

*Describe and discuss some of the challenges facing those charged with regulating **driverless cars**, and the strategies they might employ to address them.*

Introduction

In recent decades, technological advancements in a variety of sectors and industries have proceeded at a rapid rate, reshaping and transforming society. These advancements offer untold benefits for mankind – safety, convenience and efficiency being just a few. However, the accelerated and unprecedented rate at which these have occurred also presents a number of challenges, as governments and regulatory bodies, unfamiliar with the new technologies and uncertain as to how they will evolve, grapple with which regulatory approach will best ensure the public’s safety while continuing to promote technological development that is clearly of public utility. Consequently, tension exists between the law and innovation.¹ Of particular interest is the case of driverless cars, also known as autonomous vehicles. Autonomous vehicles offer a multitude of potential benefits for society, including increased transportation safety and transport mobility, reduced traffic congestion and fewer emissions when compared to regular driver-controlled vehicles.² As a result, it is widely accepted that the introduction and adoption of this technology is inevitable. Ideally, regulations protecting public safety should be in place prior to this occurring, but regulating this technology is not a straightforward task.

This essay discusses some of the challenges faced by those charged with regulating driverless cars and suggests some strategies that might be employed to address them.

Challenges

The ‘pacing problem’ is a phenomenon occurring when technological innovation outpaces the development of laws and regulations.³ It is reflective of the fundamental tension between the flexible, open-ended nature of emerging technologies and the reactive character of regulatory institutions, and results from the differing rates at which law and technology often evolve.⁴ Due to this intrinsic conflict, the ‘pacing problem’ is a challenge consistently encountered when attempting regulation of emerging technologies.

The structure and design of the legislature and court system in New Zealand – the two institutions with primary responsibility for administering and developing regulations – is largely responsible for the difficulties regulators face in creating regulations and ensuring they remain relevant.⁵

¹ Jeremy A Carp “Autonomous Vehicles: Problems and Principles for Future Regulation” (2018) 4 U Pa JL & Pub Affairs 82 at 83.

² Jeremy A Carp “Autonomous Vehicles: Problems and Principles for Future Regulation” (2018) 4 U Pa JL & Pub Affairs 82 at 87-91.

³ Adam Thierer *The Pacing Problem and the Future of Technology Regulation* (online ed, George Mason University, 8 August 2018).

⁴ Jeremy A Carp “Autonomous Vehicles: Problems and Principles for Future Regulation” (2018) 4 U Pa JL & Pub Affairs 82 at 103.

⁵ Jeremy A Carp “Autonomous Vehicles: Problems and Principles for Future Regulation” (2018) 4 U Pa JL & Pub Affairs 82 at 103-104.

Parliamentary supremacy means that laws passed by the House are binding and have ultimate precedence and priority.⁶ However, structural, procedural and political requirements which slow legislative decision-making and contribute to delays and disconnection between regulation and emerging technologies undermine the effectiveness of this power.⁷ For example, internal procedural rules such as the requirements that proposed legislation be read before the House three times and scrutinized by a Select Committee for up to six months are designed to promote caution and serve as ‘anchors against precipitous change’. This limits the ability of regulators to respond quickly to rapidly emerging technologies.⁸ The House’s inherently political nature also constrains its responsiveness, as policy matters are unlikely to be addressed outside of short ‘policy windows’ – when it is politically feasible, there is widespread public and parliamentary support and/or the need is urgent.⁹ Thus, if the pertinent issue – for example, the regulation of driverless cars – arises at the wrong time politically, there may be significant delays in addressing it.

Additionally, courts have a limited adaptive and reactive capacity due to several structural features.¹⁰ The common law system is based on the incremental development of law over time, as judges refine and adapt previous judicial decisions in analogous cases, gradually developing legal rules. While this ensures a degree of stability, it also acts as a restraint on rapid change, and limits the ability of judges to significantly adapt the law to address technological developments.¹¹ Judges who do attempt adaptation of the law also face the risk their decisions will be challenged in appellate courts, and potentially overturned – undoing the progress made. Parliamentary supremacy also means that courts are bound to apply statutory rules, which take precedence over common law rules, even if they are outdated or ineffective.¹² Accordingly, incremental progress made in the common law towards the regulation of emerging technologies may be undermined and rendered superfluous.

