CULTIVATING CHANGE: HOW CANADA'S COMPETITION ACT CAN ADDRESS THE USE OF TECHNOLOGICAL PROTECTION MEASURES IN AGRICULTURE

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Since the late 1990s, large, multinational "full-line" manufacturers of agricultural tractors and combine harvesters have worked collaboratively with smaller, independent "short-line" manufacturers of accessory equipment to ensure the compatibility and interoperability of their products. This longstanding co-operative tradition served both manufacturers and their customers, which could build out their operations with the equipment of their choice, based on their own personal preferences, or unique priorities—budget limitations, topographical considerations, crop-specific needs, uncommon soil characteristics, etc.—confident that, regardless of the manufacturer, their new equipment would operate with their other machinery. However, as agricultural practice has continued to evolve towards "smart farming", full-line manufacturers have increasingly employed "technological protection measures" to prevent unauthorized access to the on-board data, computer programs, and operating systems of their tractors and combines. The inability of short-line equipment to access the digital data and systems of tractors and combines renders their equipment unusable, and thus their business non-viable. The effectiveness of "technological protection measures" in Canada is due, in part, to the statutory protection afforded them under the anti-circumvention provisions of the Copyright Act (Canada). It is perhaps unsurprising therefore, that politicians, legal scholars, and practitioners have assumed an effective regulatory response to the issue would be best achieved via amendments to Canadian copyright law. This paper takes a different position, arguing that responses based on copyright law will not adequately address the challenges of short-line manufacturers, and proposing the use of competition law to respond to conduct which amounts to an effort by full-line manufacturers to restrict or prohibit competition via exclusive dealing, tied selling and an abuse of dominance which results in the substantial lessening or prevention of competition. The affording of relief to Canada's short-line manufacturing sector flows from competition law, not copyright law, and through the commencement of applications to the Competition Tribunal, such relief can ultimately be provided.

Depuis la fin des années 90, les grands fabricants multinationaux de tracteurs et de moissonneuses-batteuses agricoles à large gamme de production collaborent avec les petits fabricants indépendants d'équipement auxiliaire à série restreinte pour assurer la compatibilité et l'interopérabilité de leurs

produits respectifs. Cette collaboration de longue date a servi aux deux types de fabricants et à leurs clients, lesquels ont pu accroître leurs activités avec l'équipement de leur choix, selon leurs préférences personnelles ou leurs priorités uniques—limitation du budget, considérations topographiques, besoins agricoles précis, caractéristiques du sol, etc.—confiants que peu importe le fabricant, leur nouvel équipement s'adapterait à leurs autres machines. Toutefois, comme la pratique agricole devient de plus en plus « intelligente », les fabricants à large gamme de production utilisent davantage des « mesures de protection technologique » pour empêcher l'accès non autorisé aux données internes, aux programmes informatiques et aux systèmes d'exploitation de leurs tracteurs et de leurs moissonneusesbatteuses. L'impossibilité des fabricants à série restreinte à avoir accès à ces données et systèmes rend leur équipement inutilisable, et leurs activités de moins en moins viables. Les « mesures de protection technologique » au Canada doivent leur efficacité, en partie, à la protection législative qui leur est accordée par les dispositions de la Loi sur le droit d'auteur (Canada). Il n'est donc pas surprenant que les politiciens et politiciennes, les juristes et les praticiens aient supposé qu'une réponse réglementaire efficace à la question serait obtenue par la modification de la législation canadienne en matière de droit d'auteur. L'auteur de cet article adopte une position différente, selon laquelle les interventions fondées sur les lois canadiennes sur le droit d'auteur ne répondraient pas adéquatement aux préoccupations des fabricants à série restreinte. Il propose plutôt de recourir au droit de la concurrence pour corriger un comportement s'apparentant à un effort des fabricants à large gamme de production de limiter ou d'interdire la concurrence au moyen de contrats d'exclusivité, de ventes liées et de l'abus de dominance afin de réduire ou de prévenir considérablement la concurrence. L'allègement accordé au secteur de fabrication à série restreinte du Canada découle du droit de la concurrence et non du droit d'auteur, et cet allègement pourra en définitive être accordé au moyen de demandes présentées au Tribunal de la concurrence.

1. Introduction

1.1 The Regulatory Issue

When it comes to agricultural equipment on Canadian farms, the undisputed heavyweight champions are tractors and combine harvesters (referred to herein together as "T&Cs") which represent the mechanical hubs on which Canadian farmers build out their wide complement of specialized accessory equipment. T&Cs pull, push, carry, or drag every other piece of farm machinery providing the power, mobility, and mechanical movement on which all other accessory equipment relies

to function. The evolution of T&Cs from their humble origins of steam and brute force into today's sophisticated and complex wonders of digital data processing is truly bewildering, a sense nicely captured by the title of Nilay Patel's 2021 article in *The Verge*: "John Deere Turned Tractors Into Computers—What's Next?" [1] However, as is often the case with shiny new technologies, ground-breaking innovation is often followed by the appearance of unintended (or intended) consequences. These consequences can disrupt a previously stable commercial ecosystem and introduce novel and complex challenges which require regulatory intervention to restore market order and reinstate market balance.

Just such a disruption is now occurring in the Canadian agricultural equipment manufacturing industry (the "Industry") along with the unintended (or intended) consequences to the market. This paper considers this current disruption which results from the deployment of "technological protection measures" ("TPMs") by full-line manufacturers[2] of T&Cs, and which is disrupting the previously stable agricultural equipment manufacturing market. More specifically, this paper argues that the use of TPMs in T&Cs represents an effort by full-line manufacturers to substantially prevent or lessen competition[3] and has an exclusionary effect in the market including, in particular, the impeding of entry into or their expansion in the market[4] by Canadian "short-line manufacturers[5].

The exclusionary issues addressed in this paper, while specifically focused on full-line and short-line manufacturers of agricultural equipment, are emblematic of broader concerns prevalent in numerous "Big Tech" antitrust cases.[6] The potential for exclusion through electronic, digital, and data restrictions is a critical issue that extends beyond the agricultural sector, impacting a wide range of industries where smaller niche suppliers interact with larger, established competitors. In the context of antitrust cases involving "Big Tech" companies, self-preferencing practices are frequently scrutinized. These practices involve dominant firms leveraging their market power to favour their own products or services over those of competitors, often through digital and data restrictions. This paper's examination of how full-line agricultural equipment manufacturers employ TPMs to exclude short-line manufacturers serves as a microcosm of these antitrust concerns. By restricting access to essential digital data and systems, full-line manufacturers can effectively suppress competition, analogous to how technology giants may limit interoperability or access to their platforms to disadvantage rivals.

The agricultural equipment industry provides a compelling case study for these broader issues because it illustrates how exclusionary practices using data and digital technologies can impact even traditional, "non-tech" industries. As agricultural practices evolve towards "smart farming," the reliance on digital data and systems becomes increasingly significant. This evolution underscores the necessity of ensuring competitive markets across all sectors, not solely within high-tech industries. The parallels between the agricultural example and broader "Big Tech" antitrust cases highlight the essential need for robust regulatory frameworks to address and mitigate anti-competitive conduct rooted in digital and data restrictions. By focusing on the agricultural sector, this paper emphasizes that the challenges posed by digital and data-based exclusionary practices are not confined to the technology industry alone. They are pervasive issues that have the potential to disrupt any market where digital interoperability is crucial for competition. Thus, the insights and regulatory responses discussed herein are broadly applicable and hold significant relevance for policymakers and stakeholders across various industries striving to promote fair competition and prevent the abuse of market power.

Finally, while this paper recognizes that TPM use is facilitated, in part, by the anti-circumvention provisions of the Canadian *Copyright Act*,[7] a regulatory response based on that legislation will fail due to the nature of short-line manufacturers' business, and the role short-line manufacturers play in the Industry. This paper argues instead for the grounding of an effective regulatory response in Canada's *Competition Act*,[8] which is capable of appropriately answering full-line manufacturer's anti-competitive conduct and furthering the legislative purposes of Canadian competition law.

1.2 Outline of Paper

This paper utilizes an interdisciplinary approach, combining literature review, legal and industrial analysis, and comparative legal study to address Canada's TPM issue in the agricultural equipment industry under the *Competition Act*. Part 2 offers contextual background information, including the historical roles of full-line and short-line manufacturers, their relationship, the nature of TPMs, and their impact on the competitiveness of short-line manufacturers. Part 3 discusses regulatory responses considered through amendments to Canadian copyright law, while Part 4 proposes a *Competition Act*-based response. Part 5 examines relevant provisions and recommends applying for an order from the Competition Tribunal (the "Tribunal") to prohibit full-line manufacturers from using TPMs, citing violations of sections 77(2) and 79(1) of the *Competition Act*. Part 6 reviews

proposed recommendations in light of Canada's obligations under the WIPO Copyright Treaty[9] and the Agreement between the United States of America, the United Mexican States, and Canada (the "USMCA").[10] Finally, Part 7 offers a brief conclusion.

1.3 The Literature

Very little literature focuses directly on the employment of TPMs in the agricultural context, particularly regarding the use of TPMs to thwart the objectives of competition law. As discussed in detail below, the relevance of TPMs to agriculture in general, and the agricultural equipment manufacturing industry in particular, was only established in the mid-1990s and thus the impact of TPMs on agriculture, markets, and competition is a recent phenomenon. Recent works have considered issues which, while relevant to technology and agricultural, are rather general in nature, such as a 2018 article which considered the ownership of agricultural data, how it is gathered, who controls it and what rules apply to accessing it.[11] Other articles have considered related general concepts such as the models within which agricultural innovation occurs.[12] Looking at the international marketplace, Peter Phillips's 2019 article reviewed commercial trends in agricultural markets and noted that eight global farm machinery manufacturers "supply the lion's share of the international tractor and combine market" and are thus possessed of the "scale, reach and commercial interest to coordinate and exploit digital opportunities in agriculture."[13] Narrowing the focus, there has been an examination of corporate advantages gained by John Deere's leveraging of "significant issues regarding copyright and farmer access (right-to-repair) to equipment[14] and a consideration of how financing required to fund the high cost of innovation research and development is available only to the largest and the most vertically-integrated of corporate manufacturers. This dearth of available financing to smaller manufacturers is found by Phillips to have a direct impact on both the nature and the pace of innovation due, in part, to the introduction of "highly vertically integrated suite[s] of machinery, hardware and software solutions" with "tightly controlled [platforms] … initially designed to operate with little or no connection to other systems."[15] Inequalities which result from the lack of financing to fund research and development are the focus of study by Sarah Hackfort, whose 2021 article analyzes financing patterns linked to the development and adoption of digital technologies in agriculture, and reviews strategies "to reduce these inequalities and challenge the power relations in which they are embedded".[16]

Where implications of the *Copyright Act's* TPM provisions are concerned, the literature is more developed; however, it focuses primarily on a discussion of causes and proposed responses from within the parameters of copyright law. Michael Geist has considered TPM impacts on copyright law at some length, focusing primarily on their effect on "fair dealing" provisions, arguing for "a need to fix this problem by establishing an exception within the anti-circumvention rules [of the *Copyright* Act] to allow for circumvention [of TPMs] for any lawful purpose."[17] Anthony D. Rosborough has written extensively on the "right-to-repair" in Canada, including a 2022 article which looks at the challenges faced by consumer protection reforms around TPMs in Ontario and Quebec, and the likely effect of a proposed exception to the *Copyright Act's* anti-circumvention provisions.[18]

Edward M. Iacobucci considered whether the *Competition Act* was "fit-for-purpose" in the digital era in his 2021 and 2023 articles which focused on issues arising as a consequence of technological innovation, and the relevance of competition law concepts and principles in the digital context.[19] Iacobucci's earlier work, written with Ralph Winter, looks specifically at the competitive problems which arise when enterprises abuse positions of dominance, a subject which is central to this paper.[20] A 2007 article by Alex Cameron and Robert Tomkowicz[21] considers challenges posed by digital networks to copyright owners and how the use of TPMs helps or hinders users' exploitation of creative material. Cameron and Tomkowicz touch also on implications for Canadian competition policy, and the issues spawned by TPMs through digital rights management programs and processes.

