

A Criticism of ‘Right to Repair’ Laws

Manufacturers have some good reasons to limit buyers’ access.

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Consumer and industrial equipment have become increasingly sophisticated over the past decade. As machines evolve alongside the technological revolution, they become increasingly dependent on complex computing software and uniquely manufactured components. In recent years, third parties have endeavored to access the software and components embedded in these machines to modify equipment independently rather than through manufacturer-authorized channels. Manufacturers, in response, have tried to obstruct this access through technology and contracts, including the voiding of warranties.

Equipment owners and third parties dislike these obstructions and have turned to policymakers for relief. Some states have responded with laws mandating that consumers have access to software and parts to “repair” their equipment while bypassing authorized channels. These “right to repair” (R2R) efforts seek to procure consumer gains in the form of lower service fees, but policymakers—and the equipment owners themselves—fail to understand those gains can come at the expense of environmental damage, data privacy, manufacturing innovation, and consumer safety.

THE DOWNSIDES OF “TINKERING”

A wide range of unintended and potentially harmful consequences would arise if the most commonly introduced versions of R2R are adopted by more legislatures. Products often include intricately crafted hardware and software that typical consumers and independent technicians are not trained to repair on their own.

Most devices house a microprocessor that governs the device’s performance. In the case of equipment that contains an internal combustion engine, one of the microprocessor’s primary tasks is to ensure the engine’s performance adheres to rules established by the US Environmental Protection Agency under the Clean Air

Act. For some machinery, the microprocessor accomplishes this in part by constraining speed and acceleration. Some equipment owners attempt modification of their engines to bypass these constraints and boost performance. This usually cannot be done without manipulating the emissions control software, and the EPA directs companies to make it difficult or impossible for owners to defeat the emissions control equipment. That mandate becomes useless when consumers are free to tinker with the software, with no repercussions.

The evidence suggests that owners modify their equipment to defeat emissions limits with some frequency. For instance, in a 2019 survey by the Equipment Dealers Association, one-third of 770 equipment dealers reported that they serviced equipment that had been modified illegally in some way. Nearly half of those modifications involved changes that impaired or disabled emissions control equipment to improve performance.

Since the early 2000s, the EPA has attempted to constrain the actions of motorcycle shops that install after-market equipment, which often results in increased greenhouse gas emissions. As such, the push by the Federal Trade Commission and Congress to make manufacturers provide owners unfettered access to the elemental software of this equipment is incongruous with the Biden administration’s stated objective of reducing greenhouse gas emissions.

Equipment owners who modify their engines in the pursuit of greater speed or acceleration almost invariably end up compromising operator safety as well. Some owners deliberately seek to disable safety equipment if they believe it unduly constrains performance. For these reasons, the US Department of Transportation’s National Highway Traffic Safety Administration (NHTSA) registered its objections to a Massachusetts ballot initiative that would have required manufacturers to provide owners and third-party repair facilities with access to vehicle systems.

Granting owners unfettered access to their equipment’s microprocessor could also create cybersecurity issues. Requiring compa-

nies to allow owners to access and alter the central processor and software would render equipment more susceptible to cybersecurity attacks and make it easier for competitors—both domestic and abroad—to obtain the intellectual property (IP) therein.

Given those downsides, there is reason to doubt that R2R legislation will save consumers money in the long run. And there is reason to worry the efforts will result in a reduction in quality, performance, consumer safety, and the environment.

REGULATORY BACKGROUND ON R2R

In 2021 President Biden signed an executive order “Promoting Competition in the American Economy.” It directed the FTC to

R2R initiatives. In 2023, New York, Minnesota, and Colorado enacted legislation making it easier for consumers to alter their equipment. Some 23 other states have considered legislation that would force manufacturers to provide direct access to replacement parts, grant unfettered access to equipment’s central processor, and further limit manufacturers’ ability to constrain what consumers can do with their product.

The R2R movement is grounded in the assertion that manufacturers prohibit equipment owners from repairing their own property. This misconstrues the status quo. For instance, many OEM websites already provide repair information—when and where possible—to consumers; OEMs also customarily market repair manuals, tools,



enact policies limiting the ability of original equipment manufacturers (OEMs) to restrict non-authorized entities from performing certain repairs. Singling out a particularly sympathetic interest group, it claimed that “powerful manufacturers” impose “unfair anticompetitive restrictions” that “prevent farmers from repairing their equipment.”

However, even in 2021, farmers (and other end-users in a wide variety of industries) had access to the information, tools, and parts necessary to *repair* virtually any malfunction occurring in a piece of equipment they own. Nonetheless, the FTC has indicated that it considers the existing constraints on the ability of consumers to circumvent access safeguards to be problematic. For instance, a 2021 FTC study ascribed a myriad of ills to manufacturers limiting access, going so far as to suggest (without stated evidence) that such limits disproportionately affect minority consumers and may contribute to inflation.

