



Innovation and Balance

Submission to the Government of
Canada's Consultation on
Copyright, AI, and IoT

Liwah Keller and
Yuan Stevens

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Written under the supervision of David Fewer, CIPPIC General Counsel.

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About CIPPIC

The Samuelson-Glushko Canadian Internet Policy and Public Interest Clinic (CIPPIC) is Canada's first and only public interest technology law clinic. Based at the Centre for Law, Technology and Society at the University of Ottawa's Faculty of Law, our team of legal experts and law students works together to advance the public interest on critical law and technology issues including privacy, free expression, intellectual property, telecommunications policy, and data and algorithmic governance.



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1. Introduction

The Government of Canada asks how it can amend the *Copyright Act* to better accommodate AI (“artificial intelligence”) and IoT (the “Internet of Things”) technologies. The consultation document specifically inquires about authorship of AI-assisted works, liability in the context of relying on AI for production, and how technological protection measures (“TPMs”) affect the ability of users to repair IoT devices.

CIPPIC is a public interest clinic that specializes in technology law. Our goal is to advocate in the public interest for policy that promotes innovation, encourages respect for human rights, and responds to the needs of the wider public. These principles underlie the following recommendations that we offer in this submission:

- Refrain from introducing laws that attribute authorship to AI or determine how authorship should be assigned for AI-assisted works until there is a clear and pressing need (sections 2.2-2.3).
- Develop a cohesive approach to liability for infringing activities that involve the use of an AI and provide an exception or safe harbour for text and data mining (“TDM”) within certain parameters (sections 3.2-3.3).
- Amend the prohibition on TPM circumvention to allow circumvention for uses that do not infringe upon copyright and expand the current exceptions to the prohibition (sections 4.2-4.3).

2. AI, Authorship, and Copyright

2.1 Context

The Government is considering amending the *Copyright Act* to account for the belief that artificial intelligence can “create content previously attributable only to human persons.”¹

The belief rests on the idea that AI systems “can write movie scripts, software and music, and draw animation with little human input beyond the development of the AI itself.”² Many people are involved in the development and use of AI systems – including programmers who write computer code and develop algorithms as well as those who may use such tools to create new models or inputs that produce subsequent outputs.

¹ See “A Consultation on a Modern Copyright Framework for Artificial Intelligence and the Internet of Things” (16 July 2021) at 7, 11, online (pdf): *Government of Canada* <www.ic.gc.ca/eic/site/693.nsf/eng/00316.html> [Consultation Paper]; *Copyright Act*, RSC 1985, c C-42 [the Act or *Copyright Act*].

² Consultation Paper, *ibid* at 12.

Our definition of AI informs how we regulate it.³ The technology is not new and its definition has evolved over time; put simply, artificial intelligence is an interdisciplinary field that seeks to help technology process and analyze aspects of the human environment in hopes of achieving a specific goal.⁴ TurboTax is an example of early rule-based AI, where outputs stem from a decision tree based on human knowledge, while more recent examples of AI involve machine learning that extrapolates patterns after being trained on enormous amounts of data on the basis of trial and error.⁵

There are two main legal issues to resolve in the context of determining authorship over AI-assisted works. The first is whether copyright can vest in the tools or machines used to create works. The second is whether copyright can vest in those who developed AI tools or machines that are used for the creation of subsequent works, dependent on their role in the development process.⁶

For the reasons below, any changes to the *Copyright Act* regarding the determination of first authorship in respect of AI-assisted works must be commensurate to the Act's inability to capture proposed instances of authorship.

2.2 Recommendation: Refrain from Introducing Laws Attributing Authorship to AI

The Government of Canada should refrain from introducing new laws attributing authorship to machines in the context of AI-assisted works until there is a clear need to do so.

There is need to respect the underlying principles of copyright law in Canada when determining how to regulate ownership over works produced with the aid of AI. These principles include incentivizing innovation, economic and scientific development, rewarding creativity, and increasing public access to artistic and intellectual works.⁷

2.2.1 Philosophical Considerations Regarding the Purpose of Authorship

How we understand the purpose of authorship will dictate whether we believe a tool or machine such as an AI system should be able to obtain copyright.⁸ For Professors Carys Craig and Ian Kerr, the notion of author must be socially situated: authors are participants

³ See Yuan Stevens, "The Promises and Perils of Artificial Intelligence: Why Human Rights and the Rule of Law Matter" (5 September 2017), online: *Medium* <medium.com/@ystvns/the-promises-and-perils-of-artificial-intelligence-why-human-rights-norms-and-the-rule-of-law-40c57338e806>.

⁴ See Stuart J Russell & Peter Norvig, *Artificial Intelligence: A Modern Approach* (Englewood Cliffs, NJ: Prentice Hall, 1995) at 4.

⁵ See Colin Garvey, "Interview with Colin Garvey, Rensselaer Polytechnic Institute. Artificial Intelligence and Systems Medicine Convergence" (2018) 22:2 OMICS: AJ Integrative Biology 130, DOI: 10.1089/omi.2017.0218.

⁶ See e.g., Rex M Shoyama, "Intelligent Agents: Authors, Makers, and Owners of Computer-Generated Works in Canadian Copyright Law" (2005) 4:2 CJLT 129 at 131.

⁷ *Théberge v Galerie d'Art du Petit Champlain inc.*, 2002 SCC 34 at paras 11-12; *York University v Canadian Copyright Licensing Agency (Access Copyright)*, 2021 SCC 32 at paras 60-61, 90-94.

⁸ See Carys Craig & Ian Kerr, "The Death of the AI Author" (2021) 52:1 Ottawa L Rev 31.

in the circulation, interpretation, and transformation of works.⁹ The value of authorship in society is to encourage the “human creative capacity to ‘resist and transform existing patterns,’” yet AI merely identifies, reinforces, and replicates existing patterns.¹⁰ Drawing on Singer’s observation on property rights more generally, copyright can be seen as a “social system composed of entitlements which shape the contours of social relationships.”¹¹ Copyright therefore cannot be divorced from the social system in which it exists; it does not involve relations between people and things, but relations among people.¹² In the eyes of Craig and Kerr, to allow copyright to vest in a non-human actor such as an AI system is to fail to see that human communication is at the heart of authorship as a social practice.

2.2.2 AI Systems are Objects, Not Legal Subjects

As such, copyright law should remain human-centric in its determination of authorship and liability.¹³ Those who argue in favour of granting AI authorship tend to couch their positions in the desire to anthropomorphize the robots we create as well as utilitarian and functionalist approaches.¹⁴ As a counterpoint, tools such as AI systems do not themselves carry rights, obligations, and responsibilities in Canadian law. For example, doctors in Canada would remain liable for misdiagnoses that occur through reliance on AI as a decision-making tool.¹⁵ In Ontario, human drivers ultimately remain responsible for the “full care and control” of self-driving vehicles.¹⁶ This absence of legal status therefore means that individual AI systems cannot obtain copyright over works and nor do they have obligations under the *Copyright Act*.¹⁷ AI systems are not legal subjects but instead are legal objects.¹⁸

2.2.3 The Copyright Act Reserves Rights for Humans

Textual analysis of the *Copyright Act* and jurisprudence indicates that copyright is reserved for humans. As the consultation paper observes, while the *Copyright Act* does not define “author”, case law indicates that an author ought to be a natural person who exercises skill and judgment in creating the work, which is also linked to the fact that copyright protection is dependent on the timing of the author’s life and death.¹⁹ The

⁹ *Ibid* at 58.

¹⁰ *Ibid* at 86; Jennifer Nedelsky, *Law’s Relations: A Relational Theory of Self, Autonomy, and Law* (New York: Oxford University Press, 2011).

¹¹ See Joseph William Singer, “Property and Social Relations: From Title to Entitlement” at 78, online (pdf): *Harvard University* <scholar.harvard.edu/files/jsinger/files/property_and_social_relations.pdf>.

¹² *Ibid*.

¹³ See Wenqing Zhao, “AI Art, Machine Authorship, and Copyright Laws” (2020) 12:1 American U Intellectual Property Brief 1.

¹⁴ Craig & Kerr, note 8 at 58-59, 65-72.

¹⁵ See Mélanie Bourassa Forcier, Lara Khoury & Nathalie Vézina, “Liability Issues for the Use of Artificial Intelligence in Health Care in Canada: AI and Medical Decision-making” (2020) 46:2 Dalhousie Medical J 7.

¹⁶ See Alex S Ross, “Autonomous Vehicles in Canada: are Liability Rules Being Affected by Horses, Elevators and Autopilots?” (16 July 2019), online: *Lexology* <www.lexology.com/library/detail.aspx?g=f8e89e32-c67b-4fe6-a066-54e98aba0bd0>.

¹⁷ See Mauritz Kop, “AI & Intellectual Property: Towards an Articulated Public Domain” (2020) 28:3 Tex Intell Prop LJ 297.

¹⁸ *Ibid*.

¹⁹ Consultation Paper, note 1 at 12; *CCH Canadian Ltd. v Law Society of Upper Canada*, 2004 SCC 13 [*CCH v LSUC*]; *Setana Sport Limited v 2049630 Ontario Inc. (Verde Minho Tapas & Lounge)*, 2007 FC 899, at para 4.

