ADAPTING THE LAW TO TECHNOLOGICAL CHANGE: A COMPARISON OF COMMON LAW AND LEGISLATION

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I INTRODUCTION

There is something about law and technological development that seems vaguely incompatible. One is reminded of references to the inability of law to 'keep up' with changes in technology. Such claims are usually made in the absence of any meaningful definition of what it means for law to 'keep up' with change.[1] Most technological developments do not even generate a need to 'catch up.' All conduct, including conduct aided by technology, is subject to law. It is murder to kill whether one uses bare hands or a newly-designed high technology device. The latest model of Holden is still subject to ordinary rules of the road. In most instances, there is little 'catching up' to do.

Before further examining the notion of 'catching up' or 'adaptation',[2] it is necessary to understand what is meant by technological change. The concept is elusive and, while not attempting a universal definition, terms such as 'technological change' and 'new technology' will be used here to describe a new product or process that makes possible new forms of conduct. For example, technological change occurs with the invention of the automobile (making possible, among other things, speedy travel) or the first use of the technique of artificial insemination (making possible conception in the absence of sexual intercourse). Generally, a new product or process creates multiple new possibilities. *In vitro* fertilisation, for example, makes possible a range of conduct including the storage, use or destruction of an embryo *ex utero*, discrimination in the provision of *in vitro* fertilisation services, granting 'custody' to one 'parent' of an embryo contrary to the wishes of the other, and providing insurance coverage for *in vitro* fertilisation services.

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1 See generally Michael H Shapiro, 'Is Bioethics Broke?: On the Idea of Ethics and Law "Catching Up" with Technology' (1999) 33 *Indiana Law Review* 17.

2 See below Part II.

It is the interaction between the law and new forms of conduct that generate concern that the law has failed to 'keep up' with technological change. Existing rules may no longer achieve their purposes due to the changed nature of the world in which they operate. New ambiguities may arise because it is unclear whether new forms of conduct fall within the scope of existing laws. Even where this is clear, the inclusion or exclusion of new forms of conduct might be inappropriate. In addition, the law that does apply may be inadequate to meet legitimate concerns arising out of the new conduct. It is the rate at which the law is clarified or amended to overcome such hurdles that might be thought of as its rate of 'adaptation'.

There are two ways in which Australian law is usually changed. The most obvious is the enactment of a statute (which may operate directly or by authorising delegated legislation). Another forum in which law is changed is the courts. The common law (using the term throughout this article to refer to all non-statutory law) evolves over time in response to matters brought before the courts for judgment. Although Parliament always has the choice of remaining passive, the courts operate as a default forum. Where the law is unclear and the ambiguity is not resolved by statute, the courts cannot respond to a case in which the ambiguity arises by refusing to consider the issue. Similarly when an argument is made that existing rules ought to be extended to include new forms of conduct, the court is forced to make a choice. Thus the common law constantly adapts to technological change. Although slow, piecemeal and unable to reach an optimal solution to every problem on its own, the common law offers remarkable flexibility and is, in some circumstances, a superior alternative to legislation.

In this article, I will consider the roles played by different lawmakers in ensuring that the law 'keeps up' with technological change. There are circumstances in which common law reform offers advantages over statutory law reform and, in such cases, legislators ought to consider adopting a more passive role. The general description offered here is not intended to dictate the appropriate legal response to a particular technology in particular circumstances. Frequently, the specifics will provide reasons that outweigh the considerations laid out here. However, the conclusions presented should at least give reason for pause before assuming, as is often done, that legislation offers the best solution to all social problems.[3]

3 Roman Tomasic, 'Towards a Theory of Legislation: Some Conceptual Obstacles' [1985] *Statute Law Review* 84.

II THE NEED TO ADAPT

Whether or not '[n]early all technological developments pose challenges for law and government',[4] it is at least possible to think of occasions on which the law seems designed for a world shaped by outmoded technology. Technological change can make law become unclear and it can make law that was previously unobjectionable become subject to criticism. The law may also be considered too slow to control 'undesirable' or 'harmful' technologies and existing laws might become increasingly difficult to enforce. Technological change is neither a sufficient nor necessary condition for the existence of uncertain, ineffective and 'bad' laws; yet it is often the occasion for them. When it is, one might sensibly use concepts such as 'catching up' and 'adapting' to describe the process by which problems arising as a result of technological change are resolved.

A Indeterminacy and Technological Change

The relationship between the indeterminacy of law and technological change is only partial. Not all indeterminacy results from new technologies and not all new technologies give rise to new uncertainties. The relationship may be more complex: some new technologies reveal latent ambiguities in the law. Consider the invention of the computer. Even from the start, there was little doubt that stealing a computer constituted theft and that misrepresenting its features in a sale transaction could found a case for negligent misrepresentation.[5] Yet the same invention lead to uncertainties in other contexts, such as copyright law.[6]

Generally speaking, uncertainties arise where new technology or new forms of conduct do not fit easily into existing conceptual and legal categories. Prior to *Computer Edge Pty Ltd v Apple Computer Inc*,[7] it was not clear whether source and object versions of computer code fitted within the legal category of 'literary works'. Of course, the term 'literary work' is inherently ambiguous and disputes as to its meaning had arisen prior to the computer code issue.[8] The problem of classifying computer code was similar to that arising in circumstances not involving any technological change. In other circumstances, the ambiguity in legal and conceptual categories may remain latent until a rule involving that category is applied to new technology or conduct. For example, while 'literary work' is inherently ambiguous, the concept of 'motherhood' was well-

4 Robert S Summers, 'Law, Technology and Values' in Frank Fleerackers, Evert van Leeuwen and Bert van Roermund (eds), *Law, Life and the Images of Man: Modes of Thought in Modern Legal Theory – Festschrift for Jan M Broekman* (1996) 65, 66.

5 The examples are taken respectively from Colin Tapper, 'Judicial Attitudes, Aptitudes and Abilities in the Field of High Technology' (1989) 15 *Monash University Law Review* 219, 220 and *Tuckey v Burroughs Ltd* (1980) 1 SR (WA) 201 cited in Justice K M Hayne, 'Australian Law in the Twentieth Century' (2000) 74 *Australian Law Journal* 373.

6 See *Computer Edge Pty Ltd v Apple Computer Inc* (1986) 161 CLR 171 (involving, *inter alia*, the question of whether computer source and object code could be literary works for the purposes of copyright law).

7 Ibid.

8 See, eg, *Exxon Corporation v Exxon Insurance Consultants International Ltd* [1982] 1 Ch 119 (involving the question of whether a single word could be a literary work).

understood prior to the use of reproductive technologies. Yet the term harboured latent ambiguity which was revealed and resolved in some jurisdictions in cases involving surrogacy and *in vitro* fertilisation.[9]

Problems of ambiguous language can render both common law and statutory rules uncertain. Another potential source of uncertainty, peculiar to the common law, arises out of the reliance on *stare decisis* in determining the content of common law rules. Common law rules are formulated through a process of comparing fact situations and are only strictly binding where the material facts in the precedent cases and the instant case are shared. The essence of *stare decisis* is thus reasoning by example and analogy.[10] A judge will reach the same conclusion in one case as was reached in a previous case whenever they share some characteristics and either (1) the differences between the two cases are irrelevant by virtue of other precedents that foreclose certain possible grounds for distinction, or (2) the differences between them cannot in principle justify distinguishing them.[11] Where technological change makes possible new forms of conduct, there will automatically be a difference between the first case involving new conduct and *all* previous cases. Determining whether the new conduct in question is 'like' existing forms of conduct so that differences are not material will often be difficult. Relying on a precedent judge's own description of the material facts will often prove futile. That judge's conception of the appropriate legal rule is unlikely to clarify the status of conduct that was not possible at the time.