Thus, various structural and procedural requirements of the two institutions with primary responsibility for lawmaking, including regulation, act as effective checks against rapid change in the law, limiting its ability to keep pace with rapidly emerging technologies. In an industry where a multitude of companies are developing autonomous vehicles employing differing technologies, these checks handicap the laws ability to respond to these developments and pass regulations that would ensure public safety.¹³

⁶ New Zealand Parliament “Parliament Brief: What is Parliament?” (21 March 2014) <<https://www.parliament.nz/en/>>.

⁷ Jeremy A Carp “Autonomous Vehicles: Problems and Principles for Future Regulation” (2018) 4 U Pa JL & Pub Affairs 82 at 104.

⁸ New Zealand Parliament “How a bill becomes law” (12 January 2016) <<https://www.parliament.nz/en/>>; Jeremy A Carp “Autonomous Vehicles: Problems and Principles for Future Regulation” (2018) 4 U Pa JL & Pub Affairs 82 at 105, n 114.

⁹ Jeremy A Carp “Autonomous Vehicles: Problems and Principles for Future Regulation” (2018) 4 U Pa JL & Pub Affairs 82 at 105, n 120.

¹⁰ Jeremy A Carp “Autonomous Vehicles: Problems and Principles for Future Regulation” (2018) 4 U Pa JL & Pub Affairs 82 at 108, n 141.

¹¹ Joseph Dainow “The Civil Law and the Common Law: Some Points of Comparison” (1966-1967) 15 AM J Comp L 419 at 427.

¹² Jeremy A Carp “Autonomous Vehicles: Problems and Principles for Future Regulation” (2018) 4 U Pa JL & Pub Affairs 82 at 110.

¹³ Bill Whitaker “Hands off the Wheel” *CBS News* (online ed, United States of America, 4 October 2015).

A further challenge exists in determining where legal liability will rest. Driverless cars have varying levels of autonomy, ranging from no automation (Level 1) to full automation (Level 5).¹⁴ It is an established legal principle that a driver controlling a Level 1 vehicle bears legal liability when they are at fault – for example, if they are negligent.¹⁵ Additionally, it is logical that a car manufacturer should be legally responsible if their technology in a Level 5 vehicle is defective or not fit for purpose, and several major driverless car manufacturers, such as Google and Mercedes have stated they will accept liability for their fully autonomous systems once they are commercially available.¹⁶

The challenge regulators face is determining who will bear legal responsibility in the case of semi-autonomous vehicles (with some driver-control). Most semi-autonomous vehicles perform a range of tasks but require drivers to take over in certain situations. However, manufacturers have struggled to find an effective way of transferring control from the vehicle to the driver, as humans are prone to distraction, meaning they are inherently bad at monitoring semi-autonomous systems.¹⁷ Consequently, there is uncertainty regarding who should be liable when semi-autonomous vehicles are involved in accidents. Ascribing liability to drivers in these situations may deter them from adopting the technology. Conversely, attributing liability to manufacturers may slow the introduction of the technology, as manufacturers will be reluctant to release it.¹⁸ Thus, both approaches may cause the potential societal benefits of driverless cars to be unrealized. As semi-autonomous vehicles will likely be ready for market release before fully-autonomous vehicles, it is possible the adoption of any driverless car technology may be stalled until fully-autonomous vehicles have been perfected.

The challenge of regulations stunting innovation may not only manifest itself as a result of manufacturer liability being imposed but may also occur if regulators implement either of the two most common regulatory approaches to emerging technologies; the precautionary principle and future-facing mandates.

The precautionary principle is a regulatory approach which aims to slow the development and adoption of a technology until it is proven to be safe. This conservative approach allows regulators extra time to understand the emerging technology (and its risks) and develop an appropriate regulatory framework to respond to it, reducing the likelihood that it will become outdated and require amendment.¹⁹ The precautionary principle is frequently utilized in the context of emerging technologies, and has already shaped the regulatory response to driverless cars in a number of jurisdictions. For example, in America the states of Connecticut, New York and Massachusetts require that a human driver be present when using autonomous vehicles and

¹⁴ Josh Hendrickson “What Are the Different Self-Driving Car ‘Levels’ of Autonomy?” (25 January 2019) How-To-Geek <<https://www.howtogeek.com>>.

¹⁵ James M Anderson, Nidhi Kalra, Karlyn D Stanley, Paul Sorensen, Constantine Samaras and Oluwatobi A Oluwatola *Autonomous Vehicle Technology: A Guide for Policymakers* (RAND Corporation, United States of America, 2014) at ch 7.