Copyright Act also implies that authors must be a citizen or resident of a country, which is not possible for machines such as AI.²⁰

AI systems cannot engage in unilateral or multilateral legal actions, such as assigning or licencing copyright over works pursuant to the *Copyright Act*.²¹ Unlike humans, AI systems also have no heirs, nor do they have honour or reputation that can be prejudiced as part of moral rights under the *Copyright Act*. The language of the *Berne Convention* and the *TRIPS* agreement also assumes that authors are natural persons who have nationalities and finite life spans.²²

2.2.4 Creators Use AI Systems as Tools

From a practical perspective, artists and creators have also long relied on tools, technology, and machines to produce their works.²³ The term ‘artificial intelligence’ obfuscates the fact that humans, and not machines, are currently able to provide the skill and judgment required to produce works subject to copyright.²⁴

It is important to distinguish between the concepts of artificial general intelligence (AGI) and narrow AI. AGI refers to the idea that a computer or robot exhibits human or super intelligence in all fields and is able to take knowledge from one field and transfer it to another.²⁵ A good example of AGI would be a robot that is able to adapt to a new environment as humans do, with examples including Wall-E, R2D2, and HAL 9000.²⁶ AGI currently does not exist but experts estimated in 2012 that it may come into existence anywhere between a decade or several centuries.²⁷ On the other hand, narrow AI refers to the creation of systems that carry out certain behaviours in specific contexts such as playing chess.²⁸ Until AGI systems are created, AI systems remain “narrow” in capabilities and must listen to the instructions of humans.

The term ‘AI-generated’ is therefore a misnomer. Seemingly ‘random’ or ‘creative’ choices made by AI systems give an aura or illusion of creativity.²⁹ But computer code and algorithms in the context of narrow AI are always deterministic and not capable of true randomness.³⁰ Computer code and algorithms operate in a purely mechanistic way:

²⁰ *Copyright Act*, note 1, s 5(1)(a).

²¹ *Copyright Act*, note 1, s 13(4).

²² Craig & Kerr, note 8 at 46.

²³ See James Grimmelman, “There’s No Such Thing as a Computer-Authored Work—And It’s a Good Thing, Too” (2016) 39:3 Colum JL & Arts 403.

²⁴ *CCH v LSUC*, note 19.

²⁵ See Benoît Dupont et al, “Artificial Intelligence in the Context of Crime and Criminal Justice” (2018) at 10, online (pdf): www.cicc-iccc.org/public/media/files/prod/publication_files/Artificial-Intelligence-in-the-Context-of-Crime-and-Criminal-Justice_KICICCC_2019.pdf.

²⁶ Ben Goertzel, “Artificial General Intelligence: Concept, State of the Art, and Future Prospects” (2014) 5:1 J Artificial General Intelligence 1 at 2, DOI: 10.2478/jagi-2014-0001.

²⁷ See Ben Goertzel & Cassio Pennachin, eds, *Artificial General Intelligence*, (Berlin: Springer, 2007) at VII. Notably, seven years later, and AGI still does not exist.

²⁸ See Ray Kurzweil, *The Singularity is Near: When Humans Transcend Biology* (New York: Viking, 2005).

²⁹ See Brigitte Vézina & Brent Moran, “Artificial Intelligence and Creativity: Can Machines Write Like Jane Austen?” (10 August 2020), online: [Creative Commons <creativecommons.org/2020/08/10/can-machines-write-like-jane-austen/>](https://creativecommons.org/2020/08/10/can-machines-write-like-jane-austen/).

³⁰ See Jason M Rubin “Can a Computer Generate a Truly Random Number?” (1 November 2011), online: [MIT School of Engineering <engineering.mit.edu/engage/ask-an-engineer/can-a-computer-generate-a-truly-random-number/>](http://engineering.mit.edu/engage/ask-an-engineer/can-a-computer-generate-a-truly-random-number/).

algorithms are procedures for solving a mathematical problem in a finite number of steps, often involving repetition of an operation.³¹ Humans choose the inputs that are required for such analytic processes. They also choose the analytical model or set of algorithms that will be used to provide results.³²

This is even the case with unsupervised learning neural networks, a machine learning tactic that can discover patterns in significant amounts of unlabeled data.³³ When an author or creator relies on such neural networks, they may not be able to predict the exact output of the algorithmic instructions that they run. They may even be surprised by the results. However, the author or creator still uses their skill and judgment in deciding what data will be analyzed by the algorithms and the parameters involved in such ostensibly ‘black box’ processes.³⁴ In turn, this skill and judgment impacts the end result of any mathematical and mechanical process used to create a copyrightable work.³⁵

Case Study 1: Holly Herndon and Using AI to Make Music

Holly Herndon is an American composer based in Berlin. She recorded an album in 2019 that made significant use of AI for the album’s sounds.³⁶ The first six months of the recording process involved providing a training dataset. Any sounds produced by AI systems must rely on the dataset that is provided. She turned sound files into spectrograms, which are visualizations of frequencies over time. She then used an unsupervised learning neural network model, SampleRNN, to analyze her spectrograms and provide probabilistic determinations of the sounds that would likely come next based on certain inputs and parameters. She was surprised by some of the results of the neural network, but ultimately all of the sounds came from the use of the skill and judgment of humans and not by machines.

Case Study 2: The Next Rembrandt and Humans in the Loop

In the project “The Next Rembrandt”, a consortium of private and university actors relied on statistical analysis of Rembrandt’s paintings to create a 3D portrait painted in the artist’s style.³⁷ Human skill and judgment was required at each step of the project, and AI systems served a purely mechanical function to bring the output into existence. The creators first used a deep neural network algorithm to streamline the resolution of images featuring all of Rembrandt’s works.³⁸ They then classified the gender and appearance of each person depicted in his works. The creators developed software that provided probabilistic determinations of Rembrandt’s work, based on his use of geometry, composition, and painting materials.³⁹ The creators also worked with a tech company to analyze specific facial features of the people featured in Rembrandt’s portraits, allowing software to provide a proposed composite image of what a “typical” portrait of his would involve. The creators also relied on the statistical determinations of computers to create a 3D version of the portrait. In the end, the creators relied on the work of 20 data analysts, software developers, professors in AI, and 3D printing experts over a period of 18 months to create the work,⁴⁰ demonstrating that computers and AI systems were ancillary to the human labour required to produce this work of art.

³¹ See “Algorithm | Definition of Algorithm by Merriam-Webster” (12 September 2021), online: *Merriam-Webster* <www.merriam-webster.com/dictionary/algorithm>.

³⁶ See Andy Beta, “Inside the World’s First Mainstream Album Made With AI” (13 November 2019), online: *Vulture* <www.vulture.com/2019/11/holly-herndon-on-creating-an-album-made-with-ai.html>.

³⁷ See “The Next Rembrandt”, online: *The Next Rembrandt* <www.nextrembrandt.com/>.

In both of these case studies, it is clear that humans – and not machines – arguably exerted the skill and judgment required to meet the threshold for original works that can be copyrighted in Canada.⁴¹

Granting authorship to machines equipped with AI in its current state also does not respect the underlying principles of Canadian copyright law. Unlike humans, machines such as AI systems do not need incentive to generate outputs.⁴² AI systems also do not expend creative or production costs associated with authoring and disseminating works and, as such, there is no need to compensate a machine equipped with AI.⁴³ The monopoly period enjoyed by owners of copyright compensates for the differential between resources expended by authors - which can be significant - and those expended by copiers - which are trivial by comparison. AIs do not need the compensation of monopoly, and it would be anti-competitive and a burden on the marketplace and other authors to provide one by operation of law.

2.2.5 Alternative Legal Approaches

However, certain alternative solutions ought to be explored regarding the treatment of works produced through reliance on AI:

- For example, many experts have called for AI-assisted works that meet a certain threshold to be put into the public domain in order to increase public access to artistic and intellectual works.⁴⁴
- A *sui generis* regime for AI-assisted works is also possible and could be implemented for an empirically demonstrated problem such as under-production.⁴⁵ One scholar has suggested that AI-assisted works should be part of a separate copyright regime with a shorter protection term of 15 years.⁴⁶ A regime like this

³⁴ Rafael Dean Brown, "Property Ownership and the Legal Personhood of Artificial Intelligence" (2021) 30:2 Inf & Comm Tech L 208 at 217.

³⁵ See Ahmed Elgammal, "AI Is Blurring the Definition of Artist" (2019) 107:1 American Scientist 18, online: *American Scientist* <www.americanscientist.org/article/ai-is-blurring-the-definition-of-artist> which refers to the algebraic process of AI.

³⁶ See Andy Beta, "Inside the World's First Mainstream Album Made With AI" (13 November 2019), online: *Vulture* <www.vulture.com/2019/11/holly-herndon-on-protocoll-and-an-album-made-with-ai.html>.

³⁷ See "The Next Rembrandt", online: *The Next Rembrandt* <www.nextrembrandt.com/>.

³⁸ See Dutch Digital Design, "The Next Rembrandt: Bringing the Old Master Back to Life" (24 January 2018), online: *Medium* <medium.com/@DutchDigital/the-next-rembrandt-bringing-the-old-master-back-to-life-35dfb1653597>.

³⁹ *Ibid.*

⁴⁰ *Ibid.*

⁴¹ *CCH v LSUC*, note 19.

⁴² See Pamela Samuelson, "Allocating Ownership Rights in Computer-Generated Works" (1986) 47:4 U Pitt L Rev 1185 at 1199.

⁴³ See Megan Svedman, "Artificial Creativity: A Case Against Copyright for AI-Created Visual Artwork" (2020) 9:1 IP Theory 1 at 14.

⁴⁴ See e.g. Ralph D Clifford, "Intellectual Property in the Era of the Creative Computer Program: Will the True Creator Please Stand Up?" (1997) 71:6 Tul L Rev 1675; Craig & Kerr, note 8; Daniel J Gervais, "The Machine as Author" (2020) 105:5 Iowa L Rev 2053; Brigitte Vézina & Brent Moran, "Artificial Intelligence and Creativity: Why We're Against Copyright Protection for AI-Generated Output" (10 August 2020), online: *Creative Commons* <creativecommons.org/2020/08/10/no-copyright-protection-for-ai-generated-output/>; Samuelson, note 42 at 1199; Kop, note 17; Shoyama, note 6.

⁴⁵ Craig & Kerr, note 8 at 78.