This does not mean that the outcome in every case involving the application of a common law rule to new conduct will be uncertain. In many cases, the immateriality of some facts is obvious. For example, liability for negligent misstatement is independent of the object of the transaction and thus a case of negligent misstatement regarding the sale of a computer raised no difficult issues.[12] At the opposite extreme, there might be a perception (whether later proved true or false) that no existing rules apply to new forms of conduct merely because they are new. This tendency was evident in some of the earlier literature on law and the Internet.[13] More common are the situations between these extremes, where the applicability of at least some old common law rules to new forms of conduct is in question.

Consider the following dilemma confronting a court in 1955.[14] Past cases indicated that the acceptance of a contract by telephone occurred at the time and place that the communication was received. A different rule applied where the acceptance was communicated by post. For the first time, a court was forced to

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9 See, eg, *In re Marriage of Buzzanca,* 72 Cal Rptr 2d 280 (Cal Ct App, 1998) (involving parentage of child born because a couple agreed to have an embryo genetically unrelated to either of them implanted in a surrogate).

10 See generally Edward H Levi, *An Introduction to Legal Reasoning* (1949) 1–2; Cass R Sunstein, 'Commentary: On Analogical Reasoning' (1993) 106 *Harvard Law Review* 741.

11 Sunstein, above n 10, 745.

12 *Tuckey v Burroughs Ltd* (1980) 1 SR (WA) 201.

13 See, eg, David R Johnson and David Post, 'Law and Borders: The Rise of Law in Cyberspace' (1996) 48 *Stanford Law Review* 1367.

14 *Entores Ltd v Miles Far East Corporation* [1955] 2 QB 327.

classify acceptance by telex into one or other category. Communication by telex is 'like' communication in person or by telephone in that both are instantaneous but it is also 'like' communication by post in that both are written rather than oral. The court decided that the former analogy was more appropriate, but one can hardly pretend that a good argument could not have been made for going the other way. Prior to the decision in *Entores Ltd v Miles Far East Corporation*,[15] most lawyers would have advised, correctly, that the law on the issue was unclear. There was no case that had considered conduct that would inevitably be held to be 'like' accepting an offer by telex.

B Technological Change Undermining Existing Rules

As well as increasing uncertainty, new technologies might also alter the facts that justify existing common law and statutory rules.[16] This can be illustrated by using the terminology in Frederick Schauer's useful explanation of the nature of rules.[17] All prescriptive rules are based on some justification, even if it is not universally accepted. The relationship between a rule and its justification is often probabilistic.[18] For example, suppose the owner of a restaurant wishes to ensure that customers are not harassed. In designing a rule such as 'no dogs allowed,' the restaurant owner might have in mind the probability that an entity in the category 'dog' will harass the restaurant's patrons if allowed inside.[19] The rule is thus propagated because it lowers the probability that undesirable conduct will occur.

A rule that is justified based on the likelihood that it will reduce undesirable conduct can become subject to criticism if technological change alters the relationship between the rule and its justification.[20] Consider the example of government licensing of radio spectrum. The *Radiocommunications Act 1992* (Cth) restricts radio emissions out of a desire, *inter alia*, to 'maximise by ensuring the efficient allocation and use of the spectrum, the overall public benefit derived from using the radio frequency spectrum.'[21] It is easy to see how the rules set out in the Act are related to this justification: without a regime of spectrum allocation, interference between signals would mean that no clear radio channel could exist. But the argument is itself based on a technological assumption, namely that radio signals at the same frequency will interfere. It is possible that this assumption will prove false following the development of spectrum-sharing technologies. Pondering these possibilities, Professor Lessig has argued that the allocation of spectrum by government is no longer

15 Ibid.
16 See David Friedman, 'Does Technology Require New Law?' (2001–02) 25 *Harvard Journal of Law and Public Policy* 71.
17 Frederick Schauer, *Playing by the Rules: A Philosophical Examination of Rule-Based Decision-Making in Law and in Life* (1991).
18 Ibid 28–9.
19 Ibid 28.
20 Ibid 35–6.
21 *Radiocommunications Act 1992* (Cth) s 3.

appropriate.[22] Professor Lessig's argument rests on the fact that the development of spectrum-sharing technologies reduces the probability relationship between the rule providing for government allocation of spectrum and its underlying justification. Whether or not Lessig's argument itself persuades, changes in technology that reduce the probability that a rule will further its own purposes provide an occasion for at least considering amendment or repeal.[23]

Often the justification for a legal rule is less explicit than the justification for spectrum control. Consider the old rule that land was owned *usque ad coelum* (up to the heavens). Prior to balloons, airplanes and satellites, this rule would have seemed natural since only the owner of land could have any use for the airspace above it. Of course, the impossibility of air travel was never explicitly mentioned as part of the rule's justification. Yet it was reflection on the possibilities of air travel that led to the restriction of the doctrine. In *Pickering v Rudd*,[24] the court held that no action in trespass was available on the basis of a board overhanging the plaintiff's garden lest it follow that 'an aeronaut is liable to an action of trespass *quare clausum fregit* at the suit of the occupier of every field over which his balloon passes in the course of his voyage'.[25] Thus even seemingly uncontroversial rules that are not explicitly based on technological assumptions can become outmoded by technological change.

Where the justification for a rule is not challenged, technology may nonetheless create an impetus for reform by altering the costs of violating and enforcing that rule. Consider the many commentaries on the digitalisation of material subject to copyright. The difficulty of policing copyright infringement has led, on the one hand, to calls for protection of technological enforcement measures[26] and, on the other, to suggestions that copyright be replaced by alternative methods of compensating authors.[27] Technological change thus resulted, in this instance, in both proposals to amend existing law to strengthen copyright protection and proposals to remove it entirely.

As well as directly undermining the rationales for and effectiveness of existing rules, new technologies can alter social attitudes that in turn create pressure to

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22 Laurence Lessig, *The Future of Ideas* (2001) chh 5, 12.

23 Criticisms of the law and suggestions for reform are rarely uncontested. The fact that a justification supporting a rule no longer applies with the same force does not mean that there might not be other justifications. A government might have other reasons for wishing to control the use of radio waves in addition to concerns about signal interference. Even where it is agreed that the existing regime can no longer be supported, there may be vigorous disagreement as to what should replace it, especially where difficult ethical questions are involved. See, eg, Michael H Shapiro, 'On the Possibility of "Progress" in Managing Biomedical Technologies: Markets, Lotteries, and Rational Moral Standards in Organ Transplantation' (2003) 31 *Capital University Law Review* 13, 64.

24 (1815) 4 Camp 219.

25 Ibid. See also *Bernstein v Skyviews & General Ltd* [1978] 1 QB 479, 487 (involving the issue of whether flight over property constituted trespass, in which the judge stated, 'the maxim, *usque ad coelum* … is a fanciful notion leading to the absurdity of a trespass at common law being committed by a satellite every time it passes over a suburban garden').

26 See *Copyright Act 1968* (Cth) s 116A, amended by the *Copyright Amendment (Digital Agenda) Act 2000* (Cth) s 98.

27 See, eg, John Kelsey and Bruce Schneier, 'The Street Performer Protocol and Digital Copyrights' (1996) 4(6) *First Monday* <http://www.firstmonday.dk/issues/issue4_6/kelsey/index.html> at 26 November 2003.

reform the law. Well known examples include the availability of time-saving technologies that contributed to the liberation of women and social shifts caused by the development of faster means of transportation. On a general level, doing new things gives rise to the possibility of new forms of economic, political and social organisation and the adaptation of existing forms of organisation.[28] The response of law to social change (whether or not caused by technological change) is, however, beyond the scope of this article.

