to digest, and may, in this way, stretch the limits of the quantities of evidence and arguments that an adjudicator may reasonably be expected to consider. But they cannot make an *indigestible* case digestible; a case so voluminous that it must be presented in thousands of rows in a Scott Schedule is not ultimately more manageable than if it had been presented in thousands of paragraphs of prose. The point is that while such techniques can help expand our limits, these can at best offer only a *part* of the answer.

43. My contention is that the problem is more fundamental, and seems rooted in certain longstanding beliefs we have held about what justice entails, and therefore, what the role of the adjudicator ought to be. In particular, I argue that the problem stems from the assumption that justice requires, in every case, a *full and exhaustive* determination of the facts, and that the role of the adjudicator is, therefore, to *determine the truth* without compromise. Such a paradigm of justice may have served us well in an earlier, simpler time. But the complexification of disputes has raised serious questions as to whether it remains desirable or indeed *feasible* to insist that justice always and invariably

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commission-report-on-techniques-for-controlling-time-and-costs-in-arbitration-english-version.pdf ("ICC Commission Report") at pp 10-11.

[48] ICC Commission Report at p 14.

requires, in each case, an exhaustive search for the truth.

44. This brings me to the final part of my lecture, in which I offer some thoughts on a way forward. We might view this in terms of a need for change on three broad fronts.

(a) First, a large part of this will require a change in *philosophy*. I suggest we need to shift our approach to the resolution of complex disputes by moving from a narrower view of justice as always requiring an exhaustive search for the truth, to one which pursues the more realistic objective of facilitating the fair and orderly resolution of the dispute.

(b) The second is *procedure*. This will entail embracing processes and practices which can help *contain* the dispute wherever possible, and to *downsize* it where necessary.

(c) The third concerns *people* and it involves equipping adjudicators with due awareness of the unique challenges that extreme complexity poses and arming them with the skills and knowledge that they will need if they are to address these challenges.

### *A. Philosophy*

45. Let me begin with *philosophy*, by which I mean our *real* quest in the resolution of complex disputes. Doing justice, it has been said, means applying

the substantive law correctly to *true* findings of fact.[49] This is the essence of our traditional, adjudicative conception of justice, under which disputes are decided by an independent third party, bound to apply the law to the facts. Because the facts are often disputed, the role of the adjudicator, as Lord Denning had put it, "*is to find out the truth, and to do justice according to law*".[50]

46. Over time, this seems to have given rise to the assumption that the principal aim of adjudication is a search for the truth. Justice Peter Cory of the Supreme Court of Canada put it in these terms, "*[t]he ultimate aim of any trial, criminal or civil, must be to seek and to ascertain the truth*".[51]

47. Accuracy in judicial decision-making is undoubtedly important. After all, public confidence in any system of justice depends in part on its ability to produce accurate decisions that cohere with the law and the objective facts. But important as accuracy is, I am not sure that this fully supports the claim that justice *invariably and uncompromisingly* requires a full and exhaustive determination of the facts. Let me illustrate this with two points.

48. The first is a point of practicality. While a "truth-seeking" paradigm of justice may have worked well in earlier times, the complexity of modern disputes raises

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49 Ho Hock Lai, *A Philosophy of Evidence Law: Justice in the Search for Truth* (Oxford University Press, 2008) ("Ho") at p 69.

50 *Jones v National Coal Board* [1957] 2 QB 55 at p 63, cited in Ho at p 69.

51 *R v Nikolovski* [1996] 3 SCR 1197 at p 1206 per Cory J, cited in Ho at p 52.

questions as to whether it remains feasible to insist on that defining objective. The claim of the complexity problem is that it will, in some cases, be either impossible or impracticable for us to fully and accurately achieve this end. Consider, for instance, a claim for damages in respect of thousands of defects in road works performed by a contractor. A "truth-seeking" paradigm of justice would require that each defect be individually verified and documented in evidence. Yet the cost of investigating, documenting and eventually particularising a claim in respect of each defect may end up exceeding the cost of rectifying them. That cannot, on any measure, be considered a *just* outcome.