⁴⁶ Kop, note 17.

would provide for a short period of monopoly necessary to recoup costs - if any - while enriching the public domain over time. Another option could also involve an initial copyright protection term of 10 years, which could be renewed to a maximum duration.⁴⁷

However, providing *sui generis* treatment of particular technologies not only risks challenging the principle of technological neutrality but also may involve a burdensome and complicated compliance process. This is one major argument against implementing a regime in Canada that is similar to the UK's *Copyright, Designs and Patents Act 1988*, which allows copyright to vest in the person (or machine) who undertakes the arrangement for a computer-generated literary, dramatic, musical, or artistic work to be created.⁴⁸ Unsurprisingly, there have been no instances of machines initiating copyright claims to the courts. In one of the few cases involving analysis of these provisions, the judge in *Nova Production v Mazooma Games* concluded that the person who “devised the appearance of the various elements of the game [in question] and the rules and logic by which each frame is generated,” was the author of the computer-generated work.⁴⁹ For copyright expert Lionel Bently, the UK regime has proven unnecessary and has not produced beneficial results in the determination of authorship for AI.⁵⁰

Until there is clear need to do so, the Government of Canada should refrain from introducing new laws attributing authorship to machines in the context of AI-assisted or AI-generated works. Such a need would involve, for example, a significant gap in the production of AI-generated works, or circumstances arising where a person who would normally be attributed authorship rights is blocked because of involvement of AI in the work's creation, which is not foreseeably possible until the potential creation of AGI systems that operate with the same level of skill and autonomy as humans.

2.3 Recommendation: Clarifying First Authorship over AI-Assisted Works is Premature

Amendment of the *Copyright Act* with a view to clarifying the determination of first authorship over AI-assisted works by humans is premature without a pressing need for such legislative changes.

A different – yet related – challenge concerns the determination of authorship and ownership, given the multiple people that can be involved with AI-assisted creations. The

⁴⁷ *Ibid.*

⁴⁸ Paul Lambert, “Computer Generated Works and Copyright: Selfies, Traps, Robots, AI and Machine Learning” (2017) *Eur IP Rev* at 3.

⁴⁹ *Nova Productions Ltd v Mazooma Games Ltd & Ors Rev 1*, [2006] EWHC 24 at para 105.

⁵⁰ See Bertin Martens, “Copyright Issues for Creative Works Produced by Means of AI/ML at the 2018 Annual Conference of the European Copyright Society” (20 May 2018), online: [European Commission <ec.europa.eu/jrc/communities/en/community/humaint/article/copyright-issues-creative-works-produced-means-aiml-2018-annual-conference>](http://ec.europa.eu/jrc/communities/en/community/humaint/article/copyright-issues-creative-works-produced-means-aiml-2018-annual-conference); Lionel Bently, “The UK's Provisions on Computer-Generated Works: A Solution for AI Creations?” (June 2018), online: [European Copyright Society <europeancopyrightsocietydotorg.files.wordpress.com/2018/06/lionel-the-uk-provisions-on-computer-generated-works.pdf>](http://europeancopyrightsocietydotorg.files.wordpress.com/2018/06/lionel-the-uk-provisions-on-computer-generated-works.pdf).

fear appears to be that reliance on technology such as AI that facilitates the generation of statistically determined outputs renders it unclear who, exactly, is the author of a work.

However, analysis of the practices of creators and developers who produce AI-assisted works reveals that there is not necessarily a pressing need for amendments to the *Copyright Act* that would clarify how to determine rights of authorship in such contexts. In the concrete examples below, it is clear that people who produce AI tools – which can be used by others to create works of art – in fact rely on existing licencing regimes to both protect their copyright and facilitate the use of their works. Courts can also be trusted to engage in the examination of skill and judgment in respect of works where multiple people claim to be authors.

2.3.1 AI Developers are Using Licencing Schemes to Protect Their Work

Analysis of a project by Philip Wang illustrates the fact that people who provide access to computer code and AI tools that can create AI-assisted works are relying on licencing schemes already in existence to protect their work and users' interests. Wang's project, www.thispersondoesnotexist.com, depicts photos of a people who do not exist but whose images have been created using learning neural networks.⁵¹ A new photo appears each time a person visits or refreshes the webpage.

This project builds off of the work of Tero Karras et al,⁵² who provided a generative image model as well as an image dataset subject to licences that enable use, remixing, and reproduction of the works for non-commercial purposes only.⁵³ Tero Karras et al in turn engaged in what can be seen as text and data mining by having used 70,000 images of faces taken from Flickr that were shared with a Creative Commons or similar type of licence, or are in the public domain.⁵⁴ Tero Karras et al's generative image model also built off the work on generative adversarial networks by Ian Goodfellow, which is subject to an open source software licence that enables the modification, distribution, and private use even for commercial purposes so long as certain redistribution conditions are met.⁵⁵

2.3.2 Courts Are Capable of Engaging in the Factual Analysis for Assessing Ownership

How much human skill and judgment required to produce an AI-assisted work will be a matter of fact dependent on the circumstances. Indeed, other examples of AI-assisted creations involve more input from users than simply visiting a webpage. The three most

⁵¹ See Jason Brownlee, "A Gentle Introduction to StyleGAN the Style Generative Adversarial Network" (19 August 2019), online: *Machine Learning Mastery* <machinelearningmastery.com/introduction-to-style-generative-adversarial-network-stylegan/>.

⁵² See Tero Karras et al, "Analyzing and Improving the Image Quality of StyleGAN" (3 December 2019), online: *arXiv Cornell University* <github.com/NVlabs/stylegan2>.

⁵³ See "Flickr-Face-HQ Dataset (FFHQ)" (16 December 2019), online: *ArXiv* <github.com/NVlabs/ffhq-dataset>.

⁵⁴ *Ibid.*

⁵⁵ See BSD-3-Clause license in the About section: Ian J Goodfellow et al, "Generative Adversarial Networks" (2014), online: *ArXiv* <github.com/goodfeli/adversarial>.

prominent examples of such tools involve AI systems that rely on a user’s input to “generate” text⁵⁶ and images,⁵⁷ as well as for the creation and editing of sound.

As is the case for essentially all available AI systems, such software has required significant human skill and judgment in the design and development process, despite offering what appear to be examples of ‘artificial’ or automated ‘intelligence’.⁵⁸ AI systems that generate artistic outputs involve mathematical analysis of a given input – such as a string of words, images, or certain selections of parameters – and the likelihood of what a human would produce based on the AI systems’ model, which is greatly shaped by the designers of the system. To hammer this point home, AI can potentially be likened to a tool such as Microsoft Word or a pen. It is the user of the tool, not its creator, that is the author of the work.⁵⁹

2.3.3 Clarifying Ownership for AI-Assisted Works is Premature

Amendments to the *Copyright Act* to determine authorship rights in such cases do not appear to be a pressing need. This is because it is logical that the more a person’s skill and judgment is required to produce an AI-assisted work, then the more they may be found as holding copyright in respect of the creation. The *Copyright Act* was written to adapt to new and social and technological circumstances.⁶⁰ Additionally, Copyright law also has a frame of reference for works that were created in the context of a team or through collaborative efforts.⁶¹

Indeed, the examples above demonstrate that the people creating AI systems that can be used to create copyrightable works are also making use of licencing regimes in order to protect their own rights and the interests of the public in accessing, reworking and

⁵⁶ See e.g., “AI-Writer” (2021), online: *AI-Writer* <ai-writer.com/>; “Deep AI: The Front Page of A.I.”, online: *Deep AI* <deepai.org/machine-learning-model/text-generator>; “Demo-InferKit”, online: *InferKit* <app.inferkit.com/demo>; “Sassbook AI Writer: Auto Write Unique, Quality Articles with AI” (2021), online: *Sassbook* <sassbook.com/ai-writer>. Many of these systems rely on the GPT-2 model provided by the research agency OpenAI: see “OpenAI API” (2021), online: *OpenAI* <openai.com/blog/openai-api/> [*Open AI API*]; and James Vincent, “OpenAI’s New Multitalented AI Writes, Translates, and Slanders” (14 February 2019), online: *The Verge* <www.theverge.com/2019/2/14/18224704/ai-machine-learning-language-models-read-write-openai-gpt2>.

⁵⁷ See e.g., “Artflow”, online: *Artflow* <artflow.ai/>; “Text to Image API” (2019), online: *DeepAI* <deepai.org/machine-learning-model/text2img>; “DALL-E: Creating Images From Text” (5 January 2021), online: *OpenAI* <openai.com/blog/dall-e/>; “Deepart.io - Become a Digital Artist”, online: *Deepart.io* <deepart.io/>; “GoArt | Fotor - Art Effect to Trafer Photo to to Art Online”, online: *GoArt* <goart.fotor.com/>; “Top 41 Creative Tools to Generate AI Art” (2021), online: *AIArtists.org* <aiartists.org/ai-generated-art-tools/>; “Face Generator” (2021), online: *Generated Photos* <generated.photos/face-generator>. Some rely on text inputs while other rely on image inputs. others provide images of faces based on parameters chosen by users.

⁵⁸ *Open AI API*, note 56.

⁵⁹ See Aviv-Hertzel Gaon, *Artificially Intelligent Copyright: Rethinking Copyright Boundaries* (PhD Dissertation, York University, 2019) [unpublished] <yorkspace.library.yorku.ca/xmlui/bitstream/handle/10315/36284/Gaon_Aviv_Hertzel_2019_PhD.pdf?sequence=2&isAllowed=y> at 243.

⁶⁰ *Théberge*, note 7 at para 142, citing *Compagnie Générale des Établissements Michelin--Michelin & Cie v National Automobile, Aerospace, Transportation and General Workers Union of Canada (CAWCanada)*, [1997] 2 FC 306 (TD) at para 50.

