A Case for the Right to Repair Movement in the United States

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction

In 2018, the Canadian news organization CBC marketplace ran an experiment. They took an Apple Macbook Pro exhibiting a common problem, a malfunctioning display, to an Apple store and asked if they could repair it. Apple quoted them a price in excess of $1200 to complete the repair, a price that was two thirds as much as the computer would cost in the store. CBC then took the Macbook to an independent repair store, who diagnosed the problem as a bent pin connecting the display's backlight and quoted them a price of between $75 and $150 for the repair. (News · 2018) So what was the cause of this price imbalance? Put simply, Apple, and other large technology companies, was using its position to limit the repair of its devices in order to encourage customers to either purchase a new device or sign up for Apple's repair subscription service, Apple Care, which can cost between $70 and $150 per year for modern Macbooks (Anon n.d.-a). They accomplish this through both technological and legal barriers to prevent competition in the repair space thus driving up cost, limiting innovation, and increasing harmful electronic waste.

Right to Repair is a political movement that seeks to prevent these practices and combat companies from affecting how consumers may use their purchased products after the point of sale through technological or legal means. More specifically, it seeks to pass legislation protecting a consumer's right to repair or tinker with their purchased devices. These protections come in largely two categories: removing technological barriers embedded in a device and removing legal barriers to accessing or creating repair documentation.

This paper discusses the right to repair movement; the economic peculiarities that caused it, how repair has evolved, the technical and legal challenges facing repair, and finally some proposed solutions to

these challenges. Through a synthesis of published scholarly works and recent news articles, I argue that right to repair legislation should be passed in the United States, both at the state and federal levels, as this legislation would stimulate innovation, reduce prices for consumers, and prove environmentally beneficial.

A Brief Look into the Past

Starting with the industrial revolution, commonplace machinery became suitably complicated such that it was no longer trivial to repair. Looms, threshers, automobiles, etc. all contained many moving parts arranged in an intricate tapestry to run. It was therefore common for these machines to break and, as they were significant capital investments, would need to be repaired. Early Ford cars were designed to be easily repairable with the idea that customers would buy one and be able to maintain it for many years afterward(Hatta 2020). However, this lead to an economic dilemma for a company: if a product is so good that customers only need to buy one, what prevents the company from running out of customers? The solution many companies have turned to is planned obsolescence. Simply make products that break in a few years (or fewer) and customers will have to come to buy a new one. Prevent them from fixing those products for extra effectiveness. The term planned obsolescence originates from a paper by Bernard London published during the great depression. He proposed that the government should mandate a lifespan for every product as a means of guaranteeing work for everyone. After all, if you had to buy a new car every three years, there will always be demand and so there will have to be guaranteed employment in the supply of those cars (London, Bernard 1932). The automakers pioneered many of the techniques of obsolescence that we could recognize today. Ford organized their dealers such that only authorized dealers and repair shops could access original parts and special repair tools. GM (General Motors) introduced the idea of model years which, although not changing too much in terms of performance, gave each year’s car a new look that in the hopes

consumers would be driven to purchase the newer vehicles (Hatta 2020). These practices work best when a company has a monopoly, or near monopoly, in their area. Sometimes this is a true monopoly like AT&T was for a long time, but it can also be a limited monopoly. For example, Ford does not have a monopoly on cars, but they do have one on the original parts for Ford vehicles.

Unfortunately for repair, protections against monopolistic tendencies have been waning in the United States since the 1980s. In response to strong Japanese competition, many manufacturers took to intellectual property protections as means to restrict how their product is used. The United States government, eager to protect its own companies, weakened anti-monopoly statutes and reduced enforcement (Hatta 2020). These legal protections made even an attempt to tinker with or repair products by their owners legally challenging. A famous example of this is the Felton case which dealt with software means of restricting music. To prevent consumers from reading the data on CDs and converting it to MP3 files that could be easily distributed over the internet, music companies started incorporating digital “watermarks” on their CDs. When a CD was converted to MP3, the watermark would be removed and music players would refuse to play any music that did not have a watermark. In 1999 the Secure Digital Media Initiative issued a challenge to remove the watermark and still have the audio play. Dr. Ed Felten from Princeton University met this challenge and intended to present his findings at a conference. However, he was forced to retract his presentation after the music industry threatened legal action under a provision of the Digital Millennium Copyright Act (DMCA) which prohibited circumventing copyright protection (Gross and Foundation (EFF) 2001). The DMCA will be discussed in greater detail in a subsequent section. This case questioned the notion that consumers had a right to tinker with their purchased property, either to modify for greater functionality or to repair it with or without the manufacturer's approval.