C The Over- and Under-Inclusiveness of Rules

Technological change can also challenge rules in more subtle ways, by raising questions as to the scope of their application. A rule may include within its scope conduct to which it is not appropriate, in that there is a poorer correlation between the rule and its justification when applied to that conduct than otherwise. Conversely, it may be worded so as to exclude conduct to which it seems suitable. This problem is not necessarily tied to technological change; a rule excluding dogs from a restaurant designed to prevent customers being annoyed includes obedient dogs and excludes screaming children.[29] But, where a rule is over- or under-inclusive in the absence of technological change, the rule's creator had the opportunity to design a different rule. The restaurant owner could have drafted a rule that was neither over- nor under-inclusive with respect to its primary function. For example, 'no dogs allowed' might be changed to 'no entities that annoy patrons are allowed.' Such a rule might not be chosen, even though it is more precise, due to difficulties in enforcing it. Nevertheless, at least the rule's designer had the opportunity to balance its clarity, precision and ease of application.[30]

The drafter in this example did have one significant handicap, being the inability to foresee the future. For the world in which the rule was expected to operate, we might assume that a competent drafter would reach an acceptable (if controversial) balance between clarity, precision and ease of application. But the rule may also apply to conduct outside what could have been foreseen at the time of its creation. A genetically engineered dog or new breed might be easily identifiable and perfectly behaved. Had such 'dogs' been within the contemplation of the restaurant owner, he or she might have felt that a better balance could be obtained by excluding them from the rule. The change in technology has shifted the balance originally reached, potentially creating pressure to change the rule to restore that balance. If the owners of genetically engineered dogs were to bring the rule's over-inclusiveness to the restaurant owner's attention, they might persuade him or her to change the rule.

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28 See generally Laurence M Friedman, *The Republic of Choice* (1990) ch 4; Emmanuel G Mesthene, *Technological Change: Its Impact on Man and Society* (1970) ch 1; Arthur Selwyn Miller, 'Technology, Social Change and the Constitution' (1964–65) 33 *George Washington Law Review* 17, 18–19.

29 Schauer, above n 17, 28.

30 See Colin S Diver, 'The Optimal Precision of Administrative Rules' (1983) 93 *Yale Law Journal* 65, 67 (on balancing a rule's 'transparency,' 'accessibility' and 'congruency'). I have employed similar factors here; 'transparency' corresponds to clarity, 'accessibility' to ease of application, and 'congruency' to precision.

There might also be pressure to change a rule to ensure that it includes conduct not initially within its scope. For example, 'computer programs' were added to the definition of a 'literary work' in the *Copyright Amendment Act 1984* (Cth) so as to grant them the same protection as that already given to more traditional 'literary works' in the *Copyright Act 1968* (Cth). The amendment was presumably made because Parliament felt that the rationale underlying the grant of copyright protection applied to a new entity, computer programs. The existing rules were modified to include within their scope a new form of conduct (dealing with a computer program in particular ways without the copyright owner's consent).

D The Desire for New Rules

Thus far, I have considered situations that might create a need to 'adapt' the law to new technology by clarifying, repealing or amending existing rules. Latent ambiguities and dearth of relevant precedent might create a need to clarify the law. Repeal might be appropriate where a rule's justification has been undermined or where it is no longer easily enforceable; and a rule may inappropriately include or exclude new forms of conduct. It may also be necessary to create new rules.

In the absence of relevant existing rules, new rules might be appropriate because there is a reason why new forms of conduct ought to be encouraged or discouraged. Where the government wishes to encourage new forms of conduct and existing incentive systems are either too narrow or insufficient, it can set up a new government subsidy or monopoly. It might be thought prudent to discourage some new forms of conduct because they constitute risks to health, safety or the environment or threaten values such as community, privacy or human dignity. For example, the enactment of a rule requiring those providing *in vitro* fertilisation services to be licensed might be justified by a desire to ensure the procedure is carried out safely; and a rule mandating discrimination in the provision of *in vitro* fertilisation services might be thought by some to promote the values of family and child welfare.[31] These enactments were not by way of clarification, repeal or tailoring of existing law, but created entirely new rules designed to regulate new forms of conduct.

III COMPARING INSTITUTIONS

In the United States, various schools of thought have considered the proper role of legislators, administrators and judges in the development of the law. The legal process school, whose name comes from Hart and Sacks' famous

31 See *Infertility Treatment Act 1995* (Vic) ss 6, 8. Section 8, which restricted access to heterosexual couples, was held to be inoperative due to inconsistency with federal anti-discrimination legislation in *McBain v Victoria* (2000) 99 FCR 116. The restrictions would be reinstated if the Sex Discrimination Amendment Bill 2002 (Cth) is passed.

materials,[32] attempted to document the function of each institution in the legal system based on its area of competence. For example, tasks requiring an informed, deliberative and efficient process would be delegated to the legislature.[33] Although the legal process movement has fallen out of favour following criticism from 'law and economics' and 'critical legal studies' scholars, the idea of comparing decisional institutions has not.[34]

The question of appropriate institutional roles is a general one. The task contemplated here is the (slightly) narrower one of comparing the ability of courts and legislatures to 'adapt' the law to technological change by responding to the forces discussed in Part II above. This Part will focus on the characteristics of statutory and common law development that allow each to consider claims that existing law needs to be clarified, repealed or amended, or that new law designed to control new technology or conduct needs to be created.

Comparisons between institutions are usually made fleetingly and are overwhelmed by the substantive issue, being what rule ought to be adopted. Thus the discovery and use of a new product or process is frequently followed by commentary identifying new ambiguities or criticising the content or scope of existing law. Rarely is there any detailed discussion of the means by which the law ought to be changed, although proposals for reform are usually drafted in the form of legislation.

At least one commentator has observed that legislative reform can sometimes cause as much harm as good. In his book, *Limits*, Roger Dworkin undertook a detailed comparison of legal responses to bioethical questions in the rapidly advancing fields of biology and medicine.[35] Dworkin explored the dangers of 'thinking big' rather than allowing time for common law evolution in response to bioethical issues arising out of, *inter alia*, sterilisation techniques, assisted reproduction and the availability of genetic information. Although his study was limited to the biomedical context and dealt with the law of the United States, many of his observations apply more broadly. He concludes that, '[g]iven our present legal institutions and any that seem likely to emerge, the soundest response to a social issue posed by biomedical advance is to begin by assuming that no legal response is necessary' and that '[i]f a legal response to a problem is necessary, the common law should be the presumptive first-line response.'[36] The legislature and government should only intervene where 'a *real* problem exists that the common law is demonstrably incapable of dealing with'.[37]

This conclusion might seem surprising to the modern reader. Once law reform appears desirable, as well it might,[38] there seem at first to be no objections to *legislative* law reform. Yet the choice of vehicle for enabling reform can be

32 Henry M Hart, Jr and Albert M Sacks, in William N Eskridge and Phillip P Frickey (eds), *The Legal Process: Basic Problems in the Making and Application of Law* 1994 (tentative ed, 1958).

33 Ibid 695–7.

34 See Edward L Rubin, 'Commentary: The New Legal Process, the Synthesis of Discourse, and the Microanalysis of Institutions' (1996) 109 *Harvard Law Review* 1393, 1403.