⁶¹ See Pascal Visentin, “State of the Arts: How Should Canadian Copyright Law Treat Works Generated by Artificial Intelligence?” (1 June 2018), online *CBA* <www.cba.org/CBAMediaLibrary/cba_na/PDFs/Sections/IP-Copyright-of-AI-created-works-AODA.pdf> at 6.

distributing those works. These written agreements or licences will be of chief importance in the determination of first ownership in the context of collaborations.⁶²

Policy changes that introduce new protections where there is no clear need for them could result in overprotection for certain authors, such as software developers, but could increase barriers to innovations for users. The Government of Canada should balance the public interest in access to and dissemination of works with author protections for any changes to the *Copyright Act* for ownership issues related to AI systems.

3. Infringement and Liability Regarding AI

3.1 Context

There are fears that Canada's approach to copyright is insufficient in the face of potential infringements that could occur through reliance on AI to create works. There are two primary ways that copyright infringements can occur in this context related to output and input. First, a finished product (output) created with the help of AI may constitute copyright infringement. This was the case in a lawsuit initiated in 2018, when an artist relied on AI to help create a work of visual art that resembled the work of another artist.⁶³ Second, creators of a work may engage in activity during the AI development process, most notably text and data mining (TDM), which amounts to copyright infringement in respect of the extracted material (a matter of input).

Any movement towards conferring legal responsibility onto non-humans such as AI systems requires a cohesive approach in Canada to the allocation of liability in AI-assisted activities across all relevant areas of the law. Until this cohesive approach is in place, humans should remain liable for infringement in context of reliance on AI for creation of works for the reasons described above related to authorship, autonomy, and legal personhood.

With respect to TDM, the Government of Canada should be mindful of balancing broader public interest goals with protections that would facilitate investment in useful and innovative AI systems. More specifically, certain instances of TDM may constitute copyright infringement. Other instances of TDM would certainly constitute fair dealing. However, the spectre of indeterminate liability may subject innovators to the control of copyright owners in ways that stifle creativity and innovation. For these reasons, a specific exemption – what we refer to as a 'safe harbour' – is needed that provides certainty around user rights in the context of TDM in pursuit of promoting certain kinds of innovative activity while protecting owners' rights. In our submission, this approach is both necessary and appropriate to promote innovation and experimentation in the application of this emerging technology to the broadest range of activities possible.

⁶² *Ibid* at 6.

⁶³ See Chris Hannay "Artist Faces Lawsuit Over Compute System That Creates Randomly Generated Images" (3 October 2018), online: *The Globe and Mail* <www.theglobeandmail.com/arts/art-and-architecture/article-artist-faces-lawsuit-over-computer-system-that-creates-randomly/>. No decision has yet been rendered in the case.

With this said, any changes to the *Copyright Act* regarding infringement in the context of reliance on artificial intelligence for the creation of works must be commensurate with the extent of any market failure made possible by the Act.

3.2 Recommendation: A Cohesive Approach to AI Liability is Needed

Any movement towards conferring legal responsibility onto non-humans such as AI systems requires a cohesive approach in Canada across all relevant areas of the law.

The Government of Canada is gathering evidence to decide whether and how to amend the *Copyright Act* to allow AI systems to be liable under the *Act* in the context of AI-assisted works.

The first philosophical question that must be raised involves the public policy concerns in allowing machines to stand in the place of humans when it comes to liability. This already occurs to some extent with legal persons such as corporations. Corporate decision-makers in some settings can rely on the doctrine of the corporate “veil”, which limits their liability for conduct that is harmful or prejudicial to employees, creditors, consumers, and other third parties.⁶⁴ Across various sectors in Canada, an important consideration is the risk of humans wrongfully shielding themselves from liability by claiming that AI has acted autonomously. Changes to the *Copyright Act* regarding copyright infringement would ideally be guarded against this risk.

In terms of the current status of the law, the *Copyright Act* does not address the issue of copyright infringement by non-human actors. This is sufficient for the AI-assisted outputs because as it stands, AI systems do not act autonomously; as described above, they follow the instructions of humans who provide input and rules to follow.

A more complicated topic is secondary infringement under the *Copyright Act*. Infringement could occur through use of an AI system, created by someone else, for the production of an infringing work, potentially meeting the threshold of having provided a service “primarily for the purpose of enabling acts of copyright infringement if an actual infringement of copyright occurs by means of the Internet or another digital network as a result of the use of that service.”⁶⁵ There remains little case law examining secondary infringement through the provision of digital network services. As such, this provision in the *Copyright Act* may be flexible enough to respond to instances of secondary infringement facilitated through the use of artificial intelligence for the creation of works.

⁶⁴ Nicholls, Christopher C. 2001. “Liability of Corporate Officers and Directors to Third Parties.” *The Canadian Business Law Journal* 35 (1) (04): 55 at 57. Courts in Canada have also provided limits to this limitation on liability, see e.g., <https://www.canlii.org/en/commentary/doc/2015CanLIIDocs5263>.

⁶⁵ *Copyright Act*, note 1, s 27(2.3).

Case Study 3: Creating Infringing Works with Artflow?

The website www.artflow.ai allows people to generate images using text inputs. Little information is available online about who developed this project and how. However, the website's FAQ states that the AI system relies on Generative Adversarial Networks and a neural network called CLIP provided by OpenAI, the former which is licensed for use under an open-source software licence and the latter which requires permission for use.⁶⁶

Artflow could potentially be found as having engaged in secondary infringement under the *Copyright Act* in at least two ways dependent on the circumstances. People may use infringing text input, or the output of their efforts may constitute infringement. However, Artflow's terms of service tells users: "By providing content to the Platform you confirm that you are not infringing on any copyright, meaning you either are the copyright owner, the content license allows unattributed derivative work or the content is in public domain."⁶⁷

In any case, it is important to recognize that the question of whether machines are now sufficiently autonomous to act of their own accord is being raised in numerous areas of the law outside of copyright. For example, legislators have explored the liability of artificial intelligence in the context of healthcare, consumer protection,⁶⁸ product liability,⁶⁹ transportation, energy,⁷⁰ autonomous vehicles,⁷¹ and numerous others. As such, any changes to the *Copyright Act* regarding the liability for AI-assisted outputs must be in line with approaches to AI liability in other areas of the law.

3.3 Recommendation: Provide an Exception for TDM within Certain Parameters

The Government of Canada should be mindful of balancing broader public interest goals with protections that would facilitate investment in useful and innovative AI systems by providing an exception to liability for TDM activity that falls within certain parameters.

⁶⁶ Artflow, "About Us", online: *Artflow* <<https://artflow.ai/about/#faq>> [<https://web.archive.org/web/20210906200829/http://artflow.ai/about/>].

⁶⁷ *Ibid.*

⁶⁸ Andrew Smith "Using Artificial Intelligence and Algorithms" (8 April 2020), online: *Federal Trade Commission* <<https://www.ftc.gov/news-events/blogs/business-blog/2020/04/using-artificial-intelligence-algorithms>>.

⁶⁹ "Liability for artificial intelligence and other emerging digital technologies" (27 November 2019), online: *Publications Office of the European Union* <<https://op.europa.eu/en/publication-detail/-/publication/1c5e30be-1197-11ea-8c1f-01aa75ed71a1/language-en>>.

⁷⁰ Ryan E. Long, "Artificial intelligence liability: the rules are changing" (16 August 2021), online: *LSE Business Review* <<https://blogs.lse.ac.uk/businessreview/2021/08/16/artificial-intelligence-liability-the-rules-are-changing/>>.

⁷¹ George Maliha et al, "To Spur Growth in AI, We Need a New Approach to Legal Liability" (13 July 2021), online: *Harvard Business Review* <<https://hbr.org/2021/07/to-spur-growth-in-ai-we-need-a-new-approach-to-legal-liability>>.

How Canadian copyright law accounts for text and data mining currently remains somewhat uncertain. TDM matters in the context of copyright because the activity associated with it triggers various rights under the *Copyright Act*. For example, the first step required for TDM – copying a volume of works – triggers an owner’s reproduction rights. Defined succinctly, text and data mining is the process of copying large amounts of material, extracting the data found within the material, and recombining the data into different patterns.⁷²

What does TDM look like in practice? On top of the instances of TDM canvassed above in the form of case studies, there are numerous examples:⁷³

- **ImageNet:** A database of over 14 million images collected from image search engines, which is used for training large scale object recognition models.⁷⁴ Images in the dataset were labelled with words using Amazon’s Mechanical Turk.⁷⁵
- **The MNIST database:** A collection of handwritten digits with a training set of 60,000 examples and 10,000 test examples.⁷⁶
- **The Enron email dataset:** Half a million email messages by Enron employees, which were made public by the US Federal Energy Regulatory Commission into an investigation into the company.⁷⁷

To understand TDM for AI, it is also important to understand the existence of websites such as Kaggle. There are now numerous websites or platforms that provide datasets culled through TDM efforts, which also incentivize use of these datasets through competitions and through the provision of tools for data analysis.⁷⁸ Kaggle allows users to upload datasets and users also choose licences for the use and reproduction of these datasets. Peruse through the Kaggle website and one quickly observes that many of the datasets available for use are in the public domain. Other people who have uploaded

⁷² New Directive on Copyright and Related Rights in the Digital Single Market” (2 July 2019) at 4-5, online (pdf): European Innovation Council and SMEs Executive Agency <op.europa.eu/en/publication-detail/-/publication/288dad28-9d3d-11e9-9d01-01aa75ed71a1/language-en/format-PDF/source-220900645> at 3.

⁷³ A wide range of databases that were put together through text and data mining can be found, for example, on publicly available repositories, see e.g.,: “List of datasets for machine-learning research”, online *Wikipedia* <https://en.wikipedia.org/wiki/List_of_datasets_for_machine-learning_research>.