49. And the second is a point of principle. While the *accuracy* of judicial and arbitral decisions is a worthy and important goal, that seems on its own to be an *incomplete* conception of what justice is and requires. The search for truth must be and often is balanced against *other* values.

(a) We see this in action in various contexts. Take for instance the operation of the rules on legal professional privilege, which restrict the disclosure of potentially relevant and probative evidence in order to protect the sanctity of and candour within the solicitor-client relationship.[52]

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[52] Jimmy Yim SC, "Developments in Legal Privilege – A Review of the Decisions in *The Three Rivers* Case" (May 2005): https://v1.lawgazette.com.sg/2005-5/May05-feature1.htm.

(b) The search for truth must also be balanced against considerations of efficiency. Most jurisdictions, including the United Kingdom and the United States, expressly recognise this in their civil procedure rules. The very first provision in the UK Civil Procedure Rules, for example, states that the "*overriding objective*" of procedure is to enable the court to deal with cases "*justly and at proportionate cost*".[53] The same is true for arbitration. Article 22(1) of the 2021 ICC Rules obliges both the tribunal and the parties to "*make every effort to conduct the arbitration in an expeditious and cost-effective manner, having regard to the complexity and value of the dispute*".[54] These provisions are clearly intended to be more than aspirational; Article 38(5) of the ICC Rules permits the tribunal to take this "efficiency obligation" into account when making decisions on costs.[55]

50. And so, an exhaustive search for the truth is by no means an overriding, uncompromising imperative of justice. In fact, an insistence on such proof might, in certain contexts, be *inappropriate*. For example, an exhaustive investigation into the truth might not be appropriate in the context of *family* justice if it succeeds only in increasing the acrimony between the divorcing spouses to the

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53 UK Civil Procedure Rules, r 1.1. Likewise, section 37M of the Federal Court of Australia Act 1976 provides that one of the "*overarching purpose[s]*" of civil procedure is to facilitate the resolution of disputes "*as quickly, inexpensively and efficiently as possible*": as cited in Olijynk at pp 115-117.

54 ICC Arbitration Rules 2021, Art 22(1).

55 ICC Arbitration Rules 2021, Art 38(5).

child's detriment.[56] This realisation has actually reshaped our philosophy and approach towards family justice from one geared to fact- and fault-finding to one that is directed towards healing and constructive collaboration.

51. The broader point is that justice is not amenable to procrustean definition; what it entails and therefore requires in each case depends on *context*. Accuracy is an important aspect of justice, and adjudication will, to a considerable extent, be concerned with ascertaining the truth. But an *exhaustive* search for truth is not always essential, and may in fact sometimes be inappropriate.

52. Yet if adjudication is not a search for the truth, then what is it? I suggest that we are already seeing a shift toward a more holistic view of what it means to adjudicate disputes – one that welcomes the use of legal processes which have as their end not just the determination of the truth, but the resolution of the dispute in a manner that is fair and acceptable to the parties; and that embraces procedures which, whilst not as thorough, are nonetheless capable of producing reasonably accurate and broadly acceptable decisions more quickly and at far lower cost.

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[56] See Sundaresh Menon CJ, "Through the Eyes of a Child", speech at the 8th Family Law & Children's Rights Conference: World Congress 2021 (12 July 2021), observing that the fundamental pursuit of family justice, especially where children are involved, should not be a single-minded inquiry into who is in the right and ought therefore to win.

## *B. Processes*

53. The leads me to the second front of change, which pertains to the *processes* and *procedures* by which disputes are resolved. There are a number of legal processes and procedures which embody the new ethos of dispute resolution I have just outlined. On a previous occasion,[57] I have suggested that these may be categorised in terms of two broad strategies we might take to deal with the challenges of complexity in dispute resolution: (i) first, *containing* disputes; and (ii) second, *downsizing* them.