The State of Repair in 2023

Today's world is digital and as may be expected today's squeaky wheels are digital. Many machine failures today are the result of an electronic chip failing, a short circuit, or a software bug. These failures, especially software bugs, are not as noticeable as the purely mechanical failures of yesteryear.

Say your laptop’s trackpad suddenly stops working. There is no visible damage and a laundry list of potential causes. It could be as simple as the cable connecting the trackpad to the motherboard being knocked loose, to as complicated as a bad chip somewhere on the motherboard. However, identifying any individual problem as the root cause requires accessing these components, a process that is increasingly difficult on modern computers and smartphones. Most OEMs(Original Equipment Manufacturers) have designed their machines to make accessing the internal hardware as difficult as possible. The cases are often screwed shut using unusual or even proprietary screw designs that require special screwdrivers to undo (Svensson-Hoglund et al. 2021). The case is also typically glued shut, so even if the screws are removed it is difficult to open without damaging it. Once the motherboard is removed and the circuitry is laid bare, it is difficult, even for a trained and well-equipped technician to know how to fix the device due to a lack of information.

Most OEMs provide little to no technical documentation for their products. No manual, no schematics, nothing. Thus, even if the repairer knows exactly which circuit failed unless it is something obvious like a cable, they are hard-pressed to identify which of the thousands of chips, resistors, and capacitors is the one they are looking for.

Now, even if the repairer knows exactly which components have failed and successfully replaces or otherwise repairs them, there is one last barrier: software locks. Many manufacturers have taken to including in their software, either in the firmware or even the operating system itself, a piece of code

that will prevent the machine from operating normally if any of its hardware has been replaced. This is accomplished by including a tiny chip in many common components, batteries the most common, that inform the main processor of that component's serial number. If the serial number does not match those from when the machine first booted, the computer may not boot at all, or may simply disable the functionality of that chip. For example, on the iPhone 11, if the screen, a common failing component, is replaced by anyone other than Apple or their authorized repair partners, the OS will record that the screen was replaced. The OS then displays a warning message to the user warning them that dangerous modifications have been made to their device and that they should send their iPhone to Apple to be properly repaired (Kelly n.d.).

All these technical barriers to the repair of modern electronics would be surmountable if it was not for the current legal framework governing these devices. The principle offender here is the DMCA or Digital Millennium Copyright Act. The DMCA was passed in 1998 over concerns that the internet made it possible to copy and distribute copyrighted works at a rate not before seen. The act was intended to protect copyright holders but was co-opted by industry greatly expand the power of copyright. As a consequence, it made repairing, tinkering, or exploration of software on a tenuous legal footing. As part of the act, it is a federal felony to even attempt to reverse engineer or bypass any copyright lock which includes software. Thus, it is illegal to attempt to reverse engineer or bypass the software that disables swapped components. Additionally, it makes it illegal to even attempt to reverse engineer the motherboard and create your own schematics (Bello and Aufderheide 2020)so even if the OEM doesn't provide their own documentation you can't create your own.

Environmental Benefits of Repair

Anti-repair designs are not only detrimental to consumers' pocketbooks but to the environment as a whole. Many consumer electronics suffer from a surprisingly short lifespan. Modern smartphones have

a lifetime of around two years before being replaced (Cordella et al. n.d.), a full 40% of which were replaced due to a failing device (Watson et al. 2017). These devices become e-waste (electronic waste) which is particularly damaging to the environment. The printed circuit boards (PCB) that power every modern piece of electronic equipment contain dozens of heavy metals such as arsenic and cadmium. Even if these PCBs were to be recycled, the process has many toxic waste products that nullify the environmental benefits of recycling (Xiang et al. 2006). Therefore, the only environmentally responsible action is to extend a product's life through repair. After all, the saying goes reuse, repair, and recycle in that order. If something cannot be reused due to a failing component, the best thing is to repair or replace that component and keep the device running for potentially years to come. Many of these failing components are relatively easy to fix such as screens, batteries, or back covers. These components are expected to fail. Modern batteries only last about two to three years before their performance begins to seriously degrade, while the front screen and back case are subjected to constant scratches, drops, and shocks from daily use(Cordella et al. n.d.). By making these components easier to repair, for example by making the battery easily accessible via screws rather than several layers of glue, these phones could be repaired by their users rather than replaced at those same user's great expense.