⁷⁴ “About ImageNet”, online: *ImageNet* <<https://www.image-net.org/about.php>>; J. Deng, W. Dong, R. Socher, L. Li, Kai Li and Li Fei-Fei, “ImageNet: A large-scale hierarchical image database,” 2009 IEEE Conference on Computer Vision and Pattern Recognition, 2009, pp. 248-255, DOI: 10.1109/CVPR.2009.5206848.

⁷⁵ Dave Gershgorn, “The data that transformed AI research—and possibly the world” (26 July 2017), online: *Quartz* <<https://qz.com/1034972/the-data-that-changed-the-direction-of-ai-research-and-possibly-the-world/>>.

⁷⁶ Yann LeCun, Corrina Cortes & Christopher J C Burges, “THE MNIST DATABASE of handwritten digits” (2012) Online: *Yann LeCun’s Home Page* <<http://yann.lecun.com/exdb/mnist/>> [<https://web.archive.org/web/20210913173326/http://yann.lecun.com/exdb/mnist/>].

⁷⁷ William W Cohen, “Enron Email Dataset” (8 May 2015), online: *Carnegie Mellon University School of Computer Science* <<https://www.cs.cmu.edu/~enron/>> [<https://web.archive.org/web/20210903114744/https://www.cs.cmu.edu/~enron/>].

⁷⁸ See e.g., Frederik Bussler, “International alternatives to Kaggle for Data Science / Machine Learning competitions” (20 July 2020) online: *Medium* <<https://medium.com/@frederikbussler/kaggle-prizes-are-only-for-americans-here-are-international-alternatives-bd27c01dd13e>>.

datasets admit that they don't own the datasets and are unsure of how they came to be created.⁷⁹

Canadian courts have begun rendering decisions on activity associated with TDM, such as scraping, indexing, assembling, and reproducing data including through automated means. For various reasons, courts have not allowed various TDM-related actions to fall under the fair dealing exception in the context of scraping and reproducing real estate photographs and descriptions,⁸⁰ scraping and indexing a car dealer's website,⁸¹ and the scraping and reproduction of photographs of automotive parts.⁸² However, in 2012, the Supreme Court of Canada concluded that there must be and large and liberal view particularly of the "research" purpose for fair dealing, with the guiding perspective being that of the ultimate user or consumer.⁸³

TDM is such a pervasive and important activity for the training of AI systems that it would make sense to address this topic in the *Copyright Act*,⁸⁴ given it is not clear whether such activity falls under the fair dealing exception. Any change to Canada's copyright regime ought to strike a balance between the public interest in the encouragement and dissemination of works and obtaining rewards for creators. A well-developed exception or safe harbour that accounts for user interests while respecting rights holders is the best way forward.

The place of TDM in modern copyright law is not an issue unique to Canada. Australia, the United Kingdom, and the European Union have all recently considered the place of TDM within copyright law. There have generally been two approaches to accounting for TDM. First, text and data mining can be covered by open-ended exception similar to fair dealing. Second, legislators can craft a specific exception or safe harbour for text and data mining. A safe harbour for TDM in Canada is the approach CIPPIC recommends.

3.3.1 Australia's Approach: Fair Use, Flexibility, and Uncertainty

Australia has adopted a very flexible approach to TDM. The Australian Law Reform Commission recommended in 2013 that text and data mining fall under the exception of fair use on the basis that TDM involves largely non-expressive work, such as counting the frequency of terms used in a body of written work.⁸⁵ In the commission's view, fair use is "sufficiently flexible" to balance the interests of all stakeholders.⁸⁶ The fairness factors

⁷⁹ See e.g., William Trindade Leite, "MBA Admission", online: *Kaggle* <<https://www.kaggle.com/willianleite/mba-admission>>.

⁸⁰ *Century 21 Canada Limited Partnership v Rogers Communications Inc.*, 2011 BCSC 1196.

⁸¹ *Trader v CarGurus*, 2017 ONSC 1841.

⁸² *Rallysport Direct LLC v. 2424508 Ontario Ltd.*, 2019 FC 1524.

⁸³ *Society of Composers, Authors and Music Publishers of Canada v. Bell Canada*, 2012 SCC 36.

⁸⁴ Access to a wide array of datasets for TDM is important not only for training AI but also for improving the bias of these systems. See e.g., Amanda Levandowski, "How Copyright Law Can Fix Artificial Intelligence's Implicit Bias Problem" (2018) 93 Wash. L. Rev. 579.

⁸⁵ "Copyright and the Digital Economy: Final Report" (November 2013) at para 11.57-11.84, online (pdf): *Australian Law Reform Commission* <www.alrc.gov.au/publication/copyright-and-the-digital-economy-alrc-report-122/11-incident-or-technical-use-and-data-and-text-mining/data-and-text-mining-2/>. [Australian Law Reform Report].

⁸⁶ *Ibid*, at para 11.77.

enable an open ended approach that does not anchor TDM to a specific technique and accounts for contextual differences.⁸⁷

If this approach alone is adopted in Canada, users looking to use TDM would face no more certainty than what currently exists in copyright law.

3.3.2 TDM & The United Kingdom: A Positive Step Forward

Since 2014, anyone in the UK can engage in TDM for non-commercial purposes.⁸⁸ They are also able to make a copy of the work to perform TDM for non-commercial purposes and must provide sufficient acknowledgement if possible. However, the protections of the exception are lost if the user transfers copied material to another person without the original owner's permission.⁸⁹ In 2021, the UK Government began the process of seeking feedback on its approach to TDM particularly in the context of AI.⁹⁰

Canada has much to learn from the UK approach. It provides a better balance than does the Australian approach between the public interest in the creation and dissemination of works and rewarding creators for works by providing increased clarity regarding acceptable activity. In contrast to the open-ended exception that was proposed in Australia, the UK Government's approach demonstrates the value of a dedicated safe harbour provision for TDM.

3.3.3 The European Union: Detailed Clarification for Safe Harbours

Since 2019, the EU has required member states to provide an exception for TDM in limited circumstances. After undertaking significant research on the topic, the EU legislature concluded that an express TDM exception was needed to provide legal certainty.⁹¹ There are two TDM exceptions in the EU.

First, article 3 of the *Directive on the Digital Single Market* exempts acts of reproduction and extraction done by research organizations and cultural heritage institutions for the sole purposes of scientific research, provided they have lawful access to the material in question.⁹² Notably, the entities that cannot be protected by this safe harbour include small to medium enterprises or businesses that are acting for non-commercial purposes (for

⁸⁷ *Ibid*, at paras 11.78-11.84.

⁸⁸ *Copyright, Designs and Patents Act 1988*, (UK), 1988, s 29A

⁸⁹ *Ibid*.

⁹⁰ "Government response to call for views on artificial intelligence and intellectual property" (23 March 2021), online: *UK IP Office* <www.gov.uk/government/consultations/artificial-intelligence-and-intellectual-property-call-for-views/government-response-to-call-for-views-on-artificial-intelligence-and-intellectual-property>.

⁹¹ See e.g., "Impact Assessment on the modernisation of EU copyright rules" (9 March 2021), online: *European Commission* <<https://ec.europa.eu/digital-single-market/en/news/impact-assessment-modernisation-eu-copyright-rules>>, at pp. 104-105; Directive (EU) 2019/790 of the European Parliament and of the Council of 17 April 2019 on copyright and related rights in the Digital Single Market and amending Directives 96/9/EC and 2001/29/EC, online: <<https://eur-lex.europa.eu/eli/dir/2019/790/oj>> at Recital 8 [2019 Directive].

⁹² 2019 Directive, *ibid*. Article 2 defines cultural heritage institution as "a publicly accessible library or museum, an archive or a film or audio heritage institution."

example, news reporting or research) or universities engaging in TDM for purposes other than scientific research.⁹³

Second, article 4 allows anyone to engage in “reproductions and extractions of lawfully accessible works and other subject matter for the purposes of text and data mining” so long as the material in question “has not been expressly reserved by their rights-holders in an appropriate manner, such as machine-readable means in the case of content made publicly available online.”⁹⁴ In other words, it is possible for anyone to engage in TDM in the EU for commercial purposes under certain circumstances, so long as the owner of the material has not prohibited TDM by adding something such as a policy or a robot.txt document to the material that is available online.

Like the UK approach, the EU’s handling of TDM demonstrates the benefit of a safe harbour and exception for TDM. However, the EU’s approach provides even more clarity than the UK by enabling people in certain sectors to engage in TDM for certain purposes and by prioritizing consent in all other cases.

3.3.4 Canada’s Approach: Facilitating Certainty in the Balance

A primary goal of Canadian copyright law is to increase public access to works, which enriches society and often forms the basis for further creative works.⁹⁵ This foundational principle of Canadian copyright law needs to be kept in mind whenever considering how to craft additional exceptions in the *Copyright Act*.

The most effective exception that follows the foundational principles of Canadian copyright law involves developing a designated safe harbour for text and data mining. The most promising form would be to largely mirror the European Union’s articles 3 and 4 of the *Directive on the Digital Single Market*. Article 3 is geared towards users who engage in scientific research at either research organizations or cultural organizations while article 4 prioritizes the consent of the owner. In CIPPIC’s submission, the prohibitions permitted by Article 4 are misguided. Safe harbours are appropriate to encourage innovation and exploration within an emerging field. Subjecting such innovation to the permission of copyright owners undermines both fair dealing and copyright’s role as a pillar in Canada’s innovation policy.

The Consultation document specifically asks whether licencing is an appropriate mechanism to deal with TDM. The answer is no, and for the same reasons: TDM enables innovation in the emerging market for AI-enabled services and products. Such innovation cannot be expected to occur if permission is required before hand, and may be rejected or withdrawn arbitrarily.