The refocusing of the issue of TPM use in the agricultural equipment market from one of copyright law to one of competition law comprises this paper's original contribution to the academic literature, arguing that since the issue results from a compromised competitive marketplace, it is the *Competition Act*, and not the *Copyright Act*, which is best equipped to serve as the legal basis of an effective regulatory response. While existing literature has considered the interaction between copyright and competition law in Canada, such consideration has not specifically focused on the subject in the agricultural equipment manufacturing market. Similarly, while scholars have analyzed competitive concerns in agriculture, there has been no evaluation of the role played by TPMs therein.

2. The Context

Through the deployment of TPMs, full-line T&C manufacturers can electronically restrict or prevent third-party access to their equipment's

on-board computer programs, data files, and operating systems. These digital files represent the operational "brain" of today's increasingly sophisticated T&Cs, a complex hive of data processing which controls virtually every aspect of the functioning and performance of both T&Cs and the accessory implements connected thereto. These processes range from the most macro (ex. the equipment's ignition), to the most micro (ex. the adjustment of the depth of a seed drill's articulation to within millimetres). While innovation has always been the lifeblood of the agricultural equipment manufacturing industry, recent trends towards "smart farming" have seen full-line manufacturers refocus their innovative attention and innovative investment from equipment hardware (ex. the introduction by Henry Ford of the first mass-produced gasoline-fuelled tractor in 1917), to equipment software (ex. Deere & Co.'s ("John Deere") 1994 launch in of the *GreenStar™ Precision Farming System*—one of the first commercial applications of global positioning system (GPS) technology to farm equipment.) The increasing focus on digital innovation has allowed full-line manufacturers to market their products, and the resulting enhancements to performance, as "brand-exclusive" features which favourably differentiate their products from those of their competitors.

That innovation is both an objective and a hallmark of any healthy commercial marketplace does not represent radical thinking, and this paper enthusiastically supports robust and spirited competition between commercial rivals based on innovative foresight and technical competence. Regardless of whether a competitive edge is achieved in an analogue or digital format or through a hardware or software application, such innovation should be encouraged by applicable law, government policy, and industry practice. However, it is the position of this paper that full-line manufacturers of T&Cs have recently sought to exploit a key difference between contemporary electronic and digital innovation and its historical mechanical equivalent … *access*.

Prior to the wide adoption of electronics in agricultural equipment, the components of a farm implement's design and construction could be seen, touched, measured, and reverse-engineered by commercial competitors. This ready access both permitted and supported the ongoing process of mechanical design innovation and iteration. The results of innovation in the context of digital software design and control however, are, by their nature, more difficult to see, touch, and measure—particularly when locked away in T&Cs behind TPMs by full-line manufacturers. This fact adds grist to the innovative mill and can prevent, restrict or retard competitors' access to the digital processes and routines of modern T&Cs. Without access to

such data, systems, platforms, and interfaces, competitors' equipment will not function, thereby rendering their products commercially irrelevant. Were the commercial and competitive advantages in the market gained as a result of a full-line manufacturer's superior product design, increased efficiencies, or decreased cost, the competitive market could function as desired and reward the manufacturer for its innovation with increases in sales and revenues. However, when full-line manufacturers gain a commercial and competitive advantage through the use of technology to exclude competitors from the market by denying them access to data (whether through TPMs, proprietary software, unique electronic connection interfaces, etc.), a regulatory response is required to ensure an open and competitive market.

Before turning to a review of the Canadian agricultural equipment manufacturing industry, it is helpful to briefly consider the wider legal and regulatory system of intellectual property rights which has long-provided for the compelled access to proprietary data … the issuance of *patents*. Patents protect inventions and innovations to existing design through the granting of an exclusive rights to commercially exploit the invention or innovation for a limited period of time. The patent system's granting of commercial protection is contingent, however, upon the disclosure of information by the inventor/innovator which not only facilitates innovation but also permits and encourages subsequent enhancements to prior inventions. This mandatory disclosure of information as the *quid pro quo* for patent protection reflects society's statutory endorsement of progressive development, allowing innovations to build upon existing knowledge. Conversely, the law around the protection of "trade secrets" represents an alternative route available to inventors/innovators in the protection of their intellectual property and its commercial exploitation. Reliance upon trade secret protection will theoretically provide exclusivity for commercial exploitation in perpetuity, however such protection is entirely contingent upon the inventor's/innovator's successful maintenance of secrecy in perpetuity.

This bifurcation presents inventors with a clear strategic choice: opt for public disclosure and a temporally limited monopoly under patent law or maintain secrecy to safeguard their invention/innovation indefinitely. This framework of intellectual property rights highlights a critical junction of legal and strategic decision-making that directly impacts the technological and competitive landscape within the agricultural sector, particularly in the use of TPMs. Indeed, in the context of this paper's present examination, the cynic might suspect that the strategic objective of T&C manufacturers is to secure patent-like protections against commercial competition without the disclosure obligations imposed by patent law.

2.1 The Industry Players

Of the more than 4,500 companies which comprise the international agricultural equipment manufacturing industry,[22] the majority fall within one of two general categories known as "full-line manufacturers" and "short-line manufacturers."

2.1.1 Full-line Manufacturers

While fewer in number, full-line manufacturers occupy a position of considerably greater prominence within the Industry. While these customarily international enterprises are engaged in the production of a wide array of farm machinery and implements (seed drills, sprayers, mowers, balers, harvest pickers, etc.) the hallmark of full-line manufacturers is their design, production, sale, and maintenance of T&Cs. Due to the size, complexity, and cost associated with the research and development, design, and manufacture of T&Cs, only the largest and best-financed manufacturers are able to enter, compete, and remain in the business of producing, marketing, and selling. This fact, together with the role T&Cs play in modern agriculture, places full-line manufacturers at the very centre of the Industry.

T&Cs are different than all other agricultural machinery. Tractors with a power rating exceeding 100 horsepower, a threshold deemed essential for operational viability on commercial farms,[23] can operate with a variety of attachments, making them capable of undertaking different agricultural tasks. Similarly, combine harvesters are designed to perform multiple harvesting functions simultaneously. They can reap (cut), thresh (separate grains from the crop), and winnow (remove chaff) in a single operation, making them highly efficient, versatile, and timesaving. Due to the central role played by T&Cs in the operation of modern farms, and the significant financial investment by farmers which T&Cs require compared to accessory implements,[24] the relationship between farmer and full-line manufacturer is one of the most critical to a farm's success.

Due to this commanding position, full-line manufacturers are among the most influential and recognized players in the agricultural machinery industry, engaged in international sales, leasing, maintenance, research and development, all of which results in multi-billions of dollars in annual revenue. The largest and best known of the full-line manufacturers is John Deere. This Moline, Illinois-based juggernaut boasts a history dating back to 1804, more than 82,000 employees around the world,[25] facilities in more than 30 countries,[26] and 2023 global revenues in excess of $61 billion.[27] Summarized rather accurately in 1958 by A.A. Thornburgh—the president

of full-line manufacturer Massey-Ferguson Limited, "The full-line companies necessarily shape the pattern of the industry. Their operations reflect the basic economic changes that affect the industry as a whole."[28]

The words spoken by Mr. Thornburgh in 1958 remain as true today as when they were first uttered 66 years ago. The 2022 market value of the international agricultural equipment market was US$137.6 billion, a number which is expected to grow at an annual rate of 5.5%, reaching US$255 billion by 2032.[29] Despite the size of the international manufacturing marketplace, it is dominated by a surprisingly small number of large, vertically integrated, international corporations.[30] As of 2021, the top five[31] global agricultural equipment manufacturers were comprised of John Deere with 25.3% of the global market (and 46% of the U.S. market), CNH Industrial N.V. with 12.9% of the global market (brands: Case IH, New Holland, and Steyer), Kubota Corporation with 11.7% of the global market (brands: Kubota, Great Plains, Kvernland, and KIOTI), AGCO Corporation with 9.8% of the global market (brands: Massey Ferguson, Fendt, and Valtus), and CLAAS KGaA mbh with 4.2% of the global market. When considered together, these five global full-line manufacturing behemoths control around 65% of the global agricultural equipment market. This position of dominance in the global industry has only grown with the passage of time,[32] however, notwithstanding their dominance, full-line manufacturers are not lone actors in the Industry.

2.1.2 Short-line Manufacturers

While full-line manufacturers are the agricultural equipment manufacturing industry's generalists, short-line manufacturers comprise in many ways the industry's specialists. Short-liners dedicate their design and production capabilities to a limited line of products within limited product segments. Unlike their full-line counterparts which offer the farming community an extensive range of T&Cs and accessory equipment, short-line companies concentrate their efforts on developing expertise and technological advancements in specific niches where they have identified a potential competitive edge. These niches can vary widely, encompassing specialized sectors such as advanced harvesting or tillage machinery, sophisticated irrigation systems, innovative grain handling and storage solutions, or cutting-edge equipment for the precise application of fertilizers and chemicals.

Thus, short-line manufacturer's offer equipment which falls generally into two categories. The paper refers to the first category as "Competing Products" which are offered by short-line manufacturers as competitive

alternatives to similar products manufactured by their full-line counterparts (ex. the "WS Grain Belt Swather" manufactured by Honey Bee Manufacturing Ltd. of Frontier, Saskatchewan which competes with John Deere's W170 swather.) The second category of short-liner products is referred to as "Original Products" and represents products for which no full-line manufactured alternative exists (ex. manure injectors manufactured by Bazooka Farmstar of Washington, Iowa which inject manure directly into the soil offering various advantages. In either category, short-line manufacturers' products serve to complement the range of products offered by full-line manufacturers.[33]

By channeling resources and research into targeted areas and products, short-line manufacturers not only refine their product offerings but also establish themselves as benchmarks of quality and innovation within their chosen niche product areas. This focused strategy enables short-line manufacturers to achieve a level of product excellence and reliability that is often recognized by the market, enabling them to secure and sometimes surpass the market share of larger, full-line producers in their specific categories. Examples of short-line manufacturers which have achieved success in carving out global leadership positions include Great Plains Manufacturing Inc., a U.S.-based manufacturer which, prior to its acquisition by Kubota in 2016, grew to become the leading designer and manufacturer of grain drills which are essential for efficient seed planting; and Kinze Manufacturing Inc., a frontrunner in the manufacture of high-efficiency planters and which currently remains privately held by the Kinzenbaw family of Williamsburg, Indiana. The success of these companies, and others like them, demonstrates that there remains a strategic advantage for some in specializing in a few, carefully chosen segments, thereby achieving market recognition and success within niche areas of manufacturing.[34]

While relatively inconsequential compared to the commercial activities, expenditures and profits of full-line manufacturers, the Canadian short-line industry does make a sizable contribution to Canadian gross domestic product (GDP). A 2021 study prepared by Western Economic Diversification Canada[35] reported that as of that year, the Canadian agricultural implements manufacturing sector[36] accounted for over $4 billion of revenue, with manufacturing revenue growth exceeding 47% between 2015 and 2018. Statistics Canada determined that sectoral revenues reached $4.3 billion in 2021 compared to $3.6 billion the previous year, an increase of 19.4%,[37] with Canadian sectoral salaries and wages totalling $855.7 million. The study also reported 529 Canadian agricultural implement manufacturing businesses in 2019 with 87.7% of employment represented by micro

employers (1-4 employees) and small employers (5-99 employees) located primarily in the provinces of Ontario, Quebec, Manitoba, and Saskatchewan.[38] While the industry may not be among the top industrial contributors to Canada's GDP, the importance of the Canadian short-line manufacturing industry on Canadian communities should not be underestimated. As Rosborough and Dade note, "[t]he economic contribution may be lost in national GDP numbers but stands out in rural communities where the loss of 100 or 200 good middle-class manufacturing jobs can mean the senseless loss of economic viability for rural regions."[39]

Having considered the roles played by full-line and short-line manufacturers in the agricultural equipment ecosystem, the paper's next section will review the historical context in which they have recently co-existed.