35 Roger B Dworkin, *Limits: The Role of the Law in Bioethical Decision Making* (1996).

36 Ibid 169–70.

37 Ibid 170 (emphasis in original).

38 See above Part II.

important. As any lawyer knows, process is crucial in determining outcome. The types of changes and amendments that a court is likely to make will be different from those likely to appear in legislation. Further, even if the changes made by each institution would be identical, the very fact that the rule appears in legislation rather than in a judgment will affect the way in which the new or amended rule is later applied and further altered. In at least some circumstances, the common law process offers advantages over legislative reform.

A The Effect of Codification

The fact that a rule is found in legislation rather than in a case changes the way it is treated. Simple differences are easy to cite: legislative rules take precedence over common law rules in the event of a conflict; and concepts such as intent are important in determining the meaning of statutes but far less useful for interpreting precedent. One significant advantage offered by legislation is its relative ease of reference and the publicity that precedes its enactment. The advantages of increased community awareness are variable, depending on both the nature of the group being regulated and the complexity of the legislation.

Most of these differences between common law and legislation would be important in any context. In comparing the use of legislation and common law as devices for updating the law in light of technological change, the focus of this Part will be on those differences that render statute law less flexible than common law. This focus is justified because, whereas most differences between common law and legislation are important considerations when making any change to the law, flexibility is crucial in dealing with ongoing technological change. A change made to resolve a problem encountered in applying the law in the context of a new technology will only have lasting remedial effects if able to keep up with future incarnations of the technology.

The relatively inflexible nature of statute law arises primarily from the emphasis on the form of words used when applying it to a particular situation.[39] Although the purpose of the statute is important in deducing meaning, it cannot extend the meaning beyond the limits that words will bear.[40] Common law rules are not bound to their words in the same way. There is no single authoritative text for common law rules; different language may be used in different cases to express what is intended to be a single legal rule or principle. The differences may become important and one formulation may eventually be disowned, but, until that time, multiple formulations will be treated as alternatives. Even where a rule is stated in a single form, the rule will not necessarily bind courts according to its terms. It is always open to a later court to create a new exception to the rule by distinguishing the case before it from all previous cases that relied on the rule. Where the application of a rule in a particular situation would run counter to the rule's underlying justification, this technique is often used to avoid it. Thus

39 See Neil MacCormick, *Legal Reasoning and Legal Theory* (1994) 221–2.

40 See, eg, *Acts Interpretation Act 1901* (Cth) ss 15AA, 15AB.

although purpose is relevant in applying both statutory and common law rules, common law rules are more transparent to their underlying justifications.[41]

Consider, by way of example, an imaginary rule that provided: '[A]ny person driving a carriage led by one or more horses who collides with a pedestrian shall be liable for the damages so caused irrespective of negligence.' If the source of this rule were a statute, the rule would create a regime of strict liability in the circumstances contemplated. Even if the purpose of the rule were a concern for pedestrian welfare in light of the faster and heavier horse-drawn carriages, it probably would not extend to injury caused by an automobile.[42] If the rule were found in a common law precedent, however, it could be extended by analogy to new situations where justified by the rule's underlying rationale. The transparency of common law rules that allows them to be extended or retracted in light of their underlying justifications is a crucial advantage when making laws intended to apply in the context of rapidly changing technologies.

Legislation is generally unable to achieve the same effect. Consider the example of the *Infertility Treatment Act 1995* (Vic). That Act applies to fertilisation procedures, defined as any of:

> (a) the medical procedure of transferring to the body of a woman a zygote formed outside the body of any woman; or
> (b) the medical procedure of transferring to the body of a woman an embryo formed outside the body of any woman; or
> (c) the medical procedure of transferring –
>
> (i) an oocyte, without also transferring sperm, to the body of a woman; or
> (ii) sperm (other than by artificial insemination) to the body of a woman; or
> (iii) an oocyte and sperm to the body of a woman.[43]

The Act establishes a detailed regime controlling the use of such procedures, including specifying who can carry them out, mandating related services such as counselling and requiring that certain records be maintained. Yet, if it became possible to incubate an embryo in an artificial womb, the entire Act would not apply to such a procedure absent an amendment. Words have their limits. It is not simply a matter of improved or 'technology neutral' drafting; it is impossible to draft legislation with sufficient precision and clarity that also has the scope to cater for every possible application of a rapidly changing technology.[44]

An artificial womb may sound like a far-fetched scenario, but changing technologies have often rendered legislation obsolete, almost upon enactment. In the United States, an oft-cited example is the *Audio Home Recording Act*, 17 USC §§ 1001–10 (1996 & Supp 2003). This Act created a royalty regime with

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41 See Schauer, above n 17, 181.

42 There has been some commentary on the question of whether a statute might extend to situations not contemplated at the time of their enactment by use of analogy. The question first appears in the academic literature in Roscoe Pound, 'Common Law and Legislation' (1907) 21 *Harvard Law Review* 383. For an examination of the debate from an Australian perspective, see Paul Finn, 'Statutes and the Common Law' (1992) 22 *University of Western Australia Law Review* 7, 18–24.

43 *Infertility Treatment Act 1995* (Vic) s 3.

44 Tapper, above n 5, 228.

respect to the importation and manufacture of digital audio recording devices and media, the intention being to ensure proper compensation for copyright owners in a world of perfect digital recordings. The new rules have since proved almost irrelevant because multi-purpose devices such as personal computers and hard drives have become dominant tools for digital copying.

An additional factor contributes to the flexibility of the common law. A common law rule can be altered or overturned by some courts (including the High Court) and by Parliament, whereas constitutional statutory rules can only be *amended* by legislation. Of course, judicial decisions can affect the meaning of statutes by changing the way they are interpreted. Judges can interpret the words in a statute to accommodate advances in technology, including within the scope of a statute conduct that was not possible at the time it was drafted.[45] But judges are limited to the words; it would require a fair degree of judicial creativity to decide that an automobile is really a horse-drawn carriage or that a machine can be the 'body of a woman'. At least where the problem is not one of choosing between possible interpretations, in circumstances where changes in technology require further adaptation or render a rule obsolete, a statutory rule must wait until the Parliament has time to address the problem. A common law rule can be adjusted as soon as it becomes the subject of a formal dispute.

Finally, the common law's flexibility stems from the focus on particulars rather than high theory.[46] Because judges can agree at the level of particulars without committing to a broader ethical theory, moral evolution is possible over time. The law thus remains open to new facts and new perspectives. Political parties often express their aims in terms of grand ideals and may thus find it more difficult to reject or reduce the emphasis on particular ideas in formulating specific policies.

B Differences of Substance

As can be seen above, there are advantages in having a particular rule become part of the common law rather than be enacted in statutory form. However, the decision whether or not to enact legislation will only rarely revolve around concerns about flexibility. Lawmakers are more likely to focus on the fact that legislative law reform produces different outcomes to judicial law reform. From the perspective of determining the substantive content of a rule, it is legislation that provides the more flexible alternative.

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45 See *Chappell and Co Ltd v Associated Radio Co of Australia Ltd* [1925] VLR 350, 361–2 (Cussen J) (commenting on the fact that the word 'vehicle' had been held to include motor cars and deciding that a broadcast constituted a performance in public for the purposes of the *Copyright Act 1968* (Cth)). See also *Lake Macquarie SC v Aberdare CC* (1971) 123 CLR 327, 331 (Barwick CJ) (on whether the term 'gas' could include new forms of gas); *Imperial Chemical Industries of Australia & New Zealand Limited v Commissioner of Taxation of the Commonwealth* (1971) 46 ALJR 35, 43 (on whether a new technique could constitute 'mining operations'); *Wilson v Commissioner of Stamp Duties* (1986) 6 NSWLR 410.