### i. Containing Disputes

54. The first strategy involves containing disputes *before* they become too large and complex to handle. This lends itself best to dealing with seemingly large disputes which are in reality not much more than the sum of their smaller, discrete parts. Such disputes are complex not because they involve any particularly technical subject matter or require the resolution of interlocking and interrelated issues. Disputes of this kind *become* large and complex mainly because the resolution of their individual parts was not promptly pursued. Here, there may be considerable scope for the adoption of procedures which offer a truncated or much streamlined process capable of producing a "good enough"

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57 Sundaresh Menon CJ, "The Role of Commercial Courts in the Management of Complex Disputes", speech at the 7th Annual Conference of the International Academy of Construction Lawyers (9 April 2021) ("IACL Speech") at paras 12-20.

decision much more quickly and cheaply, so as to nip incipient disputes in the bud instead of leaving them to fester and grow and assume unmanageable size. I can outline three such procedures.

(a) Dispute boards are the embodiment of this sort of process, and their use has been gaining traction in construction projects, particularly in North America.[58] They involve the establishment of a standing panel of neutrals, whose task it is to prevent disputes from arising and escalating by proactively identifying potential differences and disagreements with a view to resolving these quickly and informally, whether by mediating the dispute, or by issuing a non-binding or temporarily-binding decision.[59] There is some statistical evidence to suggest that dispute boards are a cost-effective means of containing such disputes. Various surveys indicate that in 60% of the projects for which a dispute board was empanelled, no disputes crystallised;[60] and where they *did*, more than 90% of matters

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58 IACL speech at para 14, citing Robert Gaitskell, Speech at the Society of Construction Arbitrators Annual Conference 2005, "Current Trends in Dispute Resolution – Focus on ICC Dispute Resolution Boards" (14 May 2005) ("Gaitskell") at paras 8.5-8.6. See also Arcadis 2020 Global Construction Disputes Report ("Arcadis 2020") at pp 20 and 23.

59 IACL speech at para 14, citing Gaitskell at paras 8.1-8.3.

60 IACL speech at para 14y, citing Thomas J Stipanowich, "Managing Construction Conflict: Unfinished Revolution, Continuing Evolution" (2014) 34 The Construction Lawyer ("Stipanowich") at fn 42, citing Carol Menassa & Feniosky Pena Mora, "Analysis of Dispute Review Boards Application in US Construction Projects from 1975 to 2007" (2010) 26 J Manage Eng 65, stating that more than 90% of cases heard by dispute review board panels settled in the wake of panel recommendation, and that no disputes were ever heard by the panel in 50% of projects; see also Michael Patchett-Joyce, "Specialist Techniques for Construction Dispute Resolution: How Many Ways Can the Cat Be Skinned?" (2017) 4

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referred to the board were settled without the need for further recourse to litigation or arbitration.[61] And this is all accomplished at relatively low cost – on average, for just a *fraction* of a percentage point of the overall project costs.[62]

(b) Statutory adjudication has also seen considerable success in a number of jurisdictions, most notably in the United Kingdom, where it has become the most common dispute resolution method for construction disputes.[63] Adjudication offers the parties a "rough and ready" means of obtaining a decision more quickly and cheaply, with a considerably streamlined evidentiary process.[64] While adjudication produces decisions that are only temporarily binding, the experience suggests that in most cases the

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BCDR International Arbitration Review 73 ("Patchett-Joyce") at p 84, noting that one survey found that in 60% of projects with a dispute board, no dispute was experienced.

61 IACL speech at para 14, citing Gaitskell at para 8.4, which notes that "[e]xperience shows that Dispute Boards are successful, that is, they deal with and finally dispose of virtually all the disputes that come before them. Broadly, it seems that something in the order of 97% of disputes referred to a DB will not go beyond that procedure into arbitration or litigation". See also Ann McGough, Dispute Resolution Board Foundation, "Growth of Dispute Boards Around the World: DRBF Database", stating that over 98% of matters going to a dispute board do not go on to later arbitration or litigation.