Right to Repair's Solution

So, what can be done to restore tinkering and repair? The right to repair movement takes it as given that corporations will not bring about reforms themselves, it must be done through governmental regulation. Right to repair advocates have proposed a set of simple reforms to in leu of the market correcting itself. They have introduced legislation in several states that require manufacturers to supply repair documentation to anyone, not just their authorized repair partners, sell spare parts at reasonable prices, and protect independent repair businesses from lawsuits just for repairing a customer's device (Wiens 2023). These laws would greatly increase competition in the repair market, which should lower prices

for consumers and spur innovation toward making more repairable devices. However, a majority of the bills presented have received significant pushback from manufacturers that have blocked their passage.

That the principal offenders like Apple and Samsung have fought these regulations so fiercely lends credence to this assumption. They have proposed and in narrow areas passed(Cooke et al. n.d.), forcing manufacturers to release their repair manuals and diagnostic tools, provide spare parts at a reasonable cost, and either forbid the installation of embedded software that restricts repair or otherwise make it legal to bypass. It has not been proposed that planned obsolescence itself be made illegal, but rather that consumers and independent repair businesses be allowed to have the tools to provide an alternative to simply purchasing a new device. These proposals are not without precedent. In 1956, IBM was sued for antitrust violations regarding their refusal to allow customers to repair their mainframe computers. IBM lost at trial and was required to offer spare parts to its customers for a fair price (Hatta 2020).

However, for the most part, these ideas have remained proposals without the force of law. Unsurprisingly, tech giants like Apple have been very effective at lobbying against these bills to the effect that no general right to repair bill has passed at either the state or federal level. That is not to say there has been no movement. In 2022, the state of Colorado passed a bill facilitating the right to repair for wheelchairs (Cooke et al. n.d.), and in 2020 the state of Massachusetts voted overwhelmingly in favor of a ballot initiative that required automobile manufacturers to equip their vehicles with “a standardized open data platform … that vehicle owners and independent repair facilities may access to retrieve mechanical data and run diagnostics through a mobile-based application.”(Anon n.d.-b; Svensson-Hoglund et al. 2021). But these laws only cover small sections of products and do not constitute the general right to repair bill that activists have been striving for.

The largest concern with the bills laid out by right to repair activists concerns the intellectual property of manufacturers. Naturally, these companies are worried that if they simply release their documentation, a competitor will simply take that and incorporate it into their product, thus losing an advantage. This seems to be a legitimate concern upon first inspection, but upon closer examination falls apart. The main argument in this vein is that releasing information relating to the inner workings of a product could make it easier for counterfeiters to reproduce the original work, thus depriving the company of legitimate business. However, this goes against the business model of counterfeiters, which is to make a product that *looks* as close to the original while being made extremely cheaply. That cheapness often comes at the cost of quality, or even working in the first place. Their knowing how the product works is irrelevant(Grinvald and Tur-Sinai 2019). Despite this, manufacturers continue to use the fear of counterfeiting to lobby against right to repair legislation. The primary reason for their opposition is likely a perceived threat to their revenue.

In addition to intellectual property arguments against right to repair, manufacturers argue that this legislation would cause them to lose money and thus disincentivize them from developing their technology in the first place. Ignoring the fact that their primary business is to develop and sell new technologies, while right to repair may negatively affect these businesses' short-term revenues, preventing companies from creating a monopolized market around their products will increase competition and thus further incentivize their innovation (Grinvald and Tur-Sinai 2019). After all, if there is no competition, why innovate when you don't have to? Not only would right to repair improve consumers' experiences with current technology, but by eliminating a company's monopoly over the repair of their products, it may incentivize those companies to make their devices more repairable so consumers would choose either their services or their products in the future.

Independent Repair Businesses

For most of this paper, the focus has been on how consumers ought to have a right to repair their own devices, but in reality, most consumers looking to repair their devices will not do it themselves. Most consumers don't trust themselves to perform the repairs correctly and thus will use a repair professional. As it stands, independent repair businesses operate against strong headwinds from manufacturers who would rather consumers use their, potentially more expensive and restrictive, repair services. For the repair market to be competitive, and thus better for the consumer, independent repair businesses must be allowed to compete with manufacturers' repair businesses without the threat of legal action.