2.2 Trending Towards "Smart Farming"

Technological advances of recent years have enabled a new era in farming practice—known commonly as "smart farming". Smart farming has its origins in the "precision agriculture" work of Professor Pierre Robert at the University of Minnesota during the late 1980s and early 1990s. Professor Robert's work focused on variable rate application of inputs—a practice based on the recognition that different parts of a field have different crop yields and, therefore, different nutrient needs.[40] The early work of Professor Robert ultimately formed the cornerstone for variable rate field management systems that now form the foundation of contemporary smart farming practice. Professor Robert's work was premised on a simple axiom which emphasized the application of the "right input at the right time, in the right amount, and at the right place". This approach marked a significant shift in agricultural practice, which enabled increases to efficiency, yields, and sustainability—all through the precise management of resources.

Precise resource management requires precise resource measurement and Professor Robert's early work was limited practically by the inability of agricultural technology to collect and process data. Over time, however, as the pace of agricultural technology development hastened, farmers were soon able to utilize information technology and a wide array of electronic monitoring devices to optimize agricultural production processes—at planting and at harvest—more fully realizing Professor Robert's goal of greater accuracy and control in farming. As noted above, the introduction of GPS technology to agricultural practice in 1994 by John Deere represented a watershed moment in the realization of Professor Robert's smart farming goals as the technology enabled radical changes to farming practice

including field mapping, yield mapping, soil sampling, and the precision application of fertilizers and pesticides.[41]

The development and application of these novel technologies have led to significant improvements in efficiency, cost reduction, and environmental sustainability in the agricultural sector. These benefits are manifested through both the equipment's mechanical efficiencies (increased power, improved fuel consumption, reduction of pollutive discharge)[42] and the agricultural products which they tend (improvements in yields). With each passing year, smart farming technologies evolve towards ever more sophisticated data collection, analytics, machine learning, and artificial intelligence—to encompass a broader range of technologies and applications. Three examples of recent technological innovations in agriculture include the introduction in 2021 of fully autonomous T&Cs, the increasing use of unmanned aerial drones for remote crop and livestock observation and data collection, and the introduction by John Deere in 2021 of its proprietary "Smart-Apply Intelligent Control System™," which employs Light Detection and Ranging (LiDAR) technology in the air-blast sprayers that are towed behind a John Deere tractor and which uses sensors and artificial intelligence to find and remove weeds from within growing crops through the application of herbicides only where needed, and at the individual plant level.

2.3 Technological Protection Measures

TPMs are used to control access to digital copyrighted content or to prevent users from exercising the rights afforded by the *Copyright Act* to content owners. While TPM protections were originally considered necessary to encourage content creators to make their material available in digital media, the measures are now broadly used to protect software incorporated within products for purposes which have little if any connection to the protection of copyright. The first use of "technological protection measures," as anything approaching a term of art seems tied to the implementation in 1996 of the World Intellectual Property Organization's ("WIPO") *WIPO Copyright Treaty*[43] and *WIPO Performances and Phonograms Treaty*.[44]

As now commonly used, and as used in this paper, the term refers to technologies which either control *access to* or the *use of* works which are subject to protection of copyright law.[45] TPMs which control access are exemplified by simple password protection or the employment of complex cryptography, while the control of use (beyond access control, obviously) can be achieved through the control of a work's duplication which, in turn,

prevents its unauthorized modification, its inclusion in independent works, etc. often through "digital rights management" systems.[46]

In the agricultural context, TPMs which control access currently include passwords, paywalls or subscriptions, registration keys, access time limits, limits on the number of simultaneous users, and encryption; while those which control use currently include read-only limits, download blocking, copy blocking, print blocking, labeling, and watermarks.[47] Measures can include digital locks, encrypted software, and proprietary data or power connectors—but regardless of the particular technology employed, the effect in the circumstances considered here is to prevent or restrict access to the data and operating systems of T&Cs on which short-line manufacturers rely to ensure that their equipment will function properly and efficiently with full-line equipment.

2.4 The Full-line—Short-line Relationship: Complementary to Adversarial

A cursory reading of this paper's thesis might suggest that the forces of full-line and short-line manufacturers are locked in endless "winner-take-all" combat for supremacy in the agricultural equipment manufacturing industry. That understanding would, until very recently, have been incorrect. In fact, for decades full-line manufacturers worked in something of a collaborative way with short-liners via a symbiotic relationship—more complementary than competitive. Full-line manufacturers have traditionally facilitated short-line participation in the equipment industry, whether in respect of Competing Products or Original Products. As mentioned above, full-line manufacturers' T&Cs have historically served as the platforms on which farmers assemble multi-modal equipment which works together to achieve agricultural objectives. For example, a farmer might choose to equip his John Deere combine harvester with a front-mounted "header" for grain harvesting manufactured by Buhler Industries of Manitoba or Prairie Star Manufacturing of Alberta. Similarly, a tractor manufactured by CLAAS might tow a trailing storage unit with grain processing features manufactured by the Winnipeg-headquartered Ag Growth International. Until recently, farmers were free to choose from among the product lines of both full- and short-line manufacturers, confident that regardless of the implement's manufacturer, its use and efficient operation would be facilitated via standardized electronic connections and common programming languages in operating systems.[48]

In the agricultural setting, this work towards the practice of standardization has been led since 2008 by the Agricultural Industry Electronics Foundation (the "AEF"), an organization established in 2008, which currently counts eleven international agricultural equipment manufacturers[49] (including John Deere) as "core members", along with 280 general members. The foundation's objective is to improve cross-manufacturer compatibility of electronic and electric components in agricultural equipment, and to "establish transparency about compatibility issues."[50] According to the AEF's website,

> "Compatibility across manufacturers or brands is increasingly considered as a competitive advantage … This renunciation of the idea that customers should buy all their machinery from one manufacturer fuels the desire for standards within the industry. This is accompanied by the ***need to establish transparency about compatibility*** and to provide customers with relevant information prior to a purchase of agricultural machinery."[51] [Emphasis added].

This practice of providing short-line manufacturers' equipment with access to the power, data processing, and operating systems of full-line T&Cs was accomplished through the AEF's design and introduction of universal protocols such as the 2001 introduction of the internationally recognized ISOBUS standard for agricultural electronics, and its more recent release of the AEF-designed *Tractor Implement Management* standard which "allow[s] for closer integration between the tractor's central computer system and add-on components from different manufacturers."[52]

Notwithstanding the work of the AEF—or John Deere's founding membership therein—this longstanding practice of promoting product interoperability was significantly disrupted for the first time in 2020 with the introduction by John Deere of the company's X9 line of combine harvesters. A state-of-the-art combine with a retail cost in excess of US$1 million, the X9 illustrates John Deere's continued practice of integrating ever more sophisticated computer systems and data interfaces into its flagship equipment. What was novel in the X9, however, was its use of an exclusive proprietary interface which prevented any short-line or third-party equipment from communicating with it, and its repair without digital authorization from John Deere.[53] The obvious result of John Deere's adoption of a new exclusive technological strategy is that the longstanding practice of product compatibility with short-line equipment has been ended. The introduction of the X9 combine represents a pivotal moment in the history of agricultural equipment manufacturing … a rejection by the market's dominant player of a historical norm supporting equipment

compatibility, and its replacement with a practice resulting in the inoperability of competitors' equipment and, thus, their restriction in or elimination from the marketplace.

Difficulties confronting the short-line manufacturing industry have not arisen due to an inability to compete through the innovation of efficient and effective products which can respond to the unique needs of farmers, but rather from the increasingly complex and expensive task of developing technological solutions to facilitate interoperability with full-line manufacturer's recent iterations of their flagship T&Cs. John Deere's practice, in particular, has introduced technologies which incorporate "the most impenetrable proprietary interfaces and connectors, which make reverse engineering extraordinarily difficult."[54] And as Rosborough notes, "In controlling access to the machine's software code, which manages its entire functioning, the full-line manufacturer can preclude short-line equipment from working altogether by requiring full-line manufacturer authorization to "activate" (or not) the short-line-made components and by preventing its proprietary interfaces and connectors from sending or receiving data to third-party peripherals."[55] Perhaps relevant to the inference of John Deere's motives behind the adoption of its exclusive proprietary technology is the company's refusal to provide details about its new software, which could be used by competitors (whether short-line manufacturers or competing full-line manufacturers) for purposes of reverse engineering.[56]

Regardless of John Deere's intentions, be they commercial advantage, product safety, efficiencies, or "brand purity",[57] the impact on Canadian short-line manufacturers is the same … they are excluded from the agricultural manufacturing industry, hindered or prohibited from the performance of their historical role as product innovators because of their inability to ensure that their innovations are, and will continue to be, usable with full-line manufacturers' machinery.

3. Consideration of Regulatory Responses Under Copyright Law

Having reviewed the context in which the subject regulatory issue lives; the parties, their commercial positions and relationships; and the marketplace in which they operate, the paper will now consider potential regulatory responses.

3.1 The Copyright Act's Anti-Circumvention Provisions

As a result of amendments enacted in 2012, the Canadian *Copyright Act* currently affords statutory protection to TPMs. More specifically, section 41 of the act implements several provisions which protect the efficacy of TPMs including, *inter alia*, provisions which (i) provide that "no person shall circumvent a technological protection measure";[58] (ii) define TPMs to include "any effective technology, device or component" which either controls access to a work, or prevents the unauthorized exercise of any right which copyright owners enjoy under the *Copyright Act*;[59] and (iii) provide for the imposition on violators of the anti-circumvention provision of all the remedies to which copyright owners are generally entitled (injunction, damages, accounts, etc.) in the case of a breach of copyright.[60] These amendments were promoted by government in 2011 as necessary in order for Canada to implement the provisions of the WCT[61] which Canada signed in 1997.

3.2 Proposed *Copyright Act* Amendment: section 41.12(1)

In response to the challenges facing short-line manufacturers as a result of TPM use, it could be argued that the existing language of section 41.12(1) already provides sufficient redress. This section of the *Copyright Act* provides that its anti-circumvention provisions do not apply to anyone "who owns a computer program … and who circumvents a [TPM] … for the sole purpose of obtaining information that would allow the person to make the program and any other computer program interoperable."[62] Unfortunately, as other commentators have noted, while the "interoperability" exception has been characterized as the "most robust" of the statutory exceptions from anti-circumvention provisions,[63] section 41.12(1) fails to adequately address the issue for two principal reasons.

Firstly, the *Copyright Act* contains no definition of "interoperability," and what parliament intended by the term is therefore unclear. This lack of clarity in respect of the exemption's application renders its usefulness questionable. Rosborough notes that during the debate in connection with the passage of Bill C-11, parliamentarians often used the terms "interoperability" and "compatibility" interchangeably and suggests that this free-wheeling use of different terminology during debate and statutory drafting may have been the result of legislators' good faith attempts at compromise, or a simple lack of appreciation for the technical nuances arising as a result of their use of one term over the other.[64] Rosborough has carefully considered the inadequacies of section 41.12(1)[65] and I will not restate his analysis here, other

than to note that he concludes that the existing interoperability exception fails to satisfactorily address the needs of the short-line industry due to (a) a lack of clarity about what terms such as "interoperability" and "computer program" mean in respect of today's sophisticated technological equipment, and (b) the exception's reference to the sole purpose of any excluded circumvention being "the making of one computer program interoperable with another." While perhaps inadvertent, the language of section 41.12(1) fails to recognize short-liners' need to access TPM-protected content which may fall outside the parameters of a "computer program," such as proprietary cable connections, data interfaces, or electronic components or digital data which operate independently of full-liner computer programs, but for which access is essential for the ability of short-line accessories to communicate and operate with T&Cs.