62 See Patchett-Joyce, referring to a DRBF survey indicating that dispute boards cost, on average, about 0.15% of overall construction costs. See also Gaitskell, noting that some practitioners calculate that dispute boards generally cost in the order of 0.2% of project costs.

63 IACL Speech at para 13, citing Arcadis 2020 at p 18.

64 IACL Speech at para 13, citing Thomson Reuters Practical Law, "Adjudication: A quick guide": <https://uk.practicallaw.thomsonreuters.com/8-381-7429?transitionType=Default&contextData=(sc.Default)&firstPage-true>.

decision is treated as final and is not subsequently challenged by the losing party.[65]

(c) Mediation too deserves mention. It has in recent years been increasingly used to *complement* adjudicative methods of dispute resolution. In the 2021 International Arbitration Survey, close to 60% of respondents expressed a preference for using arbitration *in combination with* other forms of ADR such as mediation to resolve cross-border commercial disputes. Significantly, this represented a significant increase over the 49% and the 34% who held that view in the 2018 and 2015 surveys respectively.[66] As the cost of arbitrating complex disputes continues to rise, the popularity of international commercial arbitration will likely wane, and I believe that international commercial mediation might well, in time, take its mantle as the preferred means for resolving cross-border commercial disputes.[67] And the Singapore Convention on

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65 IACL Speech at para 13, citing Gaitskell at para 7.2; Rashda Rana, "Is Adjudication Killing Arbitration?" (2009) 75 The International Journal of Arbitration, Mediation and Dispute Management 223 at p 226; John Uff, "Dispute Resolution in the 21st Century: Barriers or Bridges?" (2001) The International Journal of Arbitration, Mediation and Dispute Management 4 at p 15: "The availability of an impartial 'first round' decision will usually be sufficient to deter further more costly disputes"; Jackson J, "Address by Jackson J to TECBAR, TeCSA and SCL (2005) 21 Construction Law Journal" 265 ("Jackson") at p 271.

66 Sundaresh Menon CJ, "Setting the Stage for Mediation's Golden Age", speech at the India-Singapore Mediation Summit (17 July 2021) at para 21 ("Mediation's Golden Age"), citing the 2021, 2018 and 2015 editions of the Queen Mary University of London International Arbitration Surveys.

67 Mediation's Golden Age at para 12. This is true not just for the resolution of our most *complex* cases, but also of those on the other end of the spectrum – high-volume, low-complexity and low-value disputes such as consumer disputes of the sort commonly dealt

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Mediation, which provides for the international enforceability of mediated settlements, will undoubtedly boost mediation's prospects in the years to come.[68]

55. Procedures like these may not allow for as thorough a fact-finding process as a full-blown trial or arbitration. But their growing popularity, even in the resolution of construction disputes – for which complexity is a common, if not *definitional* feature[69] – seems a validation of the view that justice is sometimes better served by procedures which favour speed and economy over an exhaustive search for the truth.

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with by Online Dispute Resolution (or "ODR"). Such platforms commonly integrate assisted negotiation or mediation with a truncated adjudicatory process, facilitated by predictive technologies. Predictive tools have been used in mediation, for instance, not to decide where the truth lies, but to assist with assessing the needs and interests of each party, and then with helping parties discover their best and worst alternatives to a negotiated agreement (or BATNA and WATNA): see Jeremy Barnett & Philip Treleaven, "Algorithmic Dispute Resolution – The Automation of Professional Dispute Resolution Using AI and Blockchain Technologies" (2018) 61 The Computer Journal 399 at p 406. Similar platforms exist for the mediation of matrimonial disputes; Amica, a programme developed with the support of National Legal Aid of Australia and the Legal Services Commission of South Australia, advises on property distribution in Australian matrimonial disputes, and includes a machine learning algorithm that provides a suggested division of the matrimonial assets: John Zeleznikow, "Using Artificial Intelligence to provide Intelligent Dispute Resolution Support" (2021) 30 Group Decision and Negotiation 789 at p 798.