46 See Sunstein, above n 10, 782.

1 *Principled Decision-Making*

Despite its malleability, common law decision-making is quite restrictive. Within the four corners of the Constitution, Parliament can legislate as it wishes. While judges frequently can choose how the law is formulated and applied,[47] there are bounds. Even desirable changes cannot be made where to do so would fracture a skeletal principle.[48] As Gaudron and McHugh JJ stated in *Breen v Williams*:

> Advances in the common law must begin from a baseline of accepted principle and proceed by conventional methods of legal reasoning. Judges have no authority to invent legal doctrine that distorts or does not extend or modify accepted legal rules and principles. Any changes in legal doctrine brought about by judicial creativity, must 'fit' within the body of accepted rules and principles. The judges of Australia cannot, so to speak, 'make it up' as they go along. It is a serious constitutional mistake to think that the common law courts have authority to 'provide a solvent'[49] for every social, political or economic problem. The role of the common law is a far more modest one.
>
> In a democratic society, changes in the law that cannot logically or analogically be related to existing common law rules and principles are the province of the legislature. From time to time it is necessary for the common law courts to re-formulate existing legal rules and principles to take account of changing social conditions. Less frequently, the courts may even reject the continuing operation of an established rule or principle. But such steps can be taken only when it can be seen that the 'new' rule or principle that has been created has been derived logically or analogically from other legal principles, rules and institutions. [50]

A similar point has been made in the United States by Holmes J:

> I recognize without hesitation that judges do and must legislate, but they can do so only interstitially; they are confined from molar to molecular motions. A common-law judge could not say, 'I think the doctrine of consideration a bit of historical nonsense and shall not enforce it in my court'.[51]

None of this suggests that the common law is incapable of change. The common law can never be completely determinate and indeterminacies create leeways of choice.[52] This effect is compounded by the willingness of judges actively to change the law in response to changing social conditions.[53] But the choices are not open-ended. A proposal for judicial law reform is not like a proposal for new legislation; there is no guarantee that the changes one wishes to make will fit into existing common law paradigms.

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47 See generally Julius Stone, *Precedent and Law* (1985).

48 The phrase is taken from *Mabo v Queensland (No 2)* (1992) 175 CLR 1, 43.

49 *Tucker v US Department of Commerce,* 958 F 2d 1411, 1413 (1992).

50 *Breen v Williams* (1996) 186 CLR 71, 115.

51 *South Pacific Co v Jensen*, 244 US 205, 221 (1917).

52 See generally Stone, above n 47, 269–71.

53 See generally Justice M McHugh, 'The Law-making Function of the Judicial Process (Pt I)' (1988) 62 *Australian Law Journal* 15; Justice M McHugh, 'The Law-making Function of the Judicial Process (Pt II)' (1988) 62 *Australian Law Journal* 116; Justice M McHugh, 'The Judicial Method' (1999) 73 *Australian Law Journal* 37; Chief Justice J Doyle, 'Judicial Law Making – Is Honesty the Best Policy?' (1995) 17 *Adelaide Law Review* 161; Justice R Sackville, 'Continuity and Judicial Creativity – Some Observations' (1997) 20 *University of New South Wales Law Journal* 145.

2 *Different Considerations*

Even within the limits of legitimate judicial choice, judges are likely to adopt different rules from those chosen by legislators. This is not surprising: political law-makers generally take into account different considerations from judicial law-makers. At least in modern times, one would be surprised to find a court basing its decision on theological considerations, whereas such considerations might be relevant to politicians in fields such as bioethics. The legislature is also in a better position to evaluate so-called 'policy' issues such as economic considerations.[54]

Judicial creativity is further hindered by the fact that judges consider one case at a time. Bad law can often result from a decision in a difficult or atypical case. Statutes tend to be drafted from a broader perspective despite the fact that politics will inevitably thrust some examples to the forefront of drafters' minds. Entire legal regimes, together with exceptions and transitional provisions can be enacted simultaneously. The content of and exceptions to common law rules tend to evolve more slowly in response to specific scenarios since each court can ignore the *dicta* of previous judges. Thus Parliament can take a more holistic approach to the development of law than the courts. It is in the best position to ensure that the legal framework as a whole works together to achieve economic and social goals.

3 *Different Levels and Types of Participation*

All things being equal, the greater the participation by people with a particular viewpoint in a decision-making process, the more likely it is that that viewpoint will prevail.[55] All decision-making processes rely, directly or indirectly, on the involvement of outsiders in their commencement and for their information. Where courts are the decision-making fora, this is obvious. No suit is commenced without originating process and only facts brought to the court's attention by the parties are taken into consideration. Even Parliament, which generates most legislation internally, normally acts in response to external stimuli. Politicians do not generally wait quietly, observing the world, pondering laws that might be useful. Despite the fact that they do not need to wait for any formal process, inertia is usually only overcome in response to actual events that generate a degree of community or interest group pressure. Although law reform commissions often propose laws to clarify potential interests and regulate new forms of conduct without external impetus,[56] this accounts for only a small proportion of introduced legislation.

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54 See generally Sir Anthony Mason, 'Law and Economics: Monash Law School Foundation Lecture' (1991) 17 *Monash University Law Review* 167.

55 Neil Komesar, *Imperfect Alternatives: Choosing Institutions in Law, Economics, and Public Policy* (1994).

56 In fact, a substantial amount of the work of the Australian Law Reform Commission and state law reform commissions has involved attempts to respond to scientific and technological change. See generally Justice Michael Kirby, 'Law, Technology and the Future' (1988) 21 *Australian Journal of Forensic Sciences* 112.

People are more likely to participate in politics or court proceedings if their interest in the outcome is sufficiently high to make it worth the investment of time. In the case of politics, perspectives are more likely to be presented and considered if represented by a group that is sufficiently active and collectively powerful to attract the interest of politicians. A group, however large, will have almost no influence unless it is informed and active. Where the members of a large, diverse group each have only a small interest in the outcome, generally only the intervention of an catalytic subgroup will create the momentum needed to facilitate political influence.[57] Where a majority becomes actively interested in an issue, its sheer size gives it significant political influence.[58] Where the majority remains passive, however, legislation can exhibit a minoritarian bias.[59]

The effect of participation on outcomes is perhaps even stronger where the subject matter is technical. In such cases, decision-makers rely heavily on the expertise of others. Scientific and technical explanations can themselves become powerful vehicles for advocacy, the seeming objectivity often disguising the biases of the author. Where those with expertise have a particular viewpoint, or only one viewpoint is represented in the technical material submitted to and considered by the decision-maker, the impact can be substantial.

Because courts and legislators rely on very different sources for information, they will inevitably reach different conclusions as to what the law ought to be. Although legislators are unconfined in the range of considerations they are entitled to take into account, rarely does this mean that all perspectives are considered. Organised interest groups, talk-back radio hosts and those with political influence are more likely to be heard. Even if decision-makers try to remain unbiased, the bias in sources of information will often be reflected in the outcome. While political decisions will be biased towards groups that are organised and politically powerful, judicial law reform will be strongly influenced by the parties presenting the issue to the court. Political influence is irrelevant here, each side is given an identical opportunity to present its views. However, those with an interest in the outcome who are *not* parties to the proceedings in which an issue is raised are at a significant disadvantage in presenting information and arguments to the court.