For the purposes of this paper, it is sufficient to note that there is a lack of clarity around both the meaning and the parameters of important terms such as "interoperability", "compatibility", and "integration" and that further clarity—whether provided by parliament or the courts—would assist in a more coherent understanding of the intent and practical effect of the "interoperability" exception currently set out at section 41.12(1). Like Rosborough, this paper supports a statutory amendment to section 41.12(1) in an effort to achieve parliament's likely intention underlying the 2012 amendments—the inclusion of the concept of compatibility along with interoperability.

Bill C-294,[66] a private member's bill introduced in June 2021, is an example of a proposed legislative response to the issues discussed in this section. The bill would create an expanded interoperability exception to the anti-circumvention measures in the *Copyright Act* by way of amendment of section 41.12(1) to include in the exemption any circumvention of TPMs in order to facilitate the making of "the program or a device in which it is embedded interoperable with any other computer program, device or component." While Bill C-294 may partially addresses concerns related to interoperability by addressing the interface between computer programs, devices, and components, its focus on TPMs within the domain of "computer programs" may be too narrow to capture exclusionary efforts such as proprietary data cable connections or other data interfaces. While the paper acknowledges potential arguments in favour of the applicability of Bill C-294 to non-programmatic hardware,[67] the success of such arguments is not a certainty. Furthermore, as mentioned further in section 3.3 of the paper, arguments attempting to shoehorn results into the provisions of Bill C-294 seem to comprise technology-specific, "band-aid", or use-by-use

solutions where public policy would benefit from a more principled and technologically-agnostic response by government.

In any event, Bill C-294 passed third reading in the House of Commons on June 14, 2023, but is currently stalled at second reading in the Senate.[68] That similar efforts in approach have resulted in little, if any, progress is one reason underlying this paper's focus on competition law as an alternative mechanism for relief. That said, Section 3.4.1 below considers recent events which may suggest that the approach taken by Bill C-294 may well now enjoy a greater chance of success than previously believed.

3.3 Proposed Copyright Act Amendment: section 41.21(1)

Subsection 41.21(1) and (2) of the *Copyright Act* gives the Governor in Council ("GiC") the authority to create regulations that may exempt certain TPMs (or categories thereof) from the protection afforded by section 41.1(1). Such exemptions may be made "if the [GiC] considers that the application of that section to the technological protection measure … would unduly restrict competition in the aftermarket sector in which the technological protection measure is used."[69] Furthermore, in the making of any decision regarding the creation of regulations, the GiC may consider "any relevant factor" including, *inter alia*, the legal use of copyrighted material, the commercially accessibility of the content; and the possible detrimental effects of TPMs on the principle of fair dealing.[70] As mentioned above in this paper's consideration of existing literature, the analysis of the impact of TPMs on the ability of users to access content in order to exercise their fair use rights has been given significant attention.

The GiC's use of this regulatory authority would ensure that short-line manufacturers could access the data, programs, and operating systems of T&Cs for the legal purpose of ensuring their equipment's interoperability *and* compatibility and thus warrants further consideration particularly in light of recent events discussed below in section 3.4.1. However, grounding a response to the TPM dilemma in the regulation-making powers of the GiC leaves remediation (and the ongoing effect of remediation) entirely in the hands of the government of the day, beyond the purview of wider parliamentary consideration, debate, and decision-making. Furthermore, any remediation through section 41.21(1) and (2) of the *Copyright Act* would not address the underlying anti-competitive nature of full-line manufacturers' conduct and is therefore something of an attempt to regulate on a responsive "use-by-use" basis over remedies constructed from more principled perspectives, with wider application and effect. Finally, it is important

to highlight the inherent differences between the nature of a GiC consideration of an "undue restriction of competition in an aftermarket", and that of a Tribunal consideration of whether a "significant lessening or prevention of competition" exists in accordance with the provisions of the Act. In the interests of transparency, accountability, and the creation of good public policy, the paper argues that the former response would be open to political considerations, pressures, and influences which should play no role in a the Tribunal's investigative, administrative and judicial processes.

3.4 The "Right-to-Repair"

The contemporary "right-to-repair" movement advocates for legislation and policies that would allow consumers (and/or third-party repair professionals) to have access to the tools, parts, software, and instruction manuals which are necessary to repair electronic devices and other consumer products. Proponents argue that consumers should have the option to repair their own products or choose someone other than the manufacturer to do so, aiming to reduce costs, extend the lifespan of products, promote sustainability by reducing electronic waste, and foster a competitive repair market.[71] This push for repairability challenges manufacturers' restrictive practices in respect of design elements which make third party repair more difficult, or the limiting access to electronics or repair documentation.[72]

Efforts to establish a right-to-repair have been underway in Canada for several years. The Canadian government, for example, prioritized the establishment of a right-to-repair through Prime Minster Justin Trudeau's mandate letter to the Minister of Innovation, Science and Industry in 2021, which instructed the minister to (a) implement a right-to-repair for home appliances through the compulsory availability of repair manuals and spare parts from appliance manufacturers, and (b) "[amend] the *Copyright Act* to facilitate the repair of digital devices and systems".[73] Notwithstanding this "prioritization" in 2021, and subject to the discussion in section 3.4.1 below, no evidence of progress on either front exists.

While mandate letters and ministerial priorities have accomplished little, Bill C-244,[74] a private member's bill which would establish a right-to-repair through an amendment to the *Copyright Act* has been inching its way through the Canadian parliament. The bill's proponents argue that its effect—which would permit the circumvention of TPMs for the purpose of product maintenance or repair—will empower consumers by facilitating the repair of their electronic devices; allow for more options for repair services; foster innovation in the repair and aftermarket sectors; enhance

competition; and make repairs more practical for individuals in remote or rural areas where authorized repair services might not be readily accessible. The success of Bill C-244 is far from assured, however, since after having received second reading in the Senate on February 27, 2024, the bill, as of the time of this writing, has not been assigned for review by committee. With the next Canadian federal election scheduled to take place no later than October 2025, the bill, may well die on the government's order paper.

While efforts in Canada to establish a right-to-repair may be instructive, this paper argues that such efforts will not sufficiently assist short-line manufacturers in responding to the challenges flowing from the use of TPMs discussed herein. This argument is the consequence of a distinction between the nature of an implement's "repair" and the facilitating of "compatibility" and "interoperability" between two separate implements.

The Oxford English Dictionary's definition for "repair" is, "an act of restoring an object or structure to good condition by replacing or fixing parts in order to maintain it in good condition."[75] With the limits of this definition in mind, one can understand that the work required of short-line manufacturers to ensure the interoperability or compatibility of its accessory equipment with the electronics platform of a T&C is not fully captured. Short-line manufacturers must do considerably more than simply "replace or fix a part". In fact, it is not necessary for a short-line manufacturer to repair anything, since neither its implement nor the T&C requires a replacement or a fix of any kind … indeed both pieces of equipment are in perfect operating condition. What *is* required is beyond the concept of "repair"—the ensuring of interoperability and compatibility of two pieces of equipment which may involve the programming or reprogramming of the electronic components, the de-encryption and rewriting of computer code, or the adaptation of proprietary interfaces to facilitate communication. As a result, even if eventually enacted, traditional efforts to establish a right-to-repair would fall short of providing an effective regulatory response to the impugned use of TPMs by full-line manufacturers.[76]

3.4.1 Recent Developments

On April 17, 2024, the Liberal government tabled its federal budget. The document sets out, under a heading entitled, "Lower Costs and Fairer Treatment for Farmers," a statement of government support for amendments to the *Copyright Act* to "help achieve interoperability between devices and equipment."[77] Unlike the previous legislative initiatives discussed above, which were focused on the establishment of a right-to-repair, *Budget 2024*

addresses the issue discussed herein specifically, mentioning the Canadian short-line industry directly:

> "Whether on the farm, on the jobsite, or in the backyard, Canadians deserve greater interoperability of the equipment they purchase—regardless of the brand. Farmers should be able to connect their John Deere Tractor or New Holland combine, to the specialized equipment they need from third parties, including short-line manufacturers, for various farming tasks."[78]

Clearly, (and conveniently a mere days before the completion of this paper) the release of *Budget 2024* demonstrates that short-line manufacturers have succeeded in efforts to at least place TPM-based challenges on the table for discussion, a development which represents a considerable preliminary success. The government plans to hold consultations on the issue later in 2024, along with consultations on amendments relating to the right-to-repair. Whether the current piquing of government interest in the issue will result in practical relief for short-line manufactures via amendments to the *Copyright Act* will be determined over the coming consultative processes. However, the acknowledgement of the issue by the federal government in Budget 2024 has clearly "moved the needle", perhaps increasing the chances of relief being realized through legislative amendment of Canadian copyright law. Having considered strategies to address the regulatory issue through copyright law, the paper will move on to a consideration of responses based in Canadian competition law.

4. Consideration of Regulatory Responses Under Competition Law

While there has been a cursory examination of the relevance of Canadian competition law to the central issue of this paper,[79] the following sections of the paper will more carefully consider the potential use of the *Competition Act* as the medium for an effective regulatory response.

4.1 Preliminary Considerations:

4.1.1 The Purpose(s) of the Competition Act

Before turning to the specifics of a proposed application to the Tribunal, the paper will first consider the *Competition Act's* provisions setting out its legislative purpose. Section 1.1, states:

> The purpose of this Act is to maintain and encourage competition in Canada in order to promote the efficiency and adaptability of the Canadian economy, in order to expand opportunities for Canadian participation

> in world markets while at the same time recognizing the role of foreign competition in Canada, ***in order to ensure that small and medium-sized enterprises have an equitable opportunity to participate in the Canadian economy*** and in order to provide consumers with competitive prices and product choices.[80] [Emphasis added.]

The primary purpose of the *Competition Act*—the maintenance and encouragement of competition for the provision of competitive prices and product choices—is perhaps unsurprising to anyone reading this section. However, the act's reference to a specific sector of Canadian market participants—"small and medium-sized enterprises" ("SMEs")—may go unnoticed or under-appreciated, and its inclusion is particularly pertinent to the considerations contained in this paper.[81]

In his 2021 treatise entitled "Canadian Competition Law and Policy," John Tyhurst considers the origins of the reference to small and medium size enterprises in the *Competition Act's* statement of purposes. In noting that the act's *central* purpose is the promotion of economic efficiency, Tyhurst characterized the reference to SMEs as one in a "cluster of objectives" which are concerned with the distribution of wealth and concern for economic power/business equity. These so-called "lesser objectives"[82] have, according to Tyhurst, played a diminishing role as Canadian competition law has evolved, yet he points out that they remain "part of [the *Competition Act's*] fabric, content, and context."[83] Tyhurst references several decisions by the Tribunal which, over time, have given statutory weight to the act's explicit mention of SMEs interests in the list of purposes[84] noting that the promotion of small businesses' participation in markets can increase competition and promote competitive prices and choices for consumers. Support for the furtherance of SMEs' interests through the *Competition Act* is not universally held, however. Both Tyhurst[85] and competition law scholar Edward Iacobucci[86] have questioned the relevance of the *Competition Act's* reference to the consideration of SMEs as an explicit purpose of the legislation. As per Iacobucci, "It is … not clear why concern for small and medium-sized businesses *per se* is included as a motivation for the Act in s. 1.1. SMEs are clearly essential to the Canadian economy, but it does not necessarily follow that competition policy should seek to promote their well-being."[87]

Regardless, in the context of this discussion, until such time as parliament amends the *Competition Act* to remove its current reference to the ensuring of an opportunity for SMEs to participate in the Canadian economy, the courts and the Tribunal must afford the reference an appropriate degree of interpretive consideration. While not suggesting that any one of

the Act's statutory purposes should supersede the effect of its provisions, it is appropriate for courts and tribunals, consistent with the "rule against surplusage",[88] to strive to give meaning to every provision, thus avoiding legislative interpretations rendering any clause redundant in the course of the Act's interpretation and application.