Alternatively, an exception for TDM could be allowed for one, some, or all of the fair dealing purposes allowed in Canada, including research, private study, education, parody,

⁹³ New Directive on Copyright and Related Rights in the Digital Single Market” (2 July 2019) at 4-5, online (pdf): European Innovation Council and SMEs Executive Agency <op.europa.eu/en/publication-detail/-/publication/288dad28-9d3d-11e9-9d01-01aa75ed71a1/language-en/format-PDF/source-220900645> at 4.

⁹³ 2019 Directive, note 91, art 4.

⁹⁴ *Ibid.*

⁹⁵ *York University v Canadian Copyright Licensing Agency (Access Copyright)*, 2021 SCC 32 at para 92.

or satire.⁹⁶ Linking the TDM exception to those specific purposes would at the very least ensure some increased certainty for users, would promote innovation, and would limit economic-based complaints by rightsholders.

4. Technological Protection Measures and IoT

4.1 Context

Section 41.1 of the *Copyright Act* prohibits the circumvention of technological protection measures (TPMs) that are used to protect software, data, and artistic works.⁹⁷ Section 41 of the Act defines TPMs in an expansive manner, stating that:⁹⁸

technological protection measure means any effective technology, device or component that, in the ordinary course of its operation,

(a) controls access to a work, to a performer’s performance fixed in a sound recording or to a sound recording and whose use is authorized by the copyright owner; or

(b) restricts the doing – with respect to a work, to a performer’s performance fixed in a sound recording or to a sound recording – of any act referred to in section 3, 15 or 18 and any act for which remuneration is payable under section 19.

In practice, this covers a wide range of methods, such as passwords, access codes, encryption of software, print/copy/download controls, “read only” permissions, region locking, and the physical configuration of device parts.

The Government in Canada’s consultation paper considers expanding upon the few exceptions to the s. 41.1 prohibition, with a focus on how TPMs affect access to software, data, and works in devices other than computers, smartphones and tablets – the “Internet of Things” (IoT).⁹⁹ In particular, it is interested in how the exceptions can be modified to better accommodate users who have to circumvent TPMs in order to repair their devices or make them interoperable with non-standard software or data.¹⁰⁰ The needs of these users must be balanced with those of proprietary device manufacturers, who need an incentive to innovate. Any modifications to the current exceptions must also fit within the bounds of the Canada-United States-Mexico Agreement (CUSMA), a trade agreement which mandates that parties prohibit circumvention of TPMs, providing services to circumvent TPMs, and dealing in TPM circumvention technology (ex. Manufacturing or selling tools used to circumvent TPMs).¹⁰¹ While CUSMA limits the allowed exceptions to anti-TPM circumvention provisions, exceptions are allowed for circumstances where TPM

⁹⁶ *Copyright Act*, note 1, s. 29.

⁹⁷ *Copyright Act*, note 1, s. 41.1.

⁹⁸ *Ibid*, s 41.

⁹⁹ *Copyright Consultation*, note 1 at 19.

¹⁰⁰ *Ibid* at 19-20.

¹⁰¹ *Ibid*.

protection causes “an actual or likely adverse impact on non-infringing uses of copyright subject matter”.¹⁰²

Despite the limitations of CUSMA, Canadian and American lawmakers have tried to make laws more permissive of users who seek to repair and customize their devices. In February 2021, MP Bryan May introduced Private Member’s Bill C-272, titled “An Act to Amend the *Copyright Act* (diagnosis, maintenance or repair)”, with the purpose of legalizing the circumvention of TPMs for the purposes of diagnosing, maintaining, or repairing devices.¹⁰³ The end of the 43rd Canadian Parliament on August, 2021, killed the Bill while being considered in committee.¹⁰⁴ Similarly, in June, 2021, Rep. Joseph D. Morelle introduced the “Fair Repair Act” to the United States Congress.¹⁰⁵ This bill mandates that original equipment manufacturers must provide certain documentation and diagnostic information to independent repairs providers, and that TPMs do not exempt manufacturers from this obligation.¹⁰⁶ While this legislation has not become law yet, in July, 2021, President Biden directed the Federal Trade Commission (FTC) to investigate manufacturers using TPMs to restrict repairs and limit these anti-competitive activities, in a broader executive order about antitrust laws and promoting competition.¹⁰⁷

Below, we will show that while TPMs are intended to promote the distribution of content via new digital business models, they are currently being used in ways which lie beyond the legitimate role envisioned for them by copyright policy. The *Copyright Act* aims to balance interests in the legitimate subject matter of copyright: works, sound recordings, performers’ performances and communications signals. Applications of TPMs that target downstream lines of business, such as innovative after-market additions, and customizations to devices, or prevent people from customizing or repairing goods and services that they have legal ownership of or access to, lie outside of this sphere of legitimacy. These applications raise issues for innovation policy, consumer welfare and competition law, and environmental policy. As such, there must be wide exceptions to s. 41.1 that allow for TPMs to be circumvented by parties who seek to repair devices or make them interoperable with other technologies or materials.

¹⁰² *Ibid.*, citing article 20.66, at para. 4(h) of “Canada-United States-Mexico Agreement [CUSMA]” article 20.66, at para. 4(a)-(g), online: *Global Affairs Canada* <<https://www.international.gc.ca/trade-commerce/trade-agreements-accords-commerciaux/agr-acc/cusma-aceum/text-texte/toctdm.aspx?lang=eng>>.

¹⁰³ Bill C-272, *An Act to Amend the Copyright Act (diagnosis, maintenance or repair)*, 2nd Sess, 43rd Parl, 2021.

¹⁰⁴ *Ibid.*

¹⁰⁵ US, Bill HR 4006, *Fair Repair Act*, 117th Cong, 2021.

¹⁰⁶ *Ibid.*

¹⁰⁷ *Promoting Competition in the American Economy*, 86 Fed Reg 36987 (2021) (s 5(h)(ii)).

4.2 Recommendation: Distinguish Copying and Accessing TPM-Protected Works

Legislation must distinguish between circumvention of TPMs to copy underlying software or a work, and circumvention made to access it, such as that made for repairs or to make software interoperable.

The current law contradicts key aspects of copyright law that are intended to create a balance between producers and users of works, allowing for TPMs to be used to stretch protection to subject matter—and activity—that falls outside the realm of copyrightable works. As the Standing Committee on Industry, Science and Technology observed in its discussion of circumvention in the recent Statutory Review of *Copyright Act* Report:

[T]he circumvention of TPMs should be allowed for non-infringing purposes, especially given the fact that the Nintendo case provided such a broad interpretation of TPMs. In other words, while anti-circumvention rules should support the use of TPMs to enable the remuneration of rights-holders and prevent copyright infringement, they should generally not prevent someone from committing an act otherwise authorized under the Act.¹⁰⁸

4.2.1 The Current Law is not Technologically Neutral

Section 41.1 does not effectively distinguish between circumventing TPMs to make and distribute unauthorized copies of works, and circumventing them to access and use material to which one otherwise lawfully has access. Such circumvention may be required for the purpose of repairing software or modifying it so that it can run smoothly on a different platform (making the software *interoperable*). Section 41.1(3) states that “The owner of the copyright in a work, a performer’s performance fixed in a sound recording or a sound recording in respect of which paragraph (1)(a) has been contravened may not elect under section 38.1 to recover statutory damages from an individual who contravened that paragraph only for his or her own private purposes”¹⁰⁹, but this is still not a strong enough distinction, as it is only made regarding damages. There is not any distinction between making unauthorized copies and accessing legally obtained material when determining whether the circumvention of a TPM is an offence under s. 41.1. Additionally, this provision does nothing to protect institutions where works are often shared, such as libraries, museums, or schools, who may need to circumvent TPMs on works they otherwise are lawfully authorized to access. The lack of a distinction between copying material and accessing it fails to uphold the key principle of technological

¹⁰⁸ House of Commons, *Statutory Review of the Copyright Act: Report of the Standing Committee on Industry, Science and Technology* (June 2019) (Chair: Dan Ruimy) at 71-72.

¹⁰⁹ *Copyright Act*, note 1, s 41.1(3).

neutrality, which is defined by the Supreme Court in *Canadian Broadcasting Corporation v SODRAC 2003 Inc.*¹¹⁰

The principle of technological neutrality is recognition that, absent parliamentary intent to the contrary, the *Copyright Act* should not be interpreted or applied to favour or discriminate against any particular form of technology.

One cannot apply the current prohibition against TPM circumvention, with its lack of distinction between copying and access, in a way that does not disadvantage users of systems that are older, open-source, or shared by many users, since they are more likely to need to circumvent TPMs to make otherwise lawfully accessed proprietary content run effectively on their devices.

4.2.2 The Prohibition Against TPM Circumvention Reaches Beyond the Scope of Copyright

The current *Copyright Act* provisions on TPMs may go farther than the traditional bounds of copyright in various ways. In *Nintendo of America Inc v King*, the court held that “actual infringement of copyright is not necessary” for someone to have to pay statutory damages for TPM circumvention.¹¹¹ This means that there is a risk that users could be found liable under s. 41.1 for circumventing TPMs on works they otherwise lawfully have access to. Similarly, TPMs can bar access to components of a device that do not fall into the realm of copyrightable works, such as raw data and mechanical parts that are controlled by TPM-protected software.¹¹²

Finally, the provisions on TPMs concern not only copyright law, but also areas like commercial contract law and consumer protection law, which by the conventional understanding of Canadian constitutional law, are normally dealt with under the provincial property and civil rights head of power.¹¹³ This means that there is a risk that the current law could result in a federalism conflict, especially as these provisions are not a fundamental part of the overall scheme of the *Copyright Act*.¹¹⁴ They do not fit under other federal heads of power, such as criminal law, trade and commerce, or “peace, order, and good government”.¹¹⁵

4.2.3 The Current Prohibition Against TPM Circumvention is Incompatible with Fair Dealing

The current treatment of the interoperability exception in jurisprudence contradicts how fair dealing of copyrightable works is treated.