Despite the narrow range of interests considered, the timing of the courts' decisions means that there is less likely to be a minoritarian bias in the law created. A minoritarian bias exists in decision-making where a smaller group has the organisational resources to obtain a decision that goes against the interest of the majority. Consider the example of internet service provider liability for on-line defamation.[60] Before an injury occurs, everyone is a potential victim of defamation. Although the risk falls unevenly over the population, the chance that any particular person will be defamed is relatively low. Few would hold a

57 Komesar, above n 55, 82–4.

58 Ibid 74.

59 Ibid ch 3.

60 The example is taken from Susan Freiwald, 'Comparative Institutional Analysis in Cyberspace: The Case of Intermediary Liability for Defamation' (2001) 14 *Harvard Journal of Law and Technology* 569, which is based on the analysis in Komesar, above n 55.

sufficient stake, prior to actual injury, to lobby for legislation that ensures adequate compensation for those defamed on the Internet. On the other hand, each internet service provider is likely to host or transmit defamatory material unconsciously at some stage. They are members of a relatively organised group and the stakes are high. They are likely to be in a good position to present their case to Parliament, having easy access to technical expertise. The imbalance in the positions likely to be presented to politicians differs from the balanced position presented when the issue is raised in legal proceedings. Here, the victim and the internet service provider both have a high stake in the outcome and both are likely to hire counsel to present their view to the court. One might therefore expect that the court's decisions would take a more balanced approach (from the perspective of achieving cost-effective defamation reduction) than that taken by government.[61]

In addition to differences in the range of information considered relevant by courts and legislatures and the perspective the information is likely to take, there are differences in the form in which the information is presented. Where a case turns on technical information, courts will usually rely on expert evidence to provide it. Where the evidence presented by each side differs, cross-examination is the primary vehicle by which each party tries to undermine the other's position. While useful for exposing bias, lies, minor inconsistencies and unfounded assumptions, cross-examination will rarely put the judge in a position to understand the bases for different views from which to reach a balanced conclusion.[62] It will trip up the 'bad' scientist but will not otherwise help to resolve legitimate differences in scientific or technical opinion. The information that goes into crafting a statute, however, generally comes in more varied and useful forms. Cost-benefit analyses and risk assessments can provide a sensible basis for policy formation and differences of opinion between experts can be resolved in more informal settings.

As well as receiving a broader range of information in more useful forms, political decision-makers have greater means of understanding the information presented to them. Ministers have access to technical expertise within their

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61 Ibid 607–9. Compare *Broadcasting Services Act 1992* (Cth) sch 5 s 91 (no civil or criminal liability to the extent that an internet service provider or internet content host is not aware of content); *Defamation Act 1996* (UK) c 31, s 1 (providing a defence to defamation liability for electronic distributors who take reasonable care and have no reason to be aware of defamatory material); and *Communications Decency Act*, 47 USC § 230 (2001) ('No provider or user of an interactive computer service shall be treated as the publisher or speaker of any information provided by another information content provider') with *Cubby, Inc v CompuServe, Inc*, 776 F Supp 135 (SDNY 1981) (defendant with little editorial control over content held not liable for defamation); *Stratton Oakmont, Inc v Prodigy Services Co*, 1995 NY Misc LEXIS 229 (NY Sup Ct 1995) (treating a defendant who had controlled the content on its service as a primary publisher for purposes of determining defamation liability).

62 See Barry R Furrow, 'Governing Science: Public Risks and Private Remedies' (1983) 131 *University of Pennsylvania Law Review* 1403, 1461 (pointing out that cross-examination can reveal underlying biases, unstated assumptions and methodological shortcomings in expert evidence); Joseph Sanders, 'From Science to Evidence: The Testimony of Causation in the Bendectin Cases' (1993) 46 *Stanford Law Review* 1, 47–51 (describing how the focus on credibility, putative biases and minor inconsistencies can make cross-examination less useful for the fact-finder); see also Sheila Jasanoff, *Science at the Bar* (1995) 211.

departments and explanatory memoranda can be used to explain the content and justification for a proposed law. Even with the assistance of parties' or court-appointed[63] experts, judges are often compelled to rely on their own technically inexpert understandings. The amount of technical know-how that goes into crafting a judicial decision is random; it will depend on the fields with which the judge assigned to the case is familiar. This is, however, less a handicap than might be thought. Judges, although rarely endowed with knowledge of science and technology, can be thought of as intelligent generalists.[64] In addition, their greater average familiarity with the legal landscape might give judges an advantage over politicians in formulating a rule that best fits with existing laws. To the extent that judges might have difficulty in understanding technical issues, there are solutions within the judicial model. For example, one might broaden judicial (or legal) education to include grounding in science and engineering.[65] Another possibility, which like the first has found little support, is the idea of establishing specialist courts. The reason why scant attention has been paid to either approach is that the problem is in fact less than imagined. Judges are usually able to understand the technology involved to an adequate degree; it is the legal issues that present the primary difficulty.

4 *The Retrospective Nature of Common Law Decision-making*

Almost all comparisons between statute law and common law begin with the seemingly simple observation that the common law operates *ex post facto* meaning that, if new law is made, that law applies to events arising prior to judgment. Legislatures, on the other hand, can make new law at any time, and generally choose to make the new law apply to only future conduct. None of this is to suggest that, from a timing perspective, the legislature necessarily acts sooner than would the courts. Both processes, litigation and the preparation and enactment of legislation, are slow.

The *ex post-ex ante* distinction, while seemingly obvious, is too simplistic. It is true that, if a judge changes the common law in the course of a judgment, new law is effectively applied retrospectively. However, the change in law does not allow people to re-litigate old disputes. And the common law, as a body of law, applies to conduct as it is occurring; any change, once made, will govern future conduct. The problems of retrospectivity are further reduced where future directions in law are heralded in *obiter dicta*. At the opposite end, legislation does not always operate prospectively. Yet, despite its imperfections, the *ex post-ex ante* distinction gives legislative change a fairness advantage over judge-directed change.

On the other hand, piecemeal change in response to particular circumstances also offers advantages. By dealing with actual problems rather than hypotheticals, judges can ensure that the law is adapted to the technology as it

63 At least in jurisdictions where this option is available.

64 Tapper, above n 5, 221.

65 This was proposed in Carnegie Commission on Science, Technology and Government, *Science and Technology in Judicial Decision Making* (1993).

exists rather than as it is imagined. The law is thus able to reflect the experience gained in using the technology.[66]

C Conclusions

There is little advantage in having legislative law reform pre-empt judicial law reform. If judges are able to modify the law in acceptable ways, then incorporating new rules into the common law rather than creating new statutory rules increases the flexibility in the system. Flexibility is particularly important where technological change is ongoing. Yet legislation allows for more flexibility in actually crafting appropriate reforms. Especially where modifying laws designed for different technological conditions, the ability to break with existing paradigms can be crucial. The legislature also has access to a broader range of information of a more diverse and useful nature. Nevertheless, legislative solutions can be biased where particular groups have a high degree of control over its information input. The fact that courts act *ex post facto*, a frequent basis for comparison, cuts both ways. It can ensure that decision-makers have the benefit of experience gained with a new technology but can cause unfairness to parties surprised by change in the law.