States have been even more aggressive in probing and enacting

and parts to consumers who wish to do their own repairs.

In 2018, the Association of Equipment Manufacturers (AEM) and the Equipment Dealers Association (EDA) released a statement of principles to help satisfy farmers’ demand for repairability by 2021. AEM and EDA members agreed to provide manuals, product guides, product service demonstrations, training, seminars, clinics, fleet management information, onboard diagnostics via diagnostics port or wireless interface, electronic field diagnostic service tools—as well as training on how to use them—and publications with information on service, parts, operation, and safety.

Farm equipment / One manufacturing sector that has been heavily criticized by R2R proponents is farm equipment makers, especially prominent brand John Deere. Yet, Deere chief technology officer Jahny Hindman noted in a 2021 interview that 98 percent of all possible repairs could already be done by customers, and the 2 percent of repairs that were inaccessible to owners specifi-

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cally dealt with the equipment software, which directly controls emissions output. The company now allows owners and independent repair shops to access its diagnostic tools directly, which had been available previously only through dealerships.

In early 2023, the American Farm Bureau Federation and John Deere released a Memorandum of Understanding that emphasized the need for customers' ability to maintain their tractors by ensuring the availability of specialty tools and repair manuals along with the ability to discern the diagnostic codes from the software that runs the tractors. The memorandum seeks to ensure the arrangement does not jeopardize safety controls or emissions standards, nor compromise Deere's IP.

The push for broad R2R legislation is an inept response to the efforts manufacturing companies have made to ensure customers can have their equipment replaced at cost or repaired by whomever they desire, whether that be through an authorized dealer, independent repair shop, or self-repair. The debate obscures the reality that most repairs currently can be completed by owners or third parties and that manufacturers have taken steps to help clarify and expand precisely what their consumers can do on their own.

ENVIRONMENTAL THREATS

The EPA requires all equipment manufacturers to install machine parts that strictly limit emissions of nitrogen oxides, particulate matter, and various other contaminants. These requirements extend to the equipment's use; the EPA has levied fines against companies for installing software that made engines EPA-compliant during emissions testing but later allowed for customers to modify the performance limitations. Requiring companies to allow consumers to enter the equipment's microprocessor or access embedded software—which most iterations of proposed legislation would do—would invariably result in the same alterations and associated violations of EPA-mandated emissions limits.

Few dispute that customers take such steps if they can. Many consumers who choose to alter their equipment may not intentionally set out to increase emissions when they attempt to service their equipment, but the changes they make sometimes raise emissions when the equipment is placed back in service. Other consumers are not unaware of the effects of their tinkering; there is considerable evidence that many people who seek to do their own repairs want to do so *precisely because* they intend to disable emissions controls and improve the vehicle's speed, acceleration, and performance.

Ironically, many supporters of R2R legislation insist that it would benefit the environment, insisting that cheaper maintenance costs would lead owners to keep their goods for a longer period of time, reducing waste. However, the predilection of owners to boost horsepower and acceleration suggests that reduced product life would be a more likely outcome. Modifications or inept repair can be damaging to the engine as well as the drive components. For instance, increasing an excavator's hydraulic pressure to gain more digging force—a common modification on such machines—creates an imbalance for the entire machine.

Over the past few years, the EPA has strengthened its efforts to stop aftermarket devices that serve to bypass, override, or delete emissions controls in on- and off-road engines. In 2020 the agency implemented an enforcement and compliance initiative to that effect. These alterations violate not only the Clean Air Act, but they can also create liability issues for OEMs because of noncompliance with EPA regulations.

The potential effect of these actions on the environment is significant. The EPA estimates that more than 500,000 tons of excess nitrogen oxides have entered the atmosphere since 2009 because of operators disabling or modifying emission controls in trucks. These attempts to evade emissions standards are prevalent across the auto, agriculture, construction, maritime, and motorsport industries.

An increase in pollutant and greenhouse gas emissions is not the only potentially negative effect that typical R2R legislation would have on the environment. New York's recently enacted Digital Fair Repair Act requires OEMs to make *every* part of each product covered by the law available for sale. This will lead to increased emissions as more parts are produced, shipped, and warehoused. Companies effectively need to create entirely new, expanded logistics and operations footprints to comply.

CONSUMERS' ELECTRONIC PRIVACY

Allowing consumers access to a good's software can potentially jeopardize manufacturers' IP protections as well as create cybersecurity risks for consumers. One reason that manufacturers place limits on access to proprietary information for individuals and independent repair facilities is to minimize these potential hazards.