¹¹⁰ *Canadian Broadcasting Corp v SODRAC 2003 Inc*, 2015 SCC 57 at para 66

¹¹¹ *Nintendo of America Inc v King*, 2017 FC 246 at para 137.

¹¹² *Consultation Paper*, note 1 at 21, 25. Anthony D Rosborough, “If a Machine Could Talk, We Would Not Understand It: Canadian Innovation and the *Copyright Acts* TPM Interoperability Framework” (2021) 19 CJLT 141 at 154.

¹¹³ Jeremy de Beer, “Constitutional Jurisdiction over Paracopyright Laws” in Michael Geist, ed, *In the Public Interest: the Future of Canadian Copyright Law* (Toronto: Irwin Law, 2005) 89 at 117-118.

¹¹⁴ *Ibid* at 123-124.

¹¹⁵ *Ibid*.

Nintendo of America Inc v. King, the primary case on the interoperability exception for TPMs (s. 41.12), indicates that the analysis of the exceptions to the s. 41.1 prohibition on TPM circumvention is making a troubling departure from the provision’s origins in copyright law. In this case, the court stated that for the interoperability exception to apply, there must be a “need” to circumvent TPMs and a lack of “legitimate paths” to achieve interoperability.¹¹⁶ This contrasts with the copyright approach to fair dealing, where the availability of licenses does not influence the analysis as to whether dealing is fair or not.¹¹⁷

4.2.4 A Broad Exception to the Prohibition Against TPM Circumvention is Needed

While circumventing TPMs to make unauthorized copies can still be penalized, the doing so to access lawfully obtained works should be allowed through an exception. The exception should:

- State that circumventing TPMs for repairs or interoperability should be allowed even if options that do not require the circumvention are available.
- Permit one to circumvent technical protection measures for any non-infringing purpose, or at least permit one to circumvent a TPM in order to diagnose, maintain or repair their products.
- Have a clause ensuring that lawful circumvention cannot be overridden by contract (ex. Through end-user license agreements).
- Not be limited to just individuals who own or have a license to use a computer program, and instead allow TPM circumvention for any non-infringing use of protected software, works, and data.

4.3. Recommendation: Expand Exceptions to the Prohibition on TPM Circumvention

To stop TPMs from hindering innovation, limiting rightful access to works and devices, and creating waste, Parliament must expand the *Copyright Act* provisions concerning exceptions to the prohibition against TPM circumvention.

4.3.1 The Current Exceptions to the Prohibition Against TPM Circumvention are Too Narrow

There presently are interoperability- and repairs-related exceptions to the s. 41.1 prohibition, but they apply only to narrow categories of works and activities. Section 41.12 of the *Copyright Act*, which provides for an interoperability exception, only states that parties making “a computer program” interoperable with “any other computer program” are

¹¹⁶ *Nintendo of America Inc v King*, note 111 at para 123.

¹¹⁷ See *CCH v LSUC*, note 19 at para 70.

exempt from the prohibitions in s. 41.1(a) and s. 41.1(b).¹¹⁸ Section. 41.12 does not mention other forms of software or copyrightable works, so there are concerns that if s. 41.12 is interpreted literally and narrowly, that it would still be forbidden to circumvent TPMs that protect software and copyrightable works outside of computers for the purpose of allowing for interoperability. Similarly, s. 41.15, which provides an exemption for repairs, states that the prohibitions in s. 41.1 do not apply “to a person who circumvents a technological protection measure that is subject to that paragraph for the sole purpose of, with the consent of the owner or administrator of a computer, computer system or computer network, assessing the vulnerability of the computer, system or network or correcting any security flaws.”¹¹⁹ Like s. 41.12, this exception only pertains to computers, and here, the only repairs that are allowed pertain to a system’s security, and not to other issues of its functioning.

Neither limiting an interoperability exception to “computer programs” nor limiting a repair exception to computer security problems are reflective of the reality of modern technology. TPMs are present not only in programs made for computers, but are also within a wide range of products, such as web-based applications, cloud computing (ex. Software as a service (SaaS) applications), and internet of things (IoT) and other software embodied in appliances and equipment. In practice, various industries often use software on devices that are not computers, which users may need to make interoperable with other devices, services, and software. Additionally, software is not the only thing protected by TPMs that may need to be made interoperable—data may be saved in one file format but need to be converted to another to be displayed on a different system. Having the phrasing of these exceptions limited to only computer programs stifles activity in these industries and creates uncertainty as to what modifications are and are not legal, hindering both innovation and archival work.

4.3.2 The Lack of Proper Exceptions Allows Manufacturers to Behave Anti-Competitively

The current narrow exceptions for interoperability and repairs give dominant manufacturers excessive room to use TPMs to prevent consumers from making products interoperable or accessing the repair services of their choice. By using the law surrounding TPMs to “tie” together multiple products, such as software and hardware or devices and repair services, dominant manufacturers can increase barriers to entry for software repairers and developers, artificially lowering availability of goods and services. The artificial scarcity results in increasing market prices, benefitting dominant manufacturers, but harming consumers and smaller producers that could otherwise enter the market.¹²⁰

¹¹⁸ *Copyright Act*, note 1, s 41.12.

¹¹⁹ *Ibid*, s 41.15.

¹²⁰ See Rosborough, note 112 at 156-157.

Case Study 4: Improving the Functionality of McDonald's Ice Cream Machines

In the United States, the Taylor Company has a contract with McDonald's to supply various food service machines, including their ice cream machines.¹²¹ Many McDonald's franchisees found that Taylor's ice cream machines were incredibly difficult to fix. Accessing a menu with all the machine's settings requires pressing a lengthy combination of buttons, and when machines are broken, they display a long error code that can only be comprehended by digging through an instruction manual.¹²² Kytch, a small technology company whose founders had previously been in the frozen yogurt industry and had struggles with Taylor's machines, developed an attachment that could bypass the "secret menu" and intercept error signals from the machines and convert them into human-readable messages.¹²³

Kytch sold their devices to hundreds of McDonald's franchisees, but unfortunately, one whom they thought was an interested customer reported them to Taylor and sent them their devices.¹²⁴ McDonald's and Taylor openly disavowed Kytch's technology, insisting it posed safety risks, and Taylor claimed they were developing an attachment of their own similar to Kytch's.¹²⁵ Currently, Kytch has filed a lawsuit against Taylor and its distributor for violation of trade secrets and against the turncoat franchisee for breach of contract.¹²⁶ Meanwhile, the FTC has begun a preliminary investigation and contacted McDonald's franchisees to inquire about potential anti-competitive practices by food service equipment manufacturers, as part of a broader investigation into anti-competitive device repair restrictions.¹²⁷

4.3.3 The Narrow Exception for Interoperability Restricts Consumers' Choices

If the *Copyright Act* provisions leave manufacturers free to excessively "tie" products together and prevent users from making software interoperable, the consumption choices of users would be unduly restricted. In a world where more and more devices are reliant on parts embedded with software, this can cause problems even with the most trivial of devices.

¹²¹ Andy Greenberg, "They Hacked McDonald's Ice Cream Machines—and Started a Cold War" (20 April 2021), online: *Wired* <<https://www.wired.com/story/they-hacked-mcdonalds-ice-cream-makers-started-cold-war/>> [<http://web.archive.org/web/20210906070140/https://www.wired.com/story/they-hacked-mcdonalds-ice-cream-makers-started-cold-war/>]

¹²² *Ibid.*

¹²³ *Ibid.*

¹²⁴ *Ibid.*

¹²⁵ *Ibid.*

¹²⁶ *Ibid.*

¹²⁷ Heather Haddon, "McDonald's McFlurry Machine Is Broken (Again). Now the FTC Is On It.", *The Wall Street Journal* (1 September 2021), online: <<https://www.wsj.com/articles/mcdonalds-mcflurry-machine-is-broken-again-now-the-ftc-is-on-it-11630522266>>. [<http://web.archive.org/web/20210914214643/https://www.wsj.com/articles/mcdonalds-mcflurry-machine-is-broken-again-now-the-ftc-is-on-it-11630522266>].

Case Study 5: Technologically Protected... Coffee Machines?

In 2014, the manufacturers of Keurig coffee machines tried to limit users to only using licensed coffee pods by printing a code in infrared ink on the label of their pods and having their coffee machines scan for the code, only making coffee with pods that have it.¹²⁸ Crafty consumers were able to get around this by saving a label with the code, attaching it to unlicensed pods they want to use, and then removing it when their coffee is done so that they can reuse it.¹²⁹ If the software that operates the Keurig coffee machines were counted as a “work” under the *Copyright Act*, then the infrared label system would be a TPM, and the label trick could be considered circumvention, so it would thus be prohibited under s. 41.1. While coffee drinkers in their own homes would most likely not get in trouble thanks to s. 41.1(3), workers who did this with a coffee machine in a commercial setting, such as in an office or restaurant, could still be penalized.

The lack of an expansive interoperability exception also bars users of older or open-source systems from accessing more up-to-date technologies, and makes it more difficult for systems to be legally shared by many users. This particularly harms lower income users, who may not have the resources to acquire the newest or most popular technologies.¹³⁰ Lack of interoperability can also cause issues with products that are authorized for shared use, such as DVDs and e-books that belong to libraries, where there are many potential users who have technologies from different manufacturers.¹³¹

4.3.4 The Narrow Exception for Repairs Limits Access to Repair Services

Since TPMs often make it so that users can only have their products repaired by parties which are authorized by the manufacturer, manufacturers being allowed to excessively tie together their products with TPMs could harm users whose access to authorized repairers is restricted by factors such as location, income, language, or disability. It can be argued that mitigating this issue does not require any changes to how the law treats TPMs. Encouraging unauthorized repairs could lead to more damaged technology and increased harm, such as if the software is contained in products such as vehicles, or medical or farming equipment. Instead, access to authorized repair services can be increased so that

¹²⁸ Julia Bluff, “Keurig Tries to Kill Reusable K-Cups” (4 March 2014) online: *iFixit*

<<https://www.ifixit.com/News/6347/keurig-tries-to-kill-reusable-k-cups/>>

[<http://web.archive.org/web/20210411070304/https://www.ifixit.com/News/6347/keurig-tries-to-kill-reusable-k-cups/>].