IV ADAPTING THE LAW

As illustrated in Part II, there are various circumstances in which the law might be criticised for failing to 'keep up with' or 'adapt to' technological change:

(1) there might be a great deal of uncertainty in the applicability of certain laws to new forms of conduct and new technologies;
(2) technological change might alter the facts on the basis of which existing rules were justified (whether explicitly or implicitly);
(3) new forms of conduct might fall within existing rules despite the fact that the justifications behind those rules apply little or not at all in the new context;
(4) new forms of conduct might fall outside existing rules despite the fact that the justifications behind those rules would apply to the new conduct; and
(5) the creation of entirely new rules to encourage or discourage new forms of conduct or to shape the direction of technological development to meet social goals might be thought desirable.

The first four can be grouped together as involving the clarification or alteration of existing rules in light of technological change. Comparison of common law and legislative approaches to facilitating such adaptation will be dealt with in Part IV A below. The final category will be discussed in Part IV B.

66 See, eg, Laurence Lessig, 'The Path of Cyberlaw' (1995) 104 *Yale Law Journal* 1743, 1744–5.

What is presented here is merely a general framework for making the comparison between common law and statutory approaches to law reform consequent on technological change. General observations made here will rarely be decisive but can constitute factors favouring one approach or the other, to be weighed against considerations of a more specific nature.

A Adaptation of Existing Rules

The law is most likely to adapt well to new technology where Parliament adopts a 'wait and see' attitude before amending existing law. If the courts are able to resolve the issue satisfactorily, there are flexibility advantages in leaving the ongoing adaptation of the law in their hands. However, the legislature is generally in a better position to analyse the extent to which the law, as it exists, is in accordance with community attitudes and economic goals. Such goals can still be achieved within a more passive model. The legislature will be more effective where it observes the choices made by the courts and intervenes whenever the law so made has undesirable consequences. An even more passive legislative strategy is appropriate where legislative law reform is likely to exhibit bias, as in the circumstances considered in Part III B 3 above.

A more active strategy is required where the rule whose justification has been undermined, or whose over- or under- inclusiveness is problematic, is a statutory rule. In this situation, at least where the difficulty is unlikely to be solved by judicial interpretation, no entity other than Parliament can act to change the rule. In fact, this was one of the main arguments for incorporating change into the common law. Judicial interpretation to limit the effects of the words of a rule is possible where the rule, as applied to new conduct within the scope of its words, is 'manifestly absurd' or 'unreasonable',[67] but it is otherwise difficult. Desirable reform may only be acheivable through legislation. Because the rule is already in statutory form, legislative intervention results in no loss of flexibility with respect to further technological change.

One American author, Guido Calabresi, has suggested that courts could go further in ensuring the continued usefulness of statutory rules.[68] He argues that courts ought to treat statutory rules in the same way as they do common law rules, effectively repealing them when they fail to achieve their purposes or no longer fit in the legal landscape in light of changing conditions.[69] This would effectively alter the weight of legislative inertia; the legislature could reaffirm existing law but would need to make a positive effort to do so.[70] Whatever the merits might be of this position,[71] it would require a momentous shift in the

67 *Acts Interpretation Act 1901* (Cth) s 15AB(1)(b)(ii).

68 Guido Calabresi, *A Common Law for the Age of Statutes* (1982).

69 Ibid 82, 164.

70 Ibid 164.

71 Commentary on Calibresi's approach includes Samuel Estreicher, 'Review Essay: Judicial Nullification: Guido Calabresi's Uncommon Common Law for a Statutory Age' (1982) 57 *New York University Law Review* 1126; Abner J Mikva, 'Book Review: The Shifting Sands of Legal Topography' (1982) 96 *Harvard Law Review* 534; Robert Weisberg, 'Essay: The Calabresian Judicial Artist: Statutes and the New Legal Process' (1983) 35 *Stanford Law Review* 213.

judiciary's attitude towards statutes, one unlikely to occur without statutory prompting.

Another situation in which early statutory action is important is where the uncertainty in the law is likely to have significant negative effects. For example, ongoing uncertainty might hinder the development of a new industry or have adverse economic effects. Where uncertainty itself poses a problem, passivity on the part of the legislature is undesirable. Such problems are, however, often exaggerated. If the issue is one that arises sufficiently frequently to cause large scale negative effects, it will end up in court almost as soon as it will finish going through the political process. Further, many issues, at least in the commercial area where the problems of uncertainty are most significant, can be resolved by contract.

The model of law reform proposed here relies heavily on courts to ensure that the law is responsive to technological change. The benefits of flexibility gained in this approach might be lost, however, if the courts adopt a passive approach to the application of existing rules to new situations. If common law rules become inflexible because courts decline to treat common law rules as at least partly transparent to their underlying justifications, the entire task of adapting existing law to new technology will fall on the legislature, prolonging uncertainty and creating a more rigid system. Judges ought to remember that the common law method allows the principles and justifications underlying common law rules to determine, at least in part, their field of applicability. Courts cannot afford to assume that it is the legislature, not they, that are the primary vehicle for adapting existing law to new technologies.

B Making New Rules and Controlling Technology

According to the declaratory theory of law, the courts do not make law, they only state the law as it already exists. Thus the High Court in 1915 stated, '[T]he court is not a legislator: it cannot initiate the principle, it can only state or formulate it if it already exists.'[72] If this view still held sway, there would be little point in comparing institutional capabilities in formulating new laws for new technology. However, the common law does generate new rules, if gradually. Seismic shifts in the common law are rare and often visible only in hindsight. If there is a need to create new laws to control new technology or new forms of conduct, waiting for new common law rules is likely to prove an ineffective strategy.

However, existing common law rules are able to exercise some control over new technologies and new forms of conduct. Suppose a new technology, when used in certain ways, risks causing harm to others. Ordinary rules of negligence provide an incentive either to avoid such uses, exercise caution when engaging in such uses or alter the technology to avoid the risk. The fact that a technology is 'new' does not take it outside the field of existing tort law. Of course, legislative and administrative regimes are also possible. One might require that technologies in a particular class not be used without approval or license from government or a

72 *Wilkinson v Osborne* (1915) 21 CLR 89, 97.

specified organization, or that they comply with a specified set of standards. Whether either path is appropriate will depend on the nature of the technology and the risks posed, but some general observations will also apply.

As noted in Part II D, a desire to encourage or discourage new forms of conduct or control the form a technology takes can lead to calls for new laws for new technologies. In extreme cases, the risks posed by a new technology will be irreversible or severe, so that many will wish to ban it altogether. Because judges do not of their own volition prohibit new forms of conduct, such decisions are necessarily left to the legislature. Discussion of prohibition tends to arise where a new technology poses serious risks to health or safety, or threatens fundamental values. Biomedical technology such as cloning might be banned on both grounds.[73] The decision as to whether such risks are real or amount to no more than fear of the new and unfamiliar is for the legislature, preferably following community debate and philosophical reflection.[74]

Statutory and common law approaches to the control of new technology can be compared in circumstances where there is no need to ban the technology but merely a desire to control its negative effects. Technology can be made to pose fewer risks to safety, health, the environment as well as privacy and other values through tort regimes or specific legislation mandating standards or requiring approvals or licenses.[75]

The primary advantage of tort law is that its principles are, by design or accident, relatively efficient.[76] For example, negligence law provides an incentive to avoid conduct where the magnitude of foreseeable harm, factored by its probability, outweighs the expense, difficulty and inconvenience of avoidance.[77] Rational actors will, therefore, usually avoid conduct in precisely those circumstances in which such avoidance is efficient. Effectively, the law of negligence internalises the cost of accidents to the industry engaging in the risky conduct.[78] In addition, tort law is technology-neutral: no matter how technologies change, the same test will operate to provide the appropriate disincentive. Yet tort law deals poorly with problems that are interactive or polycentric (involving multiple competing variables).[79] Such problems require that the decision-maker optimise competing factors simultaneously, and cannot be resolved by sequences

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73 See *Gene Technology Act 2000* (Cth) s 192B; *Infertility Treatment Act 1995* (Vic) s 47; *Human Reproductive Technology Act 1991* (WA) s 7(1)(d)(i).