¹⁶ Jon Walker *Autonomous Vehicle Regulations – Near-Term Challenges and Consequences* (online ed, Emerj); Bill Whitaker “Hands off the Wheel” *CBS News* (online ed, United States of America, 4 October 2015).

¹⁷ Joan Claybrook and Shaun Kildare “Autonomous vehicles: No driver...no regulation?” (2018) 361 *Science* 36 at 36-37.

¹⁸ James M Anderson, Nidhi Kalra, Karlyn D Stanley, Paul Sorensen, Constantine Samaras and Oluwatobi A Oluwatola *Autonomous Vehicle Technology: A Guide for Policymakers* (RAND Corporation, United States of America, 2014) at ch 7.

¹⁹ Jeremy A Carp “Autonomous Vehicles: Problems and Principles for Future Regulation” (2018) 4 *U Pa JL & Pub Affairs* 82 at 111-112.

that all autonomous vehicles must have accelerators, brakes and steering wheels.²⁰ By restricting the operation of autonomous vehicles and demanding the presence of superfluous features, these laws slow technological development, giving regulators time to respond. This threatens to stunt innovation in two ways. Restriction of newly emerging technology may interfere with the ‘trial and error’ experimentation process, a critical stage in the development of a safe and robust product.²¹ Additionally, imposing strict requirements necessary for the operation of the vehicle may alienate the technology from many societal groups who would otherwise invest in and adopt it – for example, those with disabilities who had the potential to benefit significantly from driverless cars. Such a potential reduction in consumer market size may cause businesses to struggle to become established or to generate sufficient revenue to continue refinement of the technology.²² Thus, rather than promoting the development of potentially beneficial technology, this common regulatory approach threatens to sabotage it and may result in potential societal benefits being unrealized.

The enacting of ‘future-facing mandates’ is the other common regulatory response to emerging technologies. This is essentially an attempt to regulate upstream and introduce regulations that will guide and shape the development of emerging technologies. The supposed advantage of this regulatory style is that frameworks are in place as technology develops, ensuring there is no disconnection or phase when a new technology is unregulated – thus promoting public safety.²³ Additionally, the broad scope of the regulations theoretically reduces the risk they will need constant amendment. The two usual approaches to future-facing regulation are to either “mandate specific characteristics or forms of a technology” or to “draft technology-neutral laws which focus on achieving a particular state of the world rather than a particular state of a technology”.²⁴ Future facing regulations, even technology-neutral ones threaten to hinder the development of emerging technologies such as driverless cars, because it is impossible to accurately predict the outcomes and end products of technology still in a developmental stage.²⁵ Attempting to predict and shape development can “lock in one pathway [to adoption of a technology] over...potentially better one[s]” or “freeze unrealistic expectations – high or low – into the law”, distorting the natural innovation and market force processes necessary to produce optimal technology.²⁶ Even technology-neutral laws which purport not to interfere with the developmental process threaten to stymie it, due to constraining the inherently unpredictable nature of technological development. The challenges of future-facing regulation are particularly prominent in the sphere of driverless car technology, as numerous companies are developing the technology – many still in early stages – with competing visions of how it

²⁰ Jeremy A Carp “Autonomous Vehicles: Problems and Principles for Future Regulation” (2018) 4 U Pa JL & Pub Affairs 82 at 99 & 113, n 89 and 164.

²¹ Adam Thierer *Permissionless Innovation: The Continuing Case for Comprehensive Technological Freedom* (George Mason University, Arlington (State of Virginia), 2016) at 27.

²² Jeremy A Carp “Autonomous Vehicles: Problems and Principles for Future Regulation” (2018) 4 U Pa JL & Pub Affairs 82 at 132, n 270.

²³ Jeremy A Carp “Autonomous Vehicles: Problems and Principles for Future Regulation” (2018) 4 U Pa JL & Pub Affairs 82 at 117.

²⁴ Jeremy A Carp “Autonomous Vehicles: Problems and Principles for Future Regulation” (2018) 4 U Pa JL & Pub Affairs 82 at 117-118, n 191 and 192.

²⁵ Daniel Sarewitz “Anticipatory Governance of Emerging Technologies” in Gary E Marchant, Braden R Allenby and Joseph R Herkert (eds) *The Growing Gap Between Emerging Technologies and Legal-Ethical Oversight* (Springer, United States of America, 2011) at 97.