4.1.2 The Definition of Market

A market's definition for purposes of competition law is the starting point for any analysis regarding competitive behaviour and regulatory oversight.[89] Market definition provides a framework for understanding and evaluating how businesses interact in the marketplace and the impact of their actions on other competitors and consumers.[90] A relevant market typically encompasses two components: the "product market" and the "geographic market." "Product market" refers to the range of products or services considered substitutable by the consumer based on characteristics, prices, and intended use; and "geographic market" defines the area in which companies compete for customers.[91] Defining a product market helps determine which products or services compete against each other, while defining a geographic market (ex. local, national, or international) helps define the area in which companies compete. This preliminary definition of the market helps assess the market power of a company, that is, the ability to significantly control prices, exclude competitors, or behave independently of competitive pressures.[92] A well-defined market is crucial to identify if a company holds a dominant position and if it abuses that position.

In *Canada (Commissioner of Competition) v. Vancouver Airport Authority*[93], the Canada Competition Tribunal meticulously evaluated several key factors in determining both the product and geographic markets, which were essential for assessing the alleged anti-competitive conduct. For the product market, the Tribunal applied the hypothetical monopolist test to ascertain whether airside access and galley handling services could be deemed distinct markets, focusing on the unique role of these services in the logistics of loading and unloading aircraft. The Tribunal also considered the possibility of functional substitution, examining whether airlines could self-supply or use double catering as viable alternatives to the services offered at Vancouver International Airport (YVR). Additionally, the demand characteristics, particularly the airlines' need for local and timely service delivery, were critical in defining these services as a distinct product market. In determining the geographic market, the Tribunal concluded that it should be confined to YVR, given the necessity of local airside access and the significant barriers to entry, including regulatory and operational requirements

controlled exclusively by the Vancouver Airport Authority. The Tribunal also considered whether practices such as double catering and self-supply could extend the geographic market beyond YVR but found them insufficient to replace the services provided locally. Consequently, the Tribunal identified the relevant markets as the Airside Access Market and the Galley Handling Market at YVR, supporting the analysis of the competition issues within this specific context.

In the context of this paper's subject, where full-line manufacturers introduce TPMs that inhibit the functionality of short-line manufacturers' equipment, the Tribunal's analysis would require a nuanced approach distinct from that applied in the *Vancouver Airport Authority* case. The Tribunal would first need to consider the specific nature of agricultural equipment, distinguishing between full-line products, such as tractors and combines, and the complementary or specialized tools produced by short-line manufacturers. This analysis would focus on whether the short-line equipment constitutes a separate product market or merely complements the broader market dominated by full-line manufacturers. The introduction of TPMs could effectively result in the bifurcation of the market, creating a distinct market for TPM-compatible equipment and another for independent, non-protected products.

The Tribunal would also likely assess the substitutability of short-line products for those offered by full-line manufacturers. If TPMs significantly diminish the substitutability of short-line products—such as attachments or software—the Tribunal might recognize separate product markets for TPM-protected versus non-protected equipment. The hypothetical monopolist test could be applied to determine if a full-line manufacturer could profitably impose a price increase on TPM-protected equipment without losing customers to short-line manufacturers. If TPMs effectively lock customers into a specific manufacturer's ecosystem, this would indicate the existence of a distinct market for such TPM-protected equipment.

Geographically, the Tribunal would examine the market reach and distribution of both full-line and short-line manufacturers, acknowledging that agricultural equipment markets often span regional, national, or international boundaries. TPMs could introduce significant barriers to entry for short-line manufacturers, potentially limiting their ability to compete in broader markets or confining them to regions where TPM restrictions are less impactful. The analysis would determine whether the effects of TPMs are consistent across various regions or whether they vary, potentially leading to different geographic market definitions.

In terms of anti-competitive effects, the Tribunal would scrutinize whether the use of TPMs constitutes exclusionary conduct by full-line manufacturers, with the potential to foreclose competition from short-line manufacturers. This would involve evaluating whether TPMs substantially lessen or prevent competition by restricting market access or reducing product variety. Additionally, the Tribunal would assess the impact of TPMs on innovation, considering whether these restrictions diminish incentives for both full-line and short-line manufacturers to innovate, akin to the non-price effects analyzed in the Vancouver Airport case.

Finally, the Tribunal would weigh the business justifications for TPMs, such as claims of necessity for product safety, interoperability, or intellectual property protection, against their potential anti-competitive effects. The analysis would involve a detailed evaluation of whether TPMs primarily serve legitimate business purposes or if they are predominantly tools for excluding competition. This framework would mirror the approach used in the Vancouver Airport case but would be specifically tailored to the dynamics of the agricultural equipment industry and the role of TPMs in shaping market competition.

Notwithstanding the foregoing analysis based on the considerations made in *Vancouver Airport Authority*, this paper raises the possibility that the current approach to market definition, which centers on identifying substitutable products, evaluating cross-elasticity of demand, and applying the hypothetical monopolist test, may prove inadequate in the context of TPMs. The traditional framework assumes that consumers can freely choose among competing and/or complementory products based on factors such as price, quality, and availability, which allows for a straightforward delineation of market boundaries. However, TPMs introduce complexities that disrupt these assumptions, challenging the efficacy of traditional methodologies.

TPMs inherently create barriers that restrict consumer choice and limit interoperability between products from different manufacturers. These measures can compel consumers to remain within a specific product ecosystem, thereby altering the competitive dynamics of the market. As a result, the conventional emphasis on product substitutability may fall short in accurately defining the market, as TPMs shape market boundaries based on the strategic decisions of the firm implementing them rather than on consumer preferences or product characteristics. The presence of TPMs renders once-complementary short-liner products non-complementary, and leads to the formation of what might be termed "artificial" market boundaries. In such a market, the competitive landscape is dictated not by open competition

but by the constraints imposed by TPMs, effectively excluding otherwise substitutable or complementary products from the market definition. Traditional market definition approaches may overlook the extent to which TPMs distort market structures, as they do not fully account for the market-transforming restrictions on competition imposed by these measures.

Moreover, TPMs can significantly impact innovation and market entry by enhancing the market power of the firms that deploy them. This, in turn, may stifle innovation and deter new competitors from entering the market. The conventional framework for market definition might fail to capture the reduction in competition and innovation within a TPM-locked ecosystem, as it is primarily designed to assess open and competitive markets.

The Tribunal's traditional approach to market definition may therefore not adequately address the complexities introduced by TPMs. There may well be a need for a more refined approach that considers how TPMs alter market structures, constrain consumer choice, and create ecosystems where competition is artificially limited. Such an approach may better assist with the acxcurate assessment of the competitive effects of TPMs and ensuring that competition law effectively addresses the challenges posed by these technological measures.

While defining a market is not an exact science[94] and it is not necessary to define the product and geographic dimensions of a market with absolute precision,[95] the fact that the Canadian T&C market is comprised entirely of products manufactured by four companies[96] is evidence of full-line manufacturers' industry dominance of the agricultural T&C market and, thus for the reasons discussed above, the entirety of the Canadian agricultural equipment market. Having concluded that full-line manufacturers currently hold a dominant position in the Canadian agricultural equipment market, the paper will discuss the nature of the recommended applications.

4.2 Discussion of Regulatory Response

This paper argues that commencement of an application by the Commissioner seeking an order by the Tribunal prohibiting full-liners' continued use of TPMs in a manner which restricts or prohibits short-line manufacturer's participation in the agricultural equipment market would constitute an appropriate and effective regulatory response. The proposed application would be advanced under two claims, namely (i) an application under section 77 (Exclusive Dealing and Tied Selling)[97]; and (ii) an application under sections 78 and 79 (Abuse of Dominant Position).[98] In the context of the proposed application, it is important to recognize that the

Tribunal's order in favour of either claim requires its first having found that the impugned TPM use by full-line manufacturers results in a "substantial lessening or prevention of competition",[99] a question that will be addressed below.

4.2.1 Application Under Section 77—Exclusive Dealing and Tied Selling

The effects of the employment of TPMs b y full-line manufacturers of T&Cs support arguments that the practice constitutes conduct in violation of prohibitions against "exclusive dealing"[100] and "tied selling".[101] A farmer's decision to purchase a TPM-enabled tractor from John Deere is subject implicitly, if not explicitly, to the condition that she "deal only or primarily in products supplied by or designated by"[102] John Deere going forward. Failure to comply with this condition will result in the farmer's purchase of accessory equipment which cannot operate in conjunction with her John Deere tractor. This result is evidence of a condition of exclusivity imposed as a result of full-line manufacturer's conduct. A similar example can illustrate engagement in tied selling. The implicit or explicit condition applicable to a farmer's purchase of a John Deere X9 combine (defined as the "tying product" under section 77(1)) requires that any accessory equipment must also be manufactured by John Deere. The farmer must, from a practical (if not legal) perspective, refrain "from using or distributing, in conjunction with the tying product, another product that is not of a brand or manufacture designated by the supplier".[103]

This paper argues that through the imposing of explicit or implicit conditions, full-line manufacturers (the "major suppliers" of agricultural equipment and, arguably, the "exclusive suppliers" of T&Cs) (a) are impeding short-liners' entry into, or expansion in, the market, (b) are impeding short-liners' introduction of products or the expansion of the sale of such products in the market, and (c) will ultimately exclude short-liners entirely from participation in the agricultural equipment market by virtue of their products being rendered inoperable. The effect of full-line manufacturers' use of TPMs will (or likely will) substantially lessen competition and such conduct justifies an order by the Tribunal prohibiting the continued engagement in such exclusive dealing and tied selling. Pursuant to section 77(2), the Tribunal's order may also contain "any other requirement that, in its opinion, is necessary to overcome the effects thereof in the market or to restore or stimulate competition in the market,"[104] a possibility which is briefly touched on in the paper's recommendations below.

4.2.2 Application Under Sections 78 & 79—Abuse of Dominant Position

Prior to the December 2023 amendments to the *Competition Act*, an abuse of a dominant position occurred when a dominant firm (or group of firms) engaged in an intentional practice of anti-competitive acts, with the effect of substantially lessening or preventing competition. The legislation required proving all three elements: dominance, anti-competitive intent, and anti-competitive effect. Following the December 2023 amendments, however, (a) the Tribunal may now make a prohibition order against a dominant firm (or group) if their conduct meets *either* the anti-competitive intent or the anti-competitive effect requirement, thus permitting an order by the Tribunal where conduct either subverts competition or was intended to do so;[105] and (b) a potential abuse of dominance is no longer limited to "anti-competitive acts" (i.e. one of the anti-competitive acts set out in the non-exhaustive list contained in section 78(1) (a)-(k));[106] but now may include any conduct that had, is having, or is likely to have a substantial anti-competitive effect in a market (i.e. conduct which has or is likely to have an effect which prevents or lessens competition in a market),[107] where such effect is not a result of "superior competitive performance".[108]

4.2.2.1 Do full-line manufacturers exhibit dominance in the Canadian agricultural equipment market?

This paper argues that the full-line manufacturers of Canadian agricultural equipment enjoy a position of dominance in the market. While a limited amount of available market share research focuses on the agricultural equipment market as a whole in Canada, the data's categorisation and presentation makes it difficult to determine the market share of individual T&C manufacturers on a national basis. That said, this paper argues that the following three data points—while not precisely on point, together provide convincing circumstantial evidence of the dominance of full-line manufacturers in the Canadian agricultural equipment market. Firstly, research conducted by IBISWorld in late 2023 found that five full-line manufacturers (John Deere (46.0%), CNH Global NV (17.3%), AGCO Corporation (9.1%), MTD Products Inc. (3.3%) and CLAAS KGaA mbH (2.6%)) together enjoyed a combined market share of more than 78% of the American agricultural equipment market.[109] Without a domestic Canadian full-line manufacturer, and in light of the close integration of the Canadian and American markets in general, one might reasonably expect that agricultural equipment market share numbers in Canada would be credibly consistent with those of the United States. Secondly, the Canadian

counterpart to the IBISWorld study of the American market revealed that "[m]ost of the major Canadian agricultural machinery manufacturers are based abroad," and that among those based in Canada, Buhler Industries Inc. held the largest share of the Canadian manufacturing market, with 2.3% of the total 2023 market.[110] It follows that there are no domestic equipment manufacturers which could uniquely influence the Canadian market, which supports the assumption that the above-referenced statistics on market dominance in the United States are applicable, generally, to Canada.