68 Mediation's Golden Age at paras 14-15. The SCM already counts 55 signatories, and entered into force just last year: UNCITRAL, "Status: United Nations Convention on International Settlement Agreements Resulting from Mediation": https://uncitral.un.org/en/texts/mediation/conventions/international_settlement_agreements/status.

69 See IACL Speech at para 4, citing the 2019 Queen Mary University of London International Arbitration Survey titled "Driving Efficiency in International Construction Disputes" at p 10, stating that "factual and technical complexity", "large amounts of evidence" and the presence of "multiple claims and/or multiple parties" were selected by respondents as the most defining features of international construction arbitration.

### ii. Downsizing Disputes

56. A strategy of containment works well when applied *early* in the life of a dispute. But where the dispute has already become so complex as to be practically unmanageable, a different, more drastic approach may be appropriate to aggressively *downsize* the dispute to a more manageable size.

57. This might be done by placing firm limits on document disclosure, written submissions, time for oral submissions, and even on the time for *cross-examining* witnesses,[70] or by encouraging the use of preliminary determinations, which can help to significantly narrow the list of issues in dispute.[71] Measures like these may initially draw cries of a breach of natural justice. But the question we should ask ourselves is whether justice really is better served by doing away with such limits and allowing the adjudicators to be inundated with evidence and submissions that we cannot reasonably expect will be exhaustively reviewed, understood and evaluated. If some disputes are becoming so large and

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70 *Idoport* at [75], cited in Olijnyk at p 181. Mid-way through the trial, the trial judge, Einstein J, announced his intention to place strict limits on cross-examination for the remainder of the trial. This was justified on the basis that were the limits not imposed the cross-examination of 160 witnesses would have consumed some 3.8 years of court time, on Einstein J's reckoning.

71 Francis Hornyold-Strickland & Duncan Speller, Kluwer Arbitration Blog, "Preliminary Determinations – Path to Efficiency or Treacherous Shortcut?" (21 April 2016): https://arbitrationblog.kluwerarbitration.com/2016/04/21/preliminary-determinations-path-to-efficiency-or-treacherous-shortcut. This might be facilitated by the practice sometimes adopted in arbitration of shifting the parties' opening *prior* to the main hearing – referred to by some as the "Kaplan Opening" – which allows the tribunal to gain a better understanding of the case sooner, which facilitates its preparation: see Neil Kaplan, "If it Ain't Broke, Don't Change It" (2014) 80 Arbitration 172.

complex, it is perhaps better we *acknowledge* that reality and consider what can be done about it, instead of imagining that they are being dealt with exhaustively when they perhaps aren't.

58. And if we accept this, we might consider other, more radical means of downsizing these disputes. One such method entails the use of representative sampling.[72] In a dispute involving thousands of defects, it may be practically impossible to insist on proof of each and every defect. In recognition of these difficulties, some have considered an approach where the result obtained in relation to a smaller, representative sample may be extrapolated to the wider set.

59. This was considered by the English High Court in *Amey LG Limited v Cumbria County Council*.[73] There, the Council claimed damages against a roadworks contractor for thousands of defects in patching and surfacing works. The Council's claim was advanced on the basis of a sample set of the works revealing a certain rate of defects, which, it argued, could be extrapolated to the whole of the works. While the damages in respect of the sample were worth some £22,000, that figure would rise to £1.69m if extrapolated to the entire works. The larger claim was ultimately dismissed on the basis that the sample evidence was found to be insufficiently representative, but the significance of

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72 IACL Speech at para 17.