²⁶ Organisation for Economic Co-operation and Development *Automated and Autonomous Driving: Regulation under uncertainty* 27 (2015) at 6.

should look and function.²⁷ Accordingly, there is major uncertainty about the end-state of the technology and attempts to regulate it at this early stage are based on deficient information. Indeed, a spokesperson for Google recently declared “[w]e think policymakers should learn about the technology and see how people want to use it first before putting a ceiling on innovation.”²⁸

Although regulation of emerging technology is not limited to precautionary and future-facing approaches, these are the usual standard. The potential risk they present to the natural and organic development of driverless car technology highlights the challenges faced by regulators of this industry.

Potential strategies

In his journal article ‘Autonomous Vehicles: Problems and Principles for Future Regulation’, Jeremy Carp proposed a solution that he felt would transcend the challenges faced when attempting to regulate autonomous vehicles. It aimed to circumvent the ‘catch 22’ that regulators face – that broad, forward-looking regulations can become disconnected from, and stunt the innovation of technology, while narrow, precautionary regulations can also stunt innovation and quickly become outdated.²⁹ His scheme, termed a ‘planned adaptive approach’ focused on shifting from an ‘ex-ante’ regulatory approach – based on forecasts rather than actual results – towards a highly adaptive, reactive approach capable of responding to rapid change. Implementing this requires a complete paradigm shift from a static view of regulation to a dynamic “evolutionary paradigm” emphasizing the need for responsiveness.³⁰ This is critical because it is “virtually impossible, early in the life of a rapidly evolving technology, to identify both an optimal regulatory approach and establish an enduring framework, all in one shot”, especially considering the limitations of regulatory institutions.³¹

The ‘planned adaptive approach’ views regulation as an iterative process, prioritising feedback, monitoring and constant evaluation of the framework. Specifically, it encompasses four stages:

1. Initial regulation
2. Intensive data collection
3. Independent assessment and recommendations
4. Consideration of recommendations and adjustment of the framework

The first stage would create an initial non-restrictive framework containing only some minimum standards of safety – essentially a foundational structure upon which a full legal framework can eventually be constructed. Once this is in place, data must be collected about the operation, manufacture, social, environmental and economic impacts of autonomous vehicles, plus all other relevant information. Comprehensive data collection is imperative to the success of a ‘planned adaptive approach’, which is reliant on feedback about how the current framework is functioning in the real world. The third stage is where flaws in the current

²⁷ Bill Whitaker “Hands off the Wheel” *CBS News* (online ed, United States of America, 4 October 2015); Jeremy A Carp “Autonomous Vehicles: Problems and Principles for Future Regulation” (2018) 4 U Pa JL & Pub Affairs 82 at 134, n 278-280.

²⁸ Alex Davies “Self-Driving Cars are Legal, but Real Rules Would Be Nice” *Wired Magazine* (online ed, United States of America, 15 May 2015).

²⁹ Jeremy A Carp “Autonomous Vehicles: Problems and Principles for Future Regulation” (2018) 4 U Pa JL & Pub Affairs 82 at 137, n 297-298.

³⁰ Barbra A Cherry & Joannes M Bauer “Adaptive Regulation Contours of a Policy Model for the Internet Economy (2004) 26 JEL 1 at 13.

³¹ Jeremy A Carp “Autonomous Vehicles: Problems and Principles for Future Regulation” (2018) 4 U Pa JL & Pub Affairs 82 at 139.

model are identified and recommendations for possible improvement suggested by various outside observers. This ‘assessment and adjustment’ process is critical in ensuring the framework’s responsiveness. Finally, the recommendations need to be considered, adjusted and implemented. The incremental building of a regulatory framework in this way ensures adaptability, responsiveness and flexibility – qualities necessary where rapidly developing technologies are concerned.³²

In a New Zealand context, delegated legislation may be the best vehicle for implementing a ‘planned adaptive approach’. Delegated legislation is rules of law promulgated by delegates of Parliament, usually Ministers, who have been authorised to create the rules under Principal Acts. These Acts contain empowering provisions – provisions of law conferring power on a delegate[s] and specifying the scope of their regulation making power. The rules usually take the form of ‘regulations’, which are often made by Order in Council. These can have binding legal effect, and do not have to be approved by the House as long as the empowering legislation specifies them not to be ‘disallowable instruments’. Accordingly, they are useful instruments for efficient administration, as proposed regulations need only be approved by the Executive Council – a much smaller and more politically homogeneous group than the entire House.³³ Thus, delegated legislation allows legal regulations to be created and amended in much shorter timeframes than primary legislation, providing the adaptability and responsiveness needed when attempting to regulate emerging technologies.