4.2.2.2 Does the use of TPMs in tractors and combine harvesters constitute an abuse of a dominant position under section 79?

Considering the December 2023 amendments to the *Competition Act*, the use of TPMs by full-line manufacturers constitutes abuse of a dominant position, whether as anti-competitive acts under section 79(1)(a) or as conduct resulting in a substantial lessening or prevention of competition under section 79(1)(b), without reliance on superior competitive performance.

Firstly, in respect of section 79(1)(a), it is important to note that the list of anti-competitive acts prescribed in section 78(1) is non-exhaustive.[111] If the Commissioner were to determine a strategic advantage in proceeding under section 78(1),[112] one could foresee her argument that TPM use has a "predatory, exclusionary or disciplinary negative effect on a competitor, or … an adverse effect on competition" in a manner analogous to the acts explicitly prescribed by section 78(1). Beyond the making of analogous arguments, the conduct prescribed by 78(1)(g) (i.e. the "adoption of product specifications that are incompatible with products produced by any other person and are designed to prevent his entry into, or to eliminate him from, a market") seems sufficiently wide to capture the effect of TPMs such as digital locks, encrypted software, and proprietary data or power connectors as discussed in section 2.3 above.

Secondly, in respect of section 79(1)(b) and its determination as to whether the conduct in issue results in a substantial lessening or prevention of competition, the Tribunal is provided some assistance in the form of considerations under section 79(4). A brief review of these conditions will lead, I argue, to the conclusion by the Tribunal that full-line manufacturers' actions result in undesired consequences through:

a) the raising of market barriers to entry, such as increased costs for short-line manufacturers in research and development, product design, security, and servicing to ensure compatibility with full-line

manufacturers' T&Cs. These costs would be incurred in respect of technical design, engineering, licensing or access fees demanded by full-line manufacturers for T&C data access, and the need to eschew agreements with manufacturers of the most popular T&Cs—entering into agreements with less popular T&C manufacturers—which limits short-line manufacturers' access to the broader equipment market. The use of TPMs by full-line manufacturers will also enable them to secure exclusive benefits from related network effects. By introducing TPMs, full-liners can create a closed ecosystem where their machinery, software, and services are tightly integrated, ensuring that only authorized accessories, tools, and parts function with their equipment. As more farmers adopt their equipment, the value of this ecosystem increases, driving additional users to choose their products to gain access to the enhanced functionality and seamless compatibility that the TPM-protected network offers. This, in turn, reinforces full-line manufacturers' market dominance, as the cost and inconvenience of switching to a short-line's brand outside this protected network become prohibitively high for customers. Consequently, the positive feedback loop generated by these network effects can lead to full-liner's higher customer retention, increased market share, and the ability to set higher prices, all while limiting competition from third-party suppliers and short-line manufacturers;

b) the significant reduction in product variety on the market, particularly affecting short-line manufacturers. TPMs create barriers that prevent third-party manufacturers from producing compatible or competing products, thereby limiting the ability of short-line manufacturers to offer alternative tools, accessories, or parts that work with the dominant equipment. As a result, the market experiences a decrease in product diversity, as farmers are forced to rely solely on the offerings of the full-line manufacturers who control the TPM-protected ecosystem. This reduction in product variety constitutes a non-price effect that can substantially lessen or prevent competition, as consumers are left with fewer choices and less innovation in the market. The diminished availability of alternatives stifles competitive dynamics, ultimately harming consumer welfare by reducing the ability to choose products that best meet their specific needs.; and

c) the significant reduction in product innovation by restricting access to underlying technology and ensuring that only authorized parts, tools, or software can interface with their equipment, TPMs effectively block third-party competitors from entering the market or offering

> alternative solutions. This anti-competitive control discourages innovation from both within full-line manufacturers and from short-line manufacturers, as the incentive to improve or create competing products diminishes in the absence of robust market competition. When competition is stifled, there is less pressure on full-line manufacturers to innovate, leading to a stagnation in product development and technological advancement. Consumers are ultimately disadvantaged, as they are deprived of potentially superior, more efficient, or more cost-effective alternatives that might have emerged in a more competitive environment. Thus, TPMs, while protecting proprietary interests, can contribute to a broader decline in innovation across the industry.

The above considerations—the erection of market barriers, the reduction in product variety, and the reduction in product innovation all support the Tribunal's conclusion that TPM use by full-line manufacturers results in a substantial lessening or prevention of competition, thus justifying an order in support of the Commissioner's application.

Before moving on, a reference to the Tribunal's analysis of "substitution" and "diversion" patterns is warranted. In the context of its abuse of dominance analysis, the Tribunal will consider whether actions (i.e. the imposition of TPMs) by dominant firms (i.e. full-line manufacturers) hinder competition by affecting substitution patterns or causing a diversion of sales. Here, "substitution" refers to the degree to which farmers are able to switch from one agricultural product to another in response to changes in price or market conditions (i.e. the imposition of TPMs), and "diversion" refers to the shift of sales or market share from one product to another due to the imposition of competitive actions (i.e. the imposition of TPMs). In fact that the imposition of TPMs results in the exclusion of short-line manufacturers from the equipment marketplace entirely, rendering this analysis relatively straightforward. The introduction of TPMs and the resulting inability of short-line manufacturers' products to operate with full-liner T&Cs eliminates farmers' ability to substitute a Competing Product for a similar full-liner product entirely—thus rendering substitution impossible. While technically not "substitution" given that full-line manufacturers do not offer competing equipment to the market, short-liners' ability to sell Original Products is also eliminated on account of such products' lack of interoperability. TPMs maximize "diversion"—in fact TPMS do more than maximize—they force the complete diversion of farmers' purchasing decisions from short-line manufacturers' equipment to their full-line counterparts' equipment.

4.2.2.3 Are the competitive impacts of TPM use in tractors and combine harvesters the result of superior competitive performance?

Since the December 2023 amendments to the *Competition Act*, any conduct by dominant firms that significantly reduces competition may violate section 79, unless it can be attributed to "superior competitive performance."[113] Full-line manufacturers may well argue in that context that their use of TPMs facilitates their ability to offer products which advance interests such as product safety and efficiency, and customer convenience through product customization and personalization. Aside from the fact that these benefits, to the extent they can be shown to exist, result from the leveraging by full-line manufacturers of the network effects discussed above, historical market data (and common sense) does not support the argument that it is their products' superior performance—and not the exclusionary effects of TPMs—which underlies any reduction or elimination of short-line manufacturers' share of the agricultural equipment market.

For decades, short-line manufacturers consistently secured and retained market share in respect of their Competitng Products and Original Products. This history of short-line manufacturer success was achieved despite the various commercial advantages enjoyed by their full-line counterparts such as (a) the ability to offer purchase price discounts when T&Cs are bundled with same-brand accessories, or (b) price or non-price efficiencies resulting from full-liner's ability to consolidate customer's maintenance, servicing, and parts needs via one-stop-shopping by the manufacturer of their T&Cs. Notwithstanding these commercial advantages, short-line manufacturers have carved out successful businesses for years. The suggestion that a reduction in short-liner market share for Competing Products is due to the sudden achievement of product superiority by full-line manufacturers beggers belief—particularly given the curious fact that such a reduction in market share would occur contemporaneously with the introduction of TPMs. Of course, where Original Products are concerned, the absence of any competitive presence by full-line manufacturers renders moot a full-liner suggestion that it is "product superiority" that has resulted in short-line manufacturers' sudden inability to sell their Original Products. In this context, the exclusionary effect of TPMs is laid bare.

Beyond the foregoing, arguments raised by full-line manufacturers supporting the exclusion of competitors from access to data seem counter to the proposition that product safety and efficiency are universal societal goals, and that competition policy should be designed, interpreted, and applied

to encourage the innovation of products which maximize safe and efficient products across industries. Excluding segments of the agricultural equipment manufacturing industry from such data contradicts the *Competition Act's* objectives, especially when one considers the explicit reference to the ensuring of equitable opportunities for small and medium-sized enterprises in the national economy.

4.2.3 Pro-Competitive Rationales for TPMs

Any discussion on regulatory responses to the use of TPMs must consider the pro-competitive arguments that are often raised in their defence. Proponents contend that TPMs are vital for protecting the fruits of innovation, enabling companies to secure returns on their investments in research and development. By ensuring that these innovations are safeguarded from unauthorized use, TPMs are believed to incentivize further technological advancements, driving continuous innovation that benefits the innovators, the market, and consumers alike. However, while the role of TPMs in fostering innovation is a compelling argument, it must be critically examined against the potential risks of misuse—risks that can lead to reduced competition, restricted market access, and ultimately, a stifling of the very innovation which proponents contend that these measures promote.

These pro-competitve arguemnts can oversimplify the relationship between innovation, investment, and competition. While it is undeniable that companies must protect their intellectual property to secure returns on investment, the broad application of TPMs can have unintended consequences that stifle competition and innovation rather than foster it. As demonstrated in the agricultural equipment industry, the use of TPMs by dominant full-line manufacturers like John Deere has led to significant market distortions. By employing TPMs that prevent interoperability with third-party or short-line manufacturers' products, these companies effectively lock out competitors, consolidating their market power and reducing the incentive for other players to innovate.

This anti-competitive behaviour, justified under the guise of protecting innovation (and profits), undermines the competitive landscape that is crucial for long-term technological advancement. Innovation thrives in environments where multiple entities can build upon existing technologies, offering improvements and alternatives that drive the industry forward. The overuse of TPMs, however, restricts this collaborative potential, leading to a market where only the largest players with the most extensive resources can survive. This not only limits consumer choice but also hinders the overall

pace of innovation by reducing the diversity of ideas and solutions that smaller, more agile companies can bring to the table.

Therefore, while the protection of intellectual property is necessary to some extent, it must be carefully balanced with the need to maintain a competitive market. By promoting interoperability and preventing the abuse of dominant positions, regulators can create an environment where innovation is both protected and encouraged across the entire industry, rather than concentrated in the hands of a few dominant players where they are used as tools for anti-competitive behaviour.

5. Recommendations

5.1 Recommendation 1:

That the Commissioner file an application under section 77(2) of the *Competition Act* seeking an order against full-line manufacturers of T&Cs that their employment of TPMs constitutes exclusive dealing and tied selling and is subject to an injunction against any further such use, together with such "other requirement that, in [the Tribunal's] opinion, is necessary to overcome the effects thereof in the market or to restore or stimulate competition in the market."[114]

5.2 Recommendation 2:

That the Commissioner file an application under section 79(1) of the *Competition Act* seeking an order against full-line manufacturers of T&Cs that their employment of TPMs constitutes an abuse of a dominant position in the agricultural equipment manufacturing industry and is subject to an injunction against any further such use, together with an order that full-line manufacturers take such additional action as the Tribunal considers "reasonable and necessary to overcome the effects of the practice in the market."[115]

Regarding both recommendations, sections 77(2) and 79(1) empower the Tribunal to include "additional terms necessary to restore or stimulate competition in the market" in its decision. Examples of such terms could entail: (a) requiring full-line manufacturers to adhere to international standards for product design to enhance interoperability, (b) mandating the use of "open design architecture" and "open standards" for data interoperability, and (c) facilitating information exchange between full-line and short-line manufacturers through the Ministry of Innovation, Science, and Industry.