74 See the Honourable Jim Kennan, 'Science and the Law' (1985) 59 *Australian Law Journal* 488.

75 Standards, whether mandated or voluntary, may also fulfill other goals, such as the interactivity of different technologies. The role of standards in achieving such goals will not be considered here.

76 See Richard A Posner, *Economic Analysis of Law* (6th ed, 2003) ch 6; William M Landes and Richard A Posner, *The Economic Structure of Tort Law* (1987).

77 *Wyong Shire Council v Shirt* (1980) 146 CLR 40, 47–8 (Mason J). But see John G Fleming, *The Law of Torts* (9th ed, 1998) 131–2 (noting that the test in *Wyong Shire Council v Shirt* is not purely economic).

78 See generally Milton Katz, 'The Function of Tort Liability in Technology Assessment' (1969) 38 *University of Cincinnati Law Review* 587, 662.

79 See Thomas Barton, 'Justiciability: A Theory of Judicial Problem Solving' (1983) 24 *Boston College Law Review* 505, 550; Thomas Barton, 'Common Law and Its Substitutes: The Allocation of Social Problems to Alternative Decisional Institutions' (1985) 63 *North Carolina Law Review* 519; Lon Fuller, 'Adjudication and the Rule of Law' in *Proceedings of the American Society of International Law* (1960) 1, 3.

of tort cases except over a long time-frame.[80] Moulding technology to satisfy safety and environmental standards is a polycentric problem; a modification that might be appropriate for avoiding one kind of accident might have other disadvantages. Tort law, which considers accidents on a case-by-case basis, tends to focus on the design feature leading to the injury in question without examining engineering decisions in their entirety.[81] Legislative regimes, whether requiring approvals, licences or compliance with standards, can adopt a broader perspective. Tort law is also less well adapted to addressing harms to the public generally as opposed to harms to individuals or identifiable groups.[82]

Mandated standards are useful in that they offer more precise advice to engineers designing technology than do the general principles of negligence.[83] Because compliance with standards is easy to check, the deterrence effect is strong. The main drawback to using standards is the possibility that technology will become frozen in its current state of development, hindering further improvements in efficiency and safety.[84] Benefits of technological advancement can often not become available until the standards are amended. Because lobbying for changes in the standard is expensive, the very existence of standards creates a disincentive for those who otherwise would seek to advance the technology. Even standards based on performance rather than design can prevent attainment of greater efficiency, as compliance is easier to demonstrate if a familiar technology is employed.[85]

Compared to standards, an approvals process, such as that used for therapeutic goods,[86] seems less likely to result in stultification.[87] It still adds to the expense of introducing new products, thus providing some disincentive, and delays the availability of new products, but the negative effect on development is less than where mandated standards are employed. An approvals regime will generally only be useful, however, in regulating new members of a class of well-established technologies (such as pharmaceutical drugs or polluting machinery). Where new *types* of technology are invented, there will be no approvals regime in place and some other form of regulation (standards or licensing) would be required.

Another technique used by government to maintain control over technologies is the requirement that those manufacturing a product or carrying out a process obtain a licence. Licensing regimes can be used as a means of allocating resources, imposing standards, requiring minimal qualifications or ensuring a

80 See generally references ibid.

81 See Richard A Epstein, *Simple Rules for a Complex World* (1995) 238.

82 Barton, 'Justiciability' above n 79, 548.

83 On the defects of tort law in this regard, see Peter W Huber and Robert E Litan, 'Overview' in Peter W Huber and Robert E Litan (eds), *The Liability Maze* (1991) 1, 14.

84 Stephen Breyer, *Regulation and its Reform* (1982) 115–6.

85 See Richard B Stewart, 'Regulation, Innovation, and Administrative Law: A Conceptual Framework' (1981) 69 *California Law Review* 1256, 1268–9.

86 *Therapeutic Goods Act 1989* (Cth). Although the Act is based primarily on an approvals process, it also makes provision for mandated standards: pt 2.

87 See generally Breyer, above n 84, ch 7.

high level of government awareness and supervision.[88] Because licensing regimes can fulfil multiple functions, little can be said by way of generalisation, although some comments made with respect to standards and approvals regimes may apply.

Sometimes government intervention, either establishing an approvals or licensing regime or mandating standards, will be necessary in light of insufficiencies in tort law. This is more likely to be the case where the incentive effect offered by tort law is reduced due to the presence of one or more of the following factors:

(1) the harm caused is to a diffuse group or to the public generally, so that litigation is less likely;
(2) a plaintiff would face difficulty in making out their claim, for example where causation is hard to establish;
(3) the vague standards offered by tort law provide insufficient precision;
(4) the technology causes harm to health but with long latency periods;
(5) the cost-benefit analysis would be difficult for an individual judge to determine, perhaps because the factors involved are polycentric;
(6) those engaging in certain conduct have sufficient bargaining power to contract out of liability in tort on unfair terms.

On the other hand, tort law is often the only incentive to design a new type of technology with health, safety and environmental risks in mind at the crucial early stages of development.[89] Incentives to take into account health, safety and environmental risks are important in the early stages of development because the path the technology takes at that stage will affect the feasibility of implementing standards at a later stage. Thus, whether or not general principles of tort law are later supplemented by a targeted statutory regime, it is important that tort law continue to operate in the background.[90] An optimal level of protection thus often requires the simultaneous operation of common law and statutory regimes.

V CONCLUSION

Debate about the appropriate legal response to particular technologies should not focus exclusively on substance. Although it is important to ask *how* the law ought to be changed, it can be almost as important to ask *by whom*. Although the legislature is usually the forum of first resort, it is not always the best suited to the task of ensuring the law adapts to new technologies. Often it is better to wait and allow the common law to develop its response before rushing in with new statutes. Because common law rules are inherently more flexible, statutory law reform risks reducing the law's ability to respond to future change.

It might be argued that the comparison between statute and common law is unnecessary, that in a democracy it is for the Parliament and not unelected judges

88 Ibid 132–3.
89 See Mary L Lyndon, 'Tort Law and Technology' (1995) 12 *Yale Journal on Regulation* 137, 150–1.
90 Ibid 143.

to change the law. However, our constitutional system is more complicated than the argument from democracy would suggest. A democratic institution is entitled to rely on a less democratic forum that is better able to perform a particular task. The very notion of the administrative state is based on this premise. Similarly, in situations where the courts offer an advantage over the legislature in ensuring the ongoing adaptation of the law, Parliament can 'delegate' this task by doing nothing.

However, courts are at risk of eliminating their own advantage. Where courts are overly deferential to legislatures and refuse to adapt the law as circumstances change, the system's ability to respond to technological change is reduced. The common law works best as a system of semi-transparent rules that are moulded by judges to best reflect their underlying justifications. If common law rules become opaque and are applied solely by reference to their canonical form, common law development would become dependent on legislation. Any flexibility advantages offered by the common law would be lost.

In the rush to reform the law, the role of the judiciary should not be forgotten. There is often good reason for legislators to wait for common law responses to new technologies before deciding whether statutory reform is necessary. Even where creating entirely new law to control new technologies, legislators should not ignore the role played by stable common law doctrines such as tort. It is by working together, each in accordance with its institutional strengths, that courts and legislatures can ensure that the law keeps pace with technological change.