If delegated legislation was identified as the best medium through which to implement a ‘planned adaptive approach’, under the Principal Act a collection of Ministers could be empowered to jointly make the regulations, facilitating a balanced and informed end result. The Ministers of Transport, Research & Innovation, Health and Environment may be appropriate. It would be important to articulate a very broad empowering provision in the Principal Act, which would grant the relevant Ministers scope to make any regulations necessary to govern autonomous vehicle technology. Although this would need to be passed by the full House using standard Parliamentary procedure, given the lack of viable alternative regulatory approaches it is foreseeable this could occur.³⁴ Following this, the Ministers could begin to develop a collection of regulations to govern autonomous vehicles, employing a ‘planned adaptive approach’ by consulting with outside parties such as lawyers, local councils, autonomous vehicle manufacturers, users and others to collect data and feedback on how the current regulations are functioning. This information could be used to create further regulations, and amend others as required. Thus, the medium of delegated legislation would allow regulations to be made rapidly, enabling regulators to keep pace with and adapt to the development of autonomous vehicle technology.

Establishing a ‘pilot program’ or trial period for driverless cars could be another means of implementing a ‘planned adaptive approach’. Driverless cars could be introduced in a carefully chosen and geographically limited area, and observation of their operation and use could take place. This period would clarify the areas where further regulation of the technology is required, as well as providing insight and feedback into the most effective and feasible regulatory approaches. Trial periods have been utilized with emerging technologies such as

³² Jeremy A Carp “Autonomous Vehicles: Problems and Principles for Future Regulation” (2018) 4 U Pa JL & Pub Affairs 82 at 140-145.

³³ New Zealand Parliament “Chapter 28 Delegated Legislation” <<https://www.parliament.nz/en/>>.

³⁴ New Zealand Parliament “Chapter 28 Delegated Legislation” <<https://www.parliament.nz/en/>>.

Lime scooters and could potentially be beneficial in the context of driverless cars, providing the system feedback necessary for evaluation and development of the regulatory framework.³⁵

A possible strategy that could be employed to address the challenge of where legal liability for autonomous and semi-autonomous vehicles should rest is to make liability contingent on the level of driver control, with a reasonableness qualification. This means manufacturers of fully autonomous vehicles would be liable for any technology failures for which they are at fault. The risk and potential costs of liability could be passed on to consumers by manufacturers raising the price of their products.³⁶ For semi-autonomous vehicles, liability would rest on the controller of the vehicle at the time of an incident, and if they were at fault. However, in situations where control had been recently transferred to the human driver, a reasonableness qualification could arise. This would require adequate warning to have been provided to the driver prior to the transfer of control, ensuring the driver has sufficient time to regain concentration and engage with the task. A reasonableness requirement would force manufacturers to find creative but practical solutions to the driver-concentration challenges of semi-autonomous vehicles, thus advancing the development of the technology and producing societal benefits. Again, the liability risks faced by manufacturers could be passed on to consumers in the form of increased price points of autonomous vehicles. If manufacturers are unable to find effective mechanisms for control transfer due to the fact that humans by nature are easily distracted, and are unwilling to shoulder some liability, semi-autonomous vehicles may not be commercially viable.

Conclusion

It is abundantly clear that emerging technologies, such as driverless cars represent the way of the future and offer immense social, economic, environmental and other benefits. However, their rapid and continuous evolution, along with uncertainty about how liability should be assigned creates significant challenges for regulators, who want to ensure public safety during interactions with these new technologies, while concurrently allowing advancement of their development and capitalizing on the potential benefits they provide. For driverless car technology, potential strategies to address and overcome the aforementioned challenges include the adoption of a ‘planned adaptive regulatory approach’, potentially through the use of delegated legislation or trial periods and the allocation of liability based on driver-control. These strategies are by no means perfect solutions; however, they do provide potential pathways and approaches for regulators, who could adapt and develop them to achieve their objectives going forward.

³⁵ Hamish McNeilly “Council e-scooter trials could contribute to new regulations” *Stuff.co.nz* (online ed, New Zealand, 22 January 2019).

³⁶ James M Anderson, Nidhi Kalra, Karlyn D Stanley, Paul Sorensen, Constantine Samaras and Oluwatobi A Oluwatola *Autonomous Vehicle Technology: A Guide for Policymakers* (RAND Corporation, United States of America, 2014) at ch 7.