6. WIPO and USMCA Considerations

6.1 WIPO Considerations

While many WIPO signatories enforce restrictions on the bypassing of TPMs, Canada's 2012 amendments to the *Copyright Act* established strict protections of both access and use controls[116] which exceed the provisions of the WCT and surpass those of other WCT member countries. For example, France has adopted a system which creates a digital rights authority focused on promoting interoperability; U.S. law mandates legislative reviews by the Library of Congress to determine whether current anti-circumvention exceptions in the *Digital Millennium Copyright Act*[117] remain appropriate and whether new exceptions are warranted; and on March 22, 2023, the European Commission proposed a directive establishing consumer rights to demand repairs.[118] While the regulation of TPMs is required under the WCT, these global responses illustrate that the signing of the WCT does not preclude sensible reforms.

6.2 USMCA Considerations

Amending the *Copyright Act* provisions related to TPMs must be carried out within the framework of Section 20.66(4) of the Agreement between the United States of America, the United Mexican States, and Canada (the "USMCA")[119] which sets out permissible exceptions or limitations to the parties' obligations with respect to the protection of TPMs. The government's options in this regard were considered in a 2021 consultation[120] which concluded that desired changes could be implemented by regulation by the GiC under either of two *Copyright Act* provisions, namely (1) if, under subsection 41.21(1)), the GiC considers that the undue restriction of competition in the aftermarket sector will result; or if, under subsection 41.21(2), a TPM could adversely affect the market for the work. Section 41.21(2) also permits the GiC to make associated regulations to require the owner of the copyright in a work protected by a TPM to provide access to the work, and to "prescribe the manner in which, and the time within which, access is to be provided, as well as any conditions that the owner of the copyright is to comply with."[121] Clearly Canada is not prevented by law from the implementation of reasonable restrictions on the existing use of TPMs. What is required, however, is the political will.

7. Conclusion

This paper recommends that the Commissioner make applications under sections 77(2) and 79(1) of the *Competition Act* seeking orders from the

Tribunal that current use of TPMs by full-line manufacturers of T&Cs results in a substantial prevention or lessening of competition in the agricultural equipment industry. The commencement of applications is an appropriate regulatory response to the employment of TPMs which further the commercial interests of full-liners at the expense of a competitive market. The paper recognizes that although previous attempts to amend the *Copyright Act* have failed, the federal government's recent support for these amendments might offer a new regulatory solution. Nonetheless, the recommendations concerning the *Competition Act* still stand as viable alternative responses to the issue.

ENDNOTES

[1] Nilay Patel, John Deere turned tractors into computers—what's next? (15 June 2021) The Verge, online: <https://www.theverge.com/22533735/johndeere-cto-hindman-decoder-interview-right-to-repair-tractors> [https://perma.cc/9TEC-7BW2].

[2] "Full-line manufacturers," as used herein are defined in section 2.1 below.

[3] *Competition Act*, RSC 1985, c C-34, s 79(1).

[4] *Competition Act*, *supra* note 3 at s 77(2).

[5] "Short-line manufacturers," as used herein are defined in section 2.1 below.

[6] *United States v Apple Inc.*, No. 24-cv-00123 (N.D. Cal. 2024) (Smartphone Market Monopolizatoin Case), *Federal Trade Commission et al v Amazon.com, Inc.*, No. 2:23-cv-01338 (W.D. Wash. 2023) (Online Retail Monopoly Case), *United States v Google LLC*, No. 20-cv-03010 (D.D.C. 2024) (Search Engine Monopoly Case), *United States v Google LLC*, No. 21-cv-06841 (E.D. Va. 2024) (Ad Tech Practices Case), *Federal Trade Commission v Meta Platforms, Inc.*, No. 21-cv-05837 (D.D.C. 2021) (Social Media Monopoly Case).

[7] *Copyright Act*, RSC 1985, c C-42.

[8] *Competition Act*, *supra* note 3.

[9] *WIPO Copyright Treaty, 20 December 1996, [1996] 2186 UNTS 303.*

[10] Agreement between the United States of America, the United Mexican States, and Canada [USMCA], 30 November 2018, online: USTR https://ustr.gov/trade-agreements/free-trade-agreements/united-states-mexico-canada-agreement/agreement-between.

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[12] Peter WB Phillips et al, "Configuring the new digital landscape in western Canadian agriculture, (2019) 90-91:1 NJAS: Wageningen Journal of Life Sciences 1-11.

[13] Peter Phillips et al, "Configuring the new digital landscape in western Canadian agriculture", *supra* note 12 at 7.

[14] K. Wiens, "We Can't Let John Deere Destroy the Very Ideal of Ownership, (2015) Wired 1-13, and L Sydell, "DIY Tractor Repair Runs Afoul of Copyright Law" (2015) Privacy & Security, online (audio file): http://www.npr.org/ssections/alltechconsidered/.

[15] Peter Phillips et al, "Configuring the new digital landscape in western Canadian agriculture", *supra*, note 12 at 7.

[16] Sarah Hackfort, "Patterns of Inequalities in Digital Agriculture: A Systematic Literature Review." (2021) 13 Sustainability, 12345.

[17] Michael Geist, "Fixing Fair Dealing for the Digital Age: What Lies Behind the Copyright Review's Most Important Recommendation" (2019) online (blog): https://www.michaelgeist.ca/2019/06/fixing-fair-dealing/.

[18] Anthony D. Rosborough, "Toward a Canadian Right-to-repair: Opportunities and Challenges" (2022) 37:3 Berkeley Technology Law Journal

1197; Anthony D. Rosborough, "If a Machine Could Talk, We Would Not Understand It: Canadian Innovation and the Copyright Act's TPM Interoperability Framework" (2023) 19:1 Canadian Journal of Law and Technology at 141.

[19] Edward M. Iacobucci, "Examining the Canadian Competition Act in the Digital Era," September 27, 2021, online: <examining-the-canadian-competition-act-in-the-digital-era-en-pdf.pdf (squarespace.com)>, Edward M. Iacobucci, "Is the Canadian Competition Act Fit for Purpose in the Digital Era? What Purpose(s)?" (2023) 67 Canadian Business Law Journal 7.

[20] Edward M Iacobucci and Ralph Winter, "Abuse of Joint Dominance in Canadian Competition Policy" (2010) 60 University of Toronto Law Journal 219.

[21] Alex Cameron and Robert Tomkowicz, "Competition Policy and Canada's New Breed of "Copyright" Law", McGill Law Journal, online:< https://lawjournal.mcgill.ca/article/competition-policy-and-canadas-new-breed-of-copyright-law/>.

[22] Dawn M Drake, A Profile of the Farm Machinery Industry: The Power to Help Farmers Feed the World (New York: Business Expert Press, 2021) at 2.

[23] Drake, A Profile of the Farm Machinery Industry, *supra* note 22 at 35.

[24] According to the Canadian John Deere website <https://configure.deere.com/cbyo/#/en_ca/configure/221740082>, the retail price for a base model John Deere X9 combine harvester (without providing for operating accessory equipment required to function in the field) is C$1,290,571.00 as of the date of this writing.

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[27] "John Deere", online: *Statista* <https://www.statista.com/study/30218/john-deere-statista-dossier/>.

[28] Drake, A Profile of the Farm Machinery Industry, *supra* note 22 at 35.

[29] Global Market Insights, "Agriculture Equipment Market Size & Share, Forecast Report 2032", online: *Global Market Insights Inc* <https://www.gminsights.com/industry-analysis/agriculture-equipment-market>.

[30] Peter WB Phillips et al, "Configuring the new digital landscape in western Canadian agriculture, (2019) 90-91:1 NJAS: Wageningen Journal of Life Sciences 1-11.

[31] Phillips, "Configuring the new digital landscape in western Canadian agriculture, *supra* note 12 at 5.

[32] Michael Conant, "Competition in the Farm-Machinery Industry" (1953) 26:1 The Journal of Business of the University of Chicago 26–36, online: https://www.jstor.org/stable/2350224 .

[33] Anthony Rosborough & Carlo Dade, "The Serious Hidden Problem Facing Canada's Agricultural Innovators" (25 February 2021), online: <https://policyoptions.irpp.org/magazines/february-2021/the-serious-hidden-problem-facing-canadas-agricultural-innovators/>.

[34] Drake, A Profile of the Farm Machinery Industry, *supra* note 22 at 37.

[35] Western Economic Diversification Canada, "Interoperability: An overview with a Western perspective" (5 February, 2021) online: <https://opencanada.blob.core.windows.net/opengovprod/resources/36976fc5-a393-409b-9416-47707fb6a34b/interoperability-an-overview-with-a-western-perspective-final.pdf> resource not found at 6.

[36] This sector is categorized under Code 33311 of the North American Industry Categorization System. While foreign-based full-line manufacturers do have operations within Canada, the *domestic* manufacturing industry is comprised entirely of enterprises best characterized as "short-line manufacturers".

[37] Government of Canada, "Agricultural implement manufacturing - 33311 - Manufacturing - Canadian Industry Statistics - Innovation, Science and Economic Development Canada", online: <https://ised-isde.canada.ca/app/ixb/cis/manufacturing-fabrication/33311>.

[38] Rosborough, "The Serious Hidden Problem Facing Canada's Agricultural Innovators", *supra* note 33.

[39] Rosborough, "The Serious Hidden Problem Facing Canada's Agricultural Innovators" *supra* note 33.

[40] Pierre C Robert, "Precision Agriculture: An Informative Revolution In Agriculture" (1999) IDEAS Working Paper Series from RePEc, online: https://search.proquest.com/docview/1697555679?pq-origsite=primo .

[41] Robert, "Precision Agriculture: An Informative Revolution In Agriculture", *supra* note 40.

[42] Dalton Erickson, "An Evaluation of Tractors Tested at The Nebraska Tractor Test Lab and the Effect of EPA Emission Standards Based Upon Average PTO Horsepower and Fuel Efficiency", (14 March 2022) (B.A. Honours Theses, University of Nebraska - Lincoln) (on file with the Digital Commons, University of Nebraska-Lincoln).

[43] *WIPO Copyright Treaty, art 12*, *supra* note 9.

[44] *WIPO Performances and Phonograms Treaty*, art 18, 20 December 1996, [1996] 2186 UNTS 203.

[45] Cameron, "Competition Policy and Canada's New Breed of 'Copyright' Law, *supra* note 21 at 300.

[46] Cameron, "Competition Policy and Canada's New Breed of 'Copyright' Law", *supra* note 21 at 300.

[47] Ryan Iwahashi, "How to Circumvent Technological Protection Measures Without Violating the DMCA: An Examination of Technological Protection Measures Under Current Legal Standards" (2011) 26:1 Berkeley Technology Law Journal 491–526, online: <https://www.jstor.org/stable/26377545>.

[48] Jennifer Blair, "Canada's Short Line Equipment Makers on the Cutting Edge" (17 September 2018), online: https://www.albertafarmexpress.ca/news/canadas-short-line-equipment-makers-on-the-cutting-edge/ .

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[50] "AEF Online - About the AEF", online: <https://www.aef-online.org/about-us/about-the-aef.html#/About> .

[51] "AEF Online - About the AEF", *supra* note 50.

[52] "Tractor Implement Management (TIM): The Implement Controls the Tractor" (last visited 19 March 2021), online: https://www.aef-online.org/about-us/activities/tractor-implement-management-tim.html .