The main way a manufacturer can use legal means to restrict independent repair is by using their trademarks to make it difficult to impossible for smaller businesses to advertise and by the before mentioned restrictions on repair information (Grinvald and Tur-Sinai 2019). In order to advertise their services, businesses need to be able to use the trademarks of the devices they are repairing. For example, if a business repairs iPhones, they should be able to use the word iPhone, a trademarked property of Apple, to advertise their services. This use has been interpreted by the courts to be protected under the precedent of *R. G. Smith v Channel Inc* which found that Mr. Smith's use of Channel Inc's Channel No. 5 trademark was justified when he compared his product to theirs (Grinvald and Tur-Sinai 2019). However, since this protection was established by Court precedent and not by an act of legislation, companies can still try to use the Courts to enforce their trademarks to disrupt competing repair businesses. Trademark infringement is also used to justify the seizure of replacement parts as counterfeit goods. The US. Customs and Border Patrol asserts that refurbished parts violate trademark protects as they may differ from the condition a product is originally sold (Svensson-Hoglund et al. 2021). As part of the right to repair legislation, clarifying that independent repair businesses can use manufacturers' trademarks to advertise is a must.

The second and more legally complicated matter is that of information. As previously established, section 1201 of the DMCA prevents the distribution of information for bypassing the commonplace digital locks that prevent repair. Thus, independent repair technicians cannot legally acquire the knowledge to repair devices and cannot legally distribute that information to their colleagues if they did come by that knowledge. Combined with the fact that they are using this knowledge to make money, the very concept of independent repair becomes vulnerable to legal challenges. However, all is not lost for independent repair. Section 107 of the Copyright Act (DMCA) maintains that certain acts involving copyrighted material can constitute “fair use” and are thus protected (Grinvald and Tur-Sinai 2019). It is no surprise then, that right to repair legislation is pushing to clarify that the acquisition and distribution of repair information by independent repair businesses fall under this fair use exception.

Passing Right to Repair Legislation

While the arguments against right to repair legislation are relatively weak, those making them are not. Right to repair is opposed by companies including Apple, Samsung, AT&T, Microsoft, Toyota, and many more, often through trade groups or other lobbying bodies (Perzanowski 2021). With a whos-who of the world’s tech giants in opposition, the right to repair movement needs to make some friends with industry weight to have a chance at succeeding. If we look to the passage of the DMCA, where many of the same companies were pushing for even stronger legal barriers than the already effective measures that passed, we can look to the DFC (Digital Future Coalition) that successfully fought against many of the most egregious section of the bill. Part of the reason for their success was that they had business allies who could and did exemplify the benefits of more free copyright. Efforts to defeat earlier copyright acts, notably by librarians in 1976, failed because they had no such allies (Bello and Aufderheide 2020). These national actors are important, as the power to amend copyright law is held exclusively by Congress and not by those states that right to repair advocates have thus far made their focus.

Conclusion

Right to repair legislation solves many of the barriers to repairing damaged devices in the United States. By forcing reluctant manufacturers to open up access to spare parts, it would allow independent repair businesses to offer cost competitive repair to consumers thus both lessening the burden on people's wallets, but also making it easier for nontechnical users to repair their devices. It will also allow those who would prefer to repair their own devices to do so, both as a means of saving money but also to tinker with their device and thus gain a greater understanding of the technology. This will increase the lifespan of those devices, which both saves money and reducing the amount of toxic electronic waste being produced. By modifying copyright law, independent repair businesses will finally be able to operate without threat of legal action, and even develop new and better repair solutions than those provided by the original manufacturer. Far from creating the wave of counterfeits that opponents predict, this can create a new and healthy market for legitimate repair tools and services. Removing these barriers would reduce prices for consumers, increase competition in the repair market, and reduce hazardous electronic waste significantly. The only question is how?

While the opposition to these reforms may seem daunting, such opposition and more have been overcome before. We need only look to the progressives of the early 20th century who stood against deep-seated corporate giants and prevailed. They managed to break the monopolies of Standard Oil and American Tobacco at the height of their powers. The arguments against them, that monopolies inherently restrict trade and limit consumers, are the same that repair advocates are making today. All it took was a sustained and concerted effort to keep the momentum going, until the weight of their arguments and their evidence became too large to ignore. As right to repair gains steam in the United States, a similar momentum is building. Surely then, the right to repair movement can prevail yet.

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