73 [2016] EWHC 2856 (TCC) ("*Amey*").

the decision perhaps lies in the Court's acceptance, at least *in principle*, of the Council's argument that the substantial quantities of patching and surfacing works made it "completely impractical" for the employer to have inspected each and every item of work.[74]

60. Another way in which disputes may be downsized is by the adoption of voluntary protocols under which the parties agree to carve out a set of "excluded" individual low-value claims in respect of which recovery is pegged to the percentage eventually recovered in respect of the remaining "non-excluded" claims. Such a protocol is available for use in cases placed on the Singapore International Commercial Court's Technology, Infrastructure and Construction List,[75] and may help to further disaggregate an otherwise unmanageable dispute such that it is only the *crux* of the issue that is dealt with in exhaustive detail.

61. And a further, and perhaps even more radical way in which disputes may come to be downsized is through the use of outcome prediction tools which can support legal decision-making in various ways. Magistrates dealing with bail applications, for instance, often have to dispose of a high volume of matters

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74 *Amey* at 1.23.

75 Singapore International Commercial Court, "The Technology, Infrastructure and Construction List": https://www.sicc.gov.sg/guide-to-the-sicc/the-technology-infrastructure-and-construction-list. See, in particular the Simplified Adjudication Process Protocol, which streamlines the resolution of smaller-value claims in cases containing a large number of distinct claims: available at: https://www.supremecourt.gov.sg/docs/default-source/default-document-library/2021-08-024---sicc-practice-directions-full.pdf#page=267.

within a short period of time, and some US courts have employed predictive tools which assist the human decision-maker by providing an indicative assessment as to the likelihood that a bailee would abscond or re-offend, based on algorithms developed from datasets comprising hundreds of thousands of cases.[76] Similarly, e-commerce dispute resolution platforms – such as the eBay Resolution Center, which sees over 60 million disputes each year – face the challenge of having to deal with an extraordinary volume of cases quickly. The development of tools and algorithms able to predict the outcomes of such cases, and so assist human agents in adjudicating such cases more quickly, is already underway.[77] There are, of course, technical and ethical limitations to the use of such programs for legal decision-making,[78] and these limitations will have to be

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76 See Arnold Ventures' Public Safety Assessment tool, which identifies nine factors, narrowed down from hundreds, that most effectively predict the likelihood of successful pre-trial outcomes. The algorithm was developed using a dataset of some 750,000 cases from almost 300 jurisdictions within the United States, and was further tested and validated against a further dataset of over 500,000 cases: see "About the Public Safety Assessment", Public Safety Assessment, https://advancingpretrial.org/psa/about; see also New Jersey Courts, Public Safety Assessment: New Jersey Risk Factor Definitions 1–4 (December 2018), https://njcourts.gov/courts/assets/criminal/psariskfactor.pdf; and Coglianese, Carey and Ben Dor, Lavi M, "AI in Adjudication and Administration" (2021) *Faculty Scholarship at Penn Law* 2118.

77 See David Tsurel *et al*, "E-Commerce Dispute Resolution Prediction", Association for Computing Machinery (23 October 2020): www.hyadatalab.com/papers/ecommerceCKIM20.pdf.

78 See Maxi Scherer, "Artificial Intelligence and Legal Decision-Making: The Wide Open?" (2019) 36 Journal of International Arbitration 539. Technical limitations include the non-availability of sufficient non-confidential case data with which to train the algorithm, as well as the fact that most algorithms work best in relatively simple decision-making contexts which involve repetitive patterns and binary outcomes. Ethical limitations include the risk of bias inherent in datasets transferring to algorithms trained on those datasets, as well as the "black box problem" – difficulties with the explainability of artificial intelligence-supported decision-making, which is of especial concern since *reasoned* decision-making is a fundamental feature of legal adjudication.

carefully debated and considered. But as the accuracy and accessibility of the technology improves, and the discourse as to where and how such technologies may be meaningfully and appropriately employed matures, the use of predictive technology could, in time, prove to be a powerful assistive tool in the management of these complex disputes.

62. Some of these protocols or proposals may be said to detract from the orthodox view that adjudication requires that the facts first be *proved*. But if we accept that adjudication is ultimately about *resolving* the dispute fairly, then we should be more open to procedures like these, which pave the way towards a fair and acceptable settlement of the parties' differences.