¹²⁹ James Vincent, “Hacking a Keurig to use cheap coffee pods only requires scissors and tape” (11

December 2014) Online: *The Verge*

<<https://www.theverge.com/2014/12/11/7375799/keurig-coffee-hack-is-simple-easy-permanent>>

[<https://web.archive.org/web/2020111210458/https://www.theverge.com/2014/12/11/7375799/keurig-coffee-hack-is-simple-easy-permanent>]. Keurig Hack, “Keurig 2.0 Hack: ANY K-Cup, Easy & Permanent Fix after The Keurig EMPIRE STRIKES BACK” (4 September 2014) online (video): YouTube

<<https://youtu.be/9e0yCq1AEeY>>

[<https://web.archive.org/web/20201120080327/https://www.youtube.com/watch?v=9e0yCq1AEeY&feature=youtu.be>].

¹³⁰ See Canada, *C-32 Brief*, by Paul Nijjar, (Submission to Legislative Committee), to Legislative Committee on Bill C-32 (31 January 2011) Online: *House of Commons*

<https://www.ourcommons.ca/Content/Committee/411/CC11/WebDoc/WD5401532/403_C32_Copyright_Briefs/NijjarPaulE.pdf>

[https://web.archive.org/web/20200225104749/https://www.ourcommons.ca/Content/Committee/411/CC11/WebDoc/WD5401532/403_C32_Copyright_Briefs/NijjarPaulE.pdf].

¹³¹ *Ibid.*

people do not have to make unauthorized repairs, such as by increasing internet access in remote communities so that their residents can more easily contact manufacturer-authorized repairers, or by encouraging manufacturers to offer authorized repair services in different languages, making them more accessible to immigrant populations. However, there is a counterargument to this—if the law restricted tying together products and repair services, this could motivate manufacturers to innovate. They may have to increase and improve their services, and push for systemic changes that would allow them to access more customers, so that customers would have more of an incentive to use authorized repairers instead of unauthorized ones.

The current tough protection of TPMs may cause lower levels of innovation and service quality, since there is less competition, so manufacturers would have no incentive to try to access user groups that are more difficult to reach. Manufacturers may be incentivized to have weaker TPMs for their products, since they do not need to invest in strengthening them if they already have legal protection, and could even profit off of “trolling” for lawsuits against small users who circumvent TPMs for purposes such as repairs. This runs counter to the *Copyright Act's* goals of encouraging innovation, and balancing the needs of both producers and users of copyrightable works.

Case Study 6: Farming Equipment and Pirated Software

In the United States and Canada, farmers who use equipment from the large manufacturer John Deere, which has software that is restricted by TPMs, often find themselves having difficulties accessing authorized repair services due to distance and/or cost.¹³² As a result, many farmers find themselves purchasing pirated software, through outlets such as Ukrainian forums, to circumvent TPMs so that they can repair their equipment or customize it.¹³³ Equipment dealers argue that legislation permitting TPM circumvention to allow for unauthorized modifications to software and equipment functions could result in more accidents.¹³⁴ They argue that instead, legislators should turn their attention towards increasing rural broadband, so that it is easier for farmers in remote areas to reach authorized repair services.¹³⁵ While it is true that the reforms proposed by the equipment dealers should be made, ultimately there may only be an incentive for manufacturers to lobby for them if they feel competitive pressure from unauthorized repair services.

4.3.5 The Lack of Proper Exceptions Results in Waste

To avoid circumventing the law, consumers may be forced to purchase multiple proprietary systems or to dispose of their old systems and replace them, which would be both economically and environmentally inefficient. Consumers would have to buy new products

¹³² Jason Koebler, “Why American Farmers Are Hacking Their Tractors With Ukrainian Firmware” (21 March 2017), online: *Vice* <<https://www.vice.com/en/article/xykkkd/why-american-farmers-are-hacking-their-tractors-with-ukrainian-firmware>> [<https://web.archive.org/web/20210911210456/https://www.vice.com/en/article/xykkkd/why-american-farmers-are-hacking-their-tractors-with-ukrainian-firmware>].

¹³³ *Ibid.*

¹³⁴ John Schmeiser, “Opinion: There’s a big difference between ‘right to repair’ and ‘right to modify’” (16 October 2020), Online: *Alberta Farmer Express* <<https://www.albertafarmexpress.ca/opinion/opinion-theres-a-big-difference-between-right-to-repair-and-right-to-modify/>> [<http://web.archive.org/web/20210116203004/https://www.albertafarmexpress.ca/opinion/opinion-theres-a-big-difference-between-right-to-repair-and-right-to-modify/>]

¹³⁵ *Ibid.*

instead of making old ones compatible with new software, and throw out devices with environmentally damaging components, such as lead, mercury, cadmium, chromium, and chlorofluorocarbons.¹³⁶ Disposal of these products could be economically wasteful if users did not repair these products mainly because of the laws against circumventing TPMs, and environmentally harmful if they disposed of products containing ecologically damaging components. Statistics show that in 2014, 60% of electronic waste was from home appliances, and 41.8 million metric tonnes of electronic waste in total were disposed of.¹³⁷ This number went up to 53.6 million metric tonnes in 2019- a 21% increase in five years.¹³⁸ While the COVID-19 pandemic has led to a temporary decrease in electronic waste¹³⁹, ultimately systemic changes—like laws that make it easier for consumers to maintain, share, and repair their devices—will be required to have a lasting impact.

4.3.6 Creating Broader Exceptions to the Prohibition Against TPM Circumvention

The following proposed changes to the *Copyright Act* would more adequately reflect technological realities, and encourage innovation in areas where devices require TPM-protected software to function:

- Amend s. 41.12 so that it refers to "a work or subject matter" and not just "a computer program".¹⁴⁰ The definition of interoperability should be amended to include "the ability of a system, software or product to exchange, and make use of, information and services with other systems."¹⁴¹
- Amend s. 41.15 so that it does not only refer to repairing computers systems for security reasons, or a new provision should be added to the *Copyright Act*, permitting the circumvention of TPMs in order to repair a wider range of technologies for various purposes.

¹³⁶ United Nations University, Press Release, "Global E-Waste Volume Hits New Peak in 2014: UNU Report" (20 April 2015), online: United Nations University <<https://unu.edu/news/news/ewaste-2014-unu-report.html>> [<https://web.archive.org/web/20210910015821/https://unu.edu/news/news/ewaste-2014-unu-report.html>].

¹³⁷ *Ibid.*

¹³⁸ United Nations University, Press Release, "Global E-Waste Surging: Up 21% in 5 Years" (2 July 2020), online: United Nations University <<https://unu.edu/media-relations/releases/global-e-waste-surg-ing-up-21-in-5-years.html>> [<https://web.archive.org/web/20210910135308/https://unu.edu/media-relations/releases/global-e-waste-surg-ing-up-21-in-5-years.html>]

¹³⁹ United Nations University, Press Release, "Laptops, Cell Phones, and eGames Defied Slump as COVID-19 Dented 2020's Electronics Sales" (9 June 2021), online: United Nations University <<https://unu.edu/media-relations/releases/the-impact-of-the-covid-19-pandemic-on-e-waste.html>> [<https://web.archive.org/web/20210910021052/https://unu.edu/media-relations/releases/the-impact-of-the-covid-19-pandemic-on-e-waste.html>]

¹⁴⁰ Canada, *Fixing Bill C-32: Proposed Amendments to the Digital Lock Provisions*, by Michael Geist & Keith Rose (Submission to Parliament) (Ottawa: June 2010) Online: House of Commons <https://www.ourcommons.ca/Content/Committee/411/CC11/WebDoc/WD5401532/403_C32_Copyright_Briefs/GeistMichaelE.pdf> [https://web.archive.org/web/20200225104534/https://www.ourcommons.ca/Content/Committee/411/CC11/WebDoc/WD5401532/403_C32_Copyright_Briefs/GeistMichaelE.pdf] at 7.

¹⁴¹ Anthony Rosborough & Carlo Dade, "The serious hidden problem facing Canada's agricultural innovators" (25 February 2021), online: *Policy Options - Institute for Research on Public Policy* <<https://policyoptions.irpp.org/magazines/february-2021/the-serious-hidden-problem-facing-canadas-agricultural-innovators/>> [<https://web.archive.org/web/20210421093233/https://policyoptions.irpp.org/magazines/february-2021/the-serious-hidden-problem-facing-canadas-agricultural-innovators/>]

Additionally, more research should be done into the usage of TPMs as anti-competitive tools, in particular when such anti-competitive activity could rise to legal significance. Research on this topic should inform the development of law and policy surrounding TPMs, both in copyright law and other areas. The Competition Bureau should follow in the footsteps of the FTC and investigate companies which could be using TPMs to engage in restrictive trade practices under the Competition Act.

5. Conclusion

AI and IoT are newly emerging technologies, whose increasing role in society and the marketplace presents a range of legal challenges. Reforming copyright law is only one step of many needed to address their impact and make things fairer for users and producers of these technologies and the general public. While here we approach these subjects with a focus on copyright, we hope our approach highlights the need to address other legal areas AI and IoT touch upon, such as consumer protection law and competition law. AI liability issues, in particular, require a coherent approach across diverse legal areas. Ultimately, the purpose of the *Copyright Act* is to strike a balance between the needs of users and producers, while encouraging innovation. CIPPIC's recommendations, we suggest, if implemented will bring the law closer to this purpose.