Technological advances in recent years have led to both radical improvements in existing devices as well as the introduction of a whole suite of new devices. For instance, consumers now have access to health and fitness monitors, home security devices, smart home appliances, and vehicles that have most of their workings governed by a central processing unit.

While these new and radically improved products have benefited consumers greatly, this expansion of connectivity intensifies the need to protect collected data, for both consumer privacy and the protection of manufacturers' IP. Unfettered proprietary access as specified in most R2R legislation has the potential to undermine the guarantees that both consumers and businesses rely on.

The unauthorized repair of certain devices creates a greater risk for compromised information because of either a lack of proper training or malicious action. Diagnostic tools provide access to the entire device, which often includes sensitive user information. Improper or insecure repair can result in the disabling of security features, making devices vulnerable to data theft. At worst, unrestricted access to user data can open the door for ill-intentioned unauthorized technicians to act malevolently.

Requiring certified technicians to service equipment is one way that manufacturers can safeguard data collected by their

products. For instance, the FTC's 2021 *Nixing the Fix Report* notes the Consumer Technology Association's argument that manufacturers' pursuit of product security includes prohibiting certain repairs by independent shops or individuals. Both the FTC's 2015 *Internet of Things* staff report and its 2015 *Start with Security Guide* recommend that companies make a substantial effort to ensure that service providers can maintain security.

Because of the interconnectivity of devices, it is not just one product that becomes vulnerable to hacking, but all devices that share a network. In effect, this means that if one tractor or smart phone's processor has been rendered more susceptible to infiltration by bad actors, it potentially puts other tractors or smart phones at risk. Consumers' collective privacy and the US economy are inextricably dependent on how decision-makers in the government and industry approach the security of this integrated system, which includes devices used in schools, banks, and hospitals, as well as those utilized in aircraft and emergency situations. The Information Technology Industry Council has remarked that these inadvertent increases in security risks could extend to government customers.

In 2020, Massachusetts voters approved an R2R ballot initiative that gives independent mechanics access to diagnostics on new vehicles. There has been a lawsuit filed preventing the law from taking effect, and NHTSA sent a letter to vehicle manufacturers directing them to comply fully with federal safety obligations that conflict with the new law. The NHTSA letter points to remote access of telematics as the primary safety concern, stating that it could allow "manipulation of systems on a vehicle" by bad actors and that "vehicle crashes, injuries, or deaths are foreseeable outcomes." The letter also notes that some vehicle manufacturers indicated they would disable the telematics to prevent the new law from affecting their vehicles.

PROTECTING IP

In addition to protecting customer data, manufacturers must also protect any proprietary knowledge embedded in the machines they sell—that is, the product of their own innovation, research, and development. R2R rules mandating a certain level of access to product information, particularly those that include access to the source code, can effectively force companies to divulge materials related to their IP, potentially allowing foreign companies (or their governments) the opportunity to replicate products and processes. Given the intense competition in smartphones and other smart devices and the ability for knockoffs to be manufactured in countries with little IP protection, innovative manufacturers have good reason to want to protect their intellectual property. While copyright and IP law protect firms to some degree, the broad extent of most proposed legislation across the states and federal government constitutes a threat to this protection.

Despite the common assertion that trade secrets would be exempt from disclosure, the legal implications of R2R regarding

copyright law are significant. For instance, bills that require the disclosure of digital locks, which protect against unauthorized access and safeguard manufacturers' IP, would conflict with a foundational aspect of copyright law: creators get to determine how their works get distributed. The success of the digital marketplace can be attributed largely to copyright protections that creators rely on, incentivizing innovation through the protection of their IP.

R2R-mandated access to hardware components may require the circumvention of digital rights management, which could leave the software unprotected and infringe on the rights of the copyright owners of the software. While manufacturers continue to stress the importance of IP, the FTC has minimized the issue and all but ignored it in its *Nixing the Fix* report. The potential of unrestricted visibility into a product software design harms both consumers and manufacturers, and there is no evidence that firms' efforts to protect their patent rights impede independent self-repair.

SAFETY STANDARDS AND FEDERAL COMPLIANCE

As noted above, processors on machines with internal combustion engines often regulate speed and acceleration to ensure the machines comply with various environmental and safety regulations. Owners and operators who tamper with equipment safety features to boost productivity put themselves at risk for potential harm and potentially open up questions of liability.

In addition to modified engines, owner-made modifications to smaller devices and electronics can pose safety risks. There are a variety of health- and fitness-related devices, such as medical devices and smart watches, that can directly affect consumers' well-being and safety. Opening up this kind of equipment could have dangerous implications if done improperly: safety equipment and features could be prone to failure at critical moments. Applications that are designed to measure barometric pressure, water depth, or heart rate could become compromised through access by someone lacking the proper training.