### *C. People*

63. And the last front of change concerns *people* – this speaks to the need to change mindsets and equip adjudicators with the tools needed to navigate a future in which complexity is a fixture. And I make just two brief points.

64. First, more should be done to raise awareness of our limitations – what I have referred to as the limits of our cognitive ability. We would surely benefit from more empirical research on the effects of information overload, not just on adjudicators and decision-making, but also on counsel and the way cases are

prepared.[79] Change will only come if there is general acceptance of the serious consequences that complexity can have on our ability to do justice. Counsel and the litigants they represent must genuinely come to believe that their best interests are not served by flooding the adjudicator with information. And adjudicators too, must accept that robust measures may have to be taken to contain the quantities of material placed before them. And, in the case of arbitration, supervisory courts need to understand these constraints and make sensible decisions when deciding due process challenges against arbitral awards.[80] Such acceptance of our limitations will more readily open us to solutions that bite the bullet and address these limitations, even if these might seem radical at first.

65. And second, there is a need for more training and sharing of best practices amongst adjudicators. There is an enormous reservoir of judicial and arbitral experience in handling complex cases and this needs to be consolidated,

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79 Some have suggested that the complexity of large disputes has led to "lawyer dysfunction", or the inability of counsel to perform the formulational task of marshalling the evidence, shaping the legal arguments, and presenting those arguments. The complexity of the facts might, for example, prevent the case from being prepared for trial within a reasonable period, or it might make the process of evidence-gathering so costly that the litigant is unable to afford to obtain information critical to reasoned judgment: Jay Tidmarsh, "Unattainable Justice: The Form of Complex Litigation and the Limits of Judicial Power" (1992) 60 Geo Wash L Rev 1683 at pp 1757-1758.

80 IACL Speech at para 24, suggesting that national courts, including international commercial courts, can continue to support arbitration by, amongst other things, "applying sensible standards of due process when considering applications to set aside or enforce arbitral awards". See also Sundaresh Menon CJ, "Dispelling due process paranoia: Fairness, efficiency and the rule of law", speech at the Chartered Institute of Arbitrators Australia Annual Lecture 2020 (13 October 2020) at para 24.

organised and shared.[81] Otherwise it will be lost as members of the profession retire.

## V. Conclusion

66. Ladies and gentlemen, the complexity problem is still evolving. Its severity and extent remain to be seen. But the challenges it poses, I suggest, are best tackled prophylactically. As with many other ills, prevention will be better than cure. I hope that the suggestions I have put forward, while not pretending to be anything like a master plan for dealing with the issue, might offer us some basis upon which we might *begin* to seriously think about the complexity problem.

67. The final point I want to leave with you is the idea of "creeping normality", which describes the process by which even major changes come to be accepted as normal and acceptable so long as they happen slowly through small, often unnoticed, increments of change. The problem of complexity seems to fit the bill – as the world becomes increasingly complex, things get just a little bit worse each year than the year before, but not bad enough for us to notice or protest. And this leads us to think we *are* coping, and we continue to underscore our achievements in handling complex cases, managing gargantuan disclosure exercises, and writing judgments and awards that run into the thousands of paragraphs.

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[81] Cranston at p 205.

68. The problem is that as we let the problem creep up on us, without realising the real danger, we might, like that proverbial frog, end up being boiled alive. The cauldron of evidential and scientific complexity is already beginning to heat up and it is becoming uncomfortable. Experiments show that real frogs do, in fact, jump out of a hot pot.[82] The question is – will we have the wisdom and courage to do so?

69. Thank you so very much for your attention.

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[82] See James Fallows, The Atlantic, "The boiled-frog myth: stop the lying now!" (16 September 2006): https://www.theatlantic.com/technology/archive/2006/09/the-boiled-frog-myth-stop-the-lying-now/7446.