[53] Anthony Rosborough, "Unscrewing the Future: The Right-to-repair and the Circumvention of Software TPMs in the EU" (2020) 11:3 J. Intellectual Property, Information Technology and E-Commerce L. 26 at para 24.

[54] Rosborough, "If a Machine Could Talk, We Would Not Understand It, *supra* note 18.

[55] Rosborough, "If a Machine Could Talk, We Would Not Understand It", *supra* note 18 at 149.

[56] Rosborough, "The Serious Hidden Problem Facing Canada's Agricultural Innovators", *supra* note 33.

[57] World Intellectual Property Organization, WIPO Doc, "Chapter 3: Branding, Innovation and Competition" at 127, online: <https://www.wipo.int/edocs/pubdocs/en/wipo_pub_944_2013-chapter3.pdf>.

[58] *Copyright Act*, *supra* note 6 at s 41.1(1).

[59] *Copyright Act*, *supra* note 6 at s 41.

[60] *Copyright Act*, *supra* note 6 at s 41.1(2).

[61] *WIPO Copyright Treaty*, *supra* note 9.

[62] *Copyright Act*, *supra* note 6 at s 41.12(1).

[63] Rosborough, "If a Machine Could Talk, We Would Not Understand It", *supra* note 18 at 158.

[64] Rosborough, "If a Machine Could Talk, We Would Not Understand It", *supra* note 18 at 158.

[65] Rosborough, "If a Machine Could Talk, We Would Not Understand It", *supra* note 18.

[66] *An Act to amend the Copyright Act (interoperability)*, Bill C-294, 1st Sess, 44th Parl, 2023.

[67] The argument would presumably require a court to determine that non-programmatic elements such as proprietary data connections (for example) fall within the definition of "technological protection measure" pursuant to section 41 of the *Copyright Act* (Canada). The definition includes any "effective technology, device or component" that controls access to a "work"; and restricts the exercise of rights thereto. If successful on this preliminary issue, one could thereafter argue that the creation and installation of an adapter for a proprietary connector, while constituting a "circumvention" under section 41 ("descrambling, avoiding, bypassing, removing, deactivating, or impairing of a [TPM]"), the amendments proposed by section 41.12(a) and (b) of Bill C-294 serve to render such technological circumventions legal.

[68] Parliament of Canada, LEGISinfo, online: <https://www.parl.ca/legisinfo/en/bill/44-1/C-294>.

[69] *Copyright Act*, *supra* note 6 at s 41.21(1).

[70] *Copyright Act*, *supra* note 6 at s 41.21(2).
[71] Aaron Perzanowski, *The Right to Repair: Reclaiming the Things We Own* (Cambridge: Cambridge University Press, 2022).
[72] Perzanowski, *The Right-to-repair*, *supra* note 71.
[73] "Minister of Innovation, Science and Industry Mandate Letter", (15 December 2021), online: *Prime Minister of Canada* <https://www.pm.gc.ca/en/mandate-letters/2021/12/16/minister-innovation-science-and-industry-mandate-letter>.
[74] Canada, House of Commons, Bill C-244, An Act to amend the Copyright Act (diagnosis, maintenance and repair), 1st Sess, 44th Parl, 2021, (first reading 9 February 2022). Bill C-244 effectively mirrors the Bill C-272, a private member's bill presented in February 2021. Bill C-272 enjoyed support across party lines passing unanimously its first and second readings in the House of Commons. and was forwarded for consideration by committee in June 2021. Committee consideration was interrupted by the Canadian federal election in the fall of 2021.
[75] Oxford English Dictionary, "Repair, N. (2)", Oxford UP, online: <https://doi.org/10.1093/OED/6633058429>.
[76] As noted above, the approach of Bill C-294 with its specific reference to the circumvention of TPMs in order to facilitate the making of "the program *or a device in which it is embedded* interoperable with any other computer program, *device or component*" may present a sufficiently responsive legislative amendment to address short-line manufacturer's needs but only in the context of a right-to-*repair*.
[77] Budget 2024 (Canada), 1st Session, 44th Parliament, (2024), <https://budget.canada.ca/2024/report-rapport/budget-2024.pdf> (accessed 19 April 2024) at 141.
[78] Budget 2024 (Canada), supra note 77 at 141.
[79] Rosborough, "If a Machine Could Talk, We Would Not Understand It" *supra* note 18.
[80] *Competition Act*, *supra* note 3 at s 1.1.
[81] In comparison, the *Treaty on the Functioning of the European Union*, and the *Sherman Act* which comprise the principal anti-trust legislation of the European Union and the United States, respectively, make no reference to legislative priorities around a specific economic class or size of competitor, instead referencing only legislative purposes of general application - "undertakings and concerted practices which may affect trade between Member States" in the case of the *Treaty on the Functioning of the European Union*, and "every contract, combination, or conspiracy in restraint of trade" in the case of the *Sherman Act*. [Treaty on the Functioning of the European Union, art 101, [2007] OJ C 115/47; Sherman Act, 1890, 15 U.S.C. at s 1.] That the Canadian parliament saw fit to include an explicit reference to "small and mid-sized enterprises" amongst the *Competition Act's* purposes could be interpreted as an indication of the importance with which Canadian law places on the economic and commercial role such enterprises play in the Canadian context.
[82] John S Tyhurst, *Canadian Competition Law and Policy* (Toronto: Irwin Law Inc., 2021).

[83] Tyhurst, *Canadian Competition Law and Policy*, *supra* note 82 at 74.
[84] *Canada (Director of Investigation & Research) v Xerox Canada Inc (1990)*, 33 CPR (3d) 83 (CCT) at para 92.
[85] Tyhurst, *Canadian Competition Law and Policy*, *supra* note 82 at 130.
[86] Edward Iacobucci, Is the Canadian Competition Act Fit For Purpose in the Digital Era? What Purpose (s)?, (2023) 67 Canadian Business Law Journal, p 7 at 27.
[87] Iacobucci, Is the Canadian Competition Act Fit For Purpose in the Digital Era? What Purpose(s), *supra* note 86 at 48.
[88] Pierre-André Côté, *The Interpretation of Legislation in Canada*, 4th ed (Toronto: Carswell, 2011) at 297-302.
[89] Michael Trebilcock, Ralph Winter, Paul Collins and Edward Iacobucci, The Law and Economics of Canadian Competition Policy (University of Toronto Press, 2003).
[90] Trebilcock et al., The Law and Economics of Canadian Competition Policy, *supra* note 89 at 24–5.
[91] Trebilcock et al., The Law and Economics of Canadian Competition Policy, *supra* note 89 at 24–5.
[92] Tyhurst, *Canadian Competition Law and Policy*, *supra* note 82 at 130.
[93] *Canada (Commissioner of Competition) v. Vancouver Airport Authority*, [2019] C.C.T.D. No. 6.
[94] *Canada (Director of Investigation and Research) v Hillsdown Holdings (Canada) Ltd (1992)*, 41 CPR (3d) 289 (CCT) at para 61.
[95] *Canada (Commissioner of Competition) v Toronto Real Estate Board*, [2016] CCTD No 7 (CCT) at para 132, affirmed 2017 FCA 236, leave to appeal to SCC refused, [2018] SCCA No 24.
[96] Drake, A Profile of the Farm Machinery Industry, *supra* at note 22 at 28.
[97] *Competition Act*, *supra* note 3 at s 77.
[98] *Competition Act*, *supra* note 3 at s 78 and 79.
[99] See *Competition Act*, *supra* note 3 at s 77(2), 77(3), and 79(1)(b)(i).
[100] *Competition Act*, *supra* note 3 at s 77(1).
[101] *Competition Act*, *supra* note 3 at s 77(1).
[102] *Competition Act*, *supra* note 3 at s 77(1)(a)(i) and (ii).
[103] *Competition Act*, *supra* note 3 at s 77(1)(a)(i) and (ii).
[104] *Competition Act*, *supra* note 3 at s 77(2).
[105] "Guide to the December 2023 amendments to the Competition Act", (18 December 2023), online: <https://ised-isde.canada.ca/site/competition-bureau-canada/en/how-we-foster-competition/education-and-outreach/guide-december-2023-amendments-competition-act>.
[106] *Competition Act*, *supra* note 3 at s 78(1)(a)-(k).
[107] *Competition Act*, *supra* note 3 at s 79(1)(a) and (b).
[108] The interpretation of what constitutes "superior competitive performance" is unclear and will likely remain so until such time as future decisions of the Tribunal or the courts provide further consideration and clarity. A related consideration here is the role of *legitimate business justification* as such concept

appears in existing jurisprudence relating to anti-competitive acts [*Canada (Commissioner of Competition) v. Canada Pipe Co.*, (2005) 40 C.P.R. (4th) 453].

[109] IBISWorld, "Industry Report - Tractors & Agricultural Machinery Manufacturing in the US", February 2024, online: <https://www.ibisworld.com/united-states/market-research-reports/tractors-agricultural-machinery-manufacturing-industry/> (accessed March 10, 2024).

[110] IBISWorld, "Industry Report - Tractors & Agricultural Machinery Manufacturing in Canada", November 2023, online: <https://www.ibisworld.com/canada/industry/tractors-agricultural-machinery-manufacturing/672/> (accessed March 9, 2024).

[111] *Toronto Real Estate Board v Canada (Commissioner of Competition)*, 2017 FCA 236.

[112] One strategic advantage in opting *not* to base an application on the characterization of the impugned use of TPMs as constituting an anti-competitive act under section 78(1) is the avoidance of needing to subsequently respond to an argument by a full-line manufacturer respondent that their use of TPMs is precluded from characterization as an anti-competitive act by virtue of section 79(5), a matter which is addressed in detail by Cameron and Tomkowicz in "Competition Policy and Canada's New Breed of 'Copyright' Law", (2007) online: McGill Law Journal <https://lawjournal.mcgill.ca/article/competition-policy-and-canadas-new-breed-of-copyright-law/>.

[113] The paper recognizes that some uncertainty currently exists regarding the meaning of the "superiror competitive performance" concept under the Act. The term's definition and relevance will be clarified by future decisions of the Tribunal and the courts.

[114] *Competition Act*, *supra* note 3 at s 77(2). Examples of such "additional terms necessary to restore or stimulate competition in the market" might include the Tribunal's establishment of (a) an obligation on full-line manufacturers to align product design with international standards in order to promote and facilitate interoperability, (b) the mandated use of "open design architecture" and "open standards" for data interoperability and exchange, and (c) the mandated facilitation of information exchange between full-line and short-line manufacturers through the Ministry of Innovation Science and Industry.

[115] *Competition Act*, *supra* note 3 at s 79(2). See footnote 114 for examples of actions that the Tribunal might consider "reasonable and necessary to overcome the effects of full-line manufacturers' use of TPMs in the market.

[116] *Copyright Modernization Act*, S.C. 2012, c. 20, s 32.

[117] *Digital Millennium Copyright Act*, Pub. L. No. 105-304, 112 Stat. 2860 (1998) (codified at 17 U.S.C. § 1201).

[118] European Commission, Proposal for a Directive on common rules promoting the repair of goods (22 March 2023).

[119] Agreement between the United States of America, the United Mexican States, and Canada [USMCA], 30 November 2018, online: <USTR <https://ustr.gov/trade-agreements/free-trade-agreements/united-states-mexico-canada-agreement/agreement-between> .

[120] Innovation, Science and Economic Development Canada, A Consultation on a Modern Copyright Framework for Artificial Intelligence and the Internet of Things (2022), available at <https://ised-isde.canada.ca/site/strategic-policy-sector/sites/default/files/attachments/2022/ConsultationPaperAIEN.pdf>.

[121] Innovation, Science and Economic Development Canada, A Consultation on a Modern Copyright Framework for Artificial Intelligence and the Internet of Things (2022), *supra* note 120 at 22.