A PATCHWORK OF STATE LAWS

Regulating the performance and safety of an ever-growing range of equipment differently across states makes little sense in practice or compliance. Yet, states adopting different R2R legislation is causing confusion for both consumers and OEMs. In 2022, Colorado enacted the Consumer Right to Repair Powered Wheelchairs Act and New York passed the Digital Fair Repair Act. In the first five months of 2023, 22 states proposed R2R legislation covering a variety of devices from agricultural equipment to wheelchairs to mobile electronics to home appliances, and Minnesota enacted its own R2R legislation.

Different R2R laws not only create inconsistencies for manufacturers but also present numerous possibilities for these laws to be at odds with federal law, specifically regarding the environment but also copyright and cybersecurity. When multiple states offer competing legislation to regulate an industry, the state with the

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costliest regulatory regime often becomes the de facto standard for the nation. Manufacturers typically find it costly to meet varying compliance requirements across states and choose the one that would allow them to operate in every state. In the case of R2R, the costliest standard—which is rarely the optimal one from a regulatory perspective—would likely reign across the country. Incongruent stipulations relating to which products and components are covered by legislation affect manufacturers' ability to adhere to the various iterations of the laws. The age range of devices for which legislation applies also has the potential to significantly increase compliance costs and legal exposure for manufacturers.

WILL R2R REDUCE CONSUMER COSTS?

Many firms have effectively implemented what economists refer to as a two-part pricing model, where they bundle a one-time charge for the actual goods produced with an ongoing service contract. R2R advocates contend that separating the good from the service would engender more consumer choice, more competition in the repair marketplace, and cost savings for consumers. However, this idea does not reflect how the repair marketplace works: it is not axiomatic—as R2R advocates often claim—that bundling purchasing and service is bad for consumers.

The manufacturer or its authorized dealer has an inherent advantage in the repair market. This is for both the safety of the consumer and protection of the OEM. An authorized repair center typically makes considerable investments to ensure that it can satisfy its customers. This includes keeping the necessary parts in stock, training employees, keeping certifications up to date, and ensuring the facility remains in compliance with both the OEM and the state.

Farm equipment service providers typically hold several million dollars' worth of spare parts and equipment. This is because manufacturers often do not find it financially feasible to quickly deliver parts directly to individual customers and would rather deliver parts to authorized dealers or service providers at scale. This also ensures repairs are made much more quickly. For many industries, the cost of delay in repair can accrue by thousands of dollars an hour, making repairs urgent.

A common complaint about the current repair landscape is the high cost. R2R advocates assert that requiring manufacturers to sell the full assortment of diagnostic equipment and repair materials directly to consumers and third-party servicers at a price deemed fair and reasonable by government regulators would save consumers money. This savings is unlikely to materialize. Many firms bundle the cost of the physical equipment with an ongoing service contract, which allows them to keep a lower cost for the primary product while also making a profit by providing reliable service. If the latter were to cease being profitable, we would expect to see an increase in the price of equipment.

Bundling two complementary products together can be beneficial, which means that bundling's effective prohibition—which is what R2R imposes—hurts consumers. A 2023 *Management*

Science article concludes by observing that R2R “compromises manufacturer profit, reduces consumer surplus, and exacerbates the environmental impact.”

R2R legislation would not only affect consumers but also authorized dealerships, which are independently owned small businesses. Per their contracts with OEMs, authorized dealers can purchase service materials at a discounted price because they are buying a high volume and keeping stock available to quickly meet customers' needs. Requiring manufacturers to sell directly to the consumer disincentivizes dealers to keep parts in stock and potentially results in increased wait times for owners seeking repair.

This would not only make it unlikely that consumers save money under such an outcome, but they would also suffer from a variety of unforeseen consequences. For instance, the requirement that replacement parts be provided at or near cost (and sometimes at no cost) would decimate the OEM network because authorized dealers would no longer have a cost advantage in providing parts to their customers. The demise of a robust network would leave many owners without a reliable and efficient place to get a repair—especially in rural communities. This could significantly increase costs for customers as delays in placing equipment back in service directly affect a business's bottom line.

CONCLUSION

R2R's various iterations seek to procure short-term consumer gains in the form of lower service fees. But this would be achieved at a steep cost: damage to the environment, consumer safety and privacy, and manufacturing innovation resulting from unfettered access to complex equipment and devices.

Real-world experience has shown consumers consistently seek to alter their equipment to boost performance, in direct violation of important environmental and safety regulations. Allowing consumers access to proprietary systems to make these alterations exposes manufacturers' IP. And undermining OEMs' product-plus-service bundle will imperil local dealers and dramatically increase repair times.

Manufacturers are producing increasingly advanced products that benefit consumers—both individuals and businesses—throughout the economy. R2R threatens to slow these gains. R

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