

The Right to Repair Electronics:
Do you Own the Devices you Buy?

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Introduction

When someone goes to a store to buy bread, they have complete control over how they use that bread. They have the ability to eat it plain, toast it, make a sandwich, or do whatever they want with it. That right does not currently exist for purchasers of consumer electronics. Before 20 years ago, if someone bought any new electronic product, such as a television or a computer, it would come with a phonebook-sized manual detailing every little part within the machine and how it works. Nowadays, companies do not want the consumer to have that information. It is in their best interest to keep us locked out, through a combination of hardware and software, from our devices. An increasing number of the devices consumers buy are designed to prevent them and third-party repair shops from accessing the inner workings of their products. Whether it be for repairing, upgrading, or altering the device in any way, devices are made unnecessarily complex to discourage any tampering.

It is common for someone to find that their computer is not working. When they take it back to the store to be repaired, they are told it would cost hundreds of dollars, even though all that is out of place is one small broken piece that costs, at most, a few dollars to produce. Many companies want to retain their customers' loyalty and to have them continue to buy their new products. Even though their original product is still 95% functional, they convince buyers that it is not worth salvaging and that they should buy a newer version: the company's main interest is increasing profits, not the consumer's benefit. If the buyer had instead gone to an independent repair shop, the quote might have been a fraction of the price, but it is not so simple for these repair shops to get by.

Manufacturers who distribute parts for electronics will get orders for millions of proprietary units from a big company, in exchange for distributing those units solely to the company. This makes it nearly impossible for repair shops to get access to these parts. Even if they did, there is no easy way to know how to repair the goods made by these companies when they make it illegal to own a copy of their copyrighted device manuals and schematics. Many companies claim that they still own that part of the device and that no one else should be allowed to even open the devices they sell. These policies have caused the relatively new right to repair movement to slowly build up traction and begin to make its way into mainstream media in recent years.

This is an issue that affects every person and virtually every device with a computer chip. Millions of individuals worldwide use many devices that contain electronic components that can easily break down, ranging from cell phones and laptops to printers and washing machines. This is a modern form of planned obsolescence that is being advertised as a safety concern to make big companies look good while causing massive amounts of electronic waste and increasing their sales. Right to repair is an issue that currently lacks a large amount of research, and this paper hopes to contribute to the pool of academic literature using almost all of the accessible peer reviewed literature on this topic and discussing the future of repair. This paper will argue that there is a need for the right to repair legislation to give the rights back to the consumers and eliminate unethical business practices regarding product repair.

This paper will start with a history of how product repair used to be 20-30 years ago. Then it will discuss the practice of planned obsolescence which has been adopted in the electronics industry and is the root behind why devices are not repairable in the 21st century. The paper will also discuss the origins of the grassroots right to repair movement. Next, the paper

will analyze the current situation for third-party repair companies and what they need to repair devices. After that, the manufacturers' deals with companies will be discussed and how that limits repairability. Additional analysis will be done on the right to repair from an intellectual property point of view in terms of both patents and copyright infringement. Interestingly, this paper will be able to examine case studies first with car repair laws which can be looked at as a successful model in a smaller context for the greater right to repair and the laws recently passed in the European Union. To end the analysis the paper will discuss why nothing had changed until recently, where pledges have been made by companies as well as an executive order issued by President Biden telling the Federal Trade Commission (FTC) to work on solving this issue. In addition to the pledges, some communities as well as companies have begun adopting the right to repair mindset to their products. To conclude, the paper will suggest legislation that should be passed to enforce the right to repair.

Background

Humans have always been creating tools, and it is one of the things that makes the species so unique. These tools, over time, have gotten more complex and durable, while still being repairable. From a consumer perspective, it almost always makes sense to repair a small problem rather than discard the entire unit. This is true in terms of production time as well as monetarily. The only reason not to repair something is that there is a newer, better version of a product or because it is too difficult to repair.

It used to be that if a craftsman wanted someone to buy a new product, he had to work hard designing a new superior version to get a past consumer to choose on his own free will to

upgrade. This leads to a healthy self-competition and fuels innovation which is beneficial for the consumer. However, once businesses realized an easier method of getting customers to purchase products again was by not offering a means of repair, that was deemed easier and more profitable.

Before this was the case, developers would want their buyers to be curious about how their devices work. Tinkering was encouraged, and it allowed consumers to get a better sense of how their devices worked. Apple co-founder Steve Wozniak has released a video of himself saying how he learned electronics because as a child, he had a radio and would take it apart and put it back together, allowing him to gain a deeper understanding of the technical workings inside his devices (Wozniak 2021). He said that if it were not for him tinkering with his radios and TVs, there would be no Apple today. Wozniak talks about the power of modifying devices and upgrading them for personal uses, which is no longer found today with the same accessibility. He approaches this issue as one that inhibits creative minds from getting the hands-on experience he had as a child and mentioned his discontent with the current policy changes since he left Apple.

Another change that took place almost a century ago was the practice of planned obsolescence. Planned obsolescence is when a device is built purposely so that it will fail after a certain amount of time. In the 1920s, General Motors, to compete with the popular model T Ford, tried to get their customers to exchange their current GM car for the latest version simply because they felt “a certain dissatisfaction with past models compared with the new one (Sloan 265).” They did this through tactics like releasing different paint colors each year which led consumers to believe there was something better out there compared to what they had. Despite GM not directly lowering the durability of the parts, this began the idea of enticing buyers to

ditch their older purchases for newer ones which then evolved into practices of lower part durability to increase repeat sales (Yanes 2020).

A few years later, in 1924, the Phoebus cartel, a group of the world's largest light bulb manufacturers, was formed. They established standards for the light bulbs produced, limiting manufacturers to making 1,000-hour light bulbs instead of the 1,500 or 2,000-hour ones they could make at the time. This solved one issue the companies had that as their light bulbs were getting better, their sales were decreasing. By purposely making their light bulbs out of worse materials, they could bring down their cost of production and increase the number of sales. This went mostly unnoticed, and while the average light bulb's life expectancy diminished towards the 1,000-hour goal, the companies claimed that the loss of longevity was due to the bulbs being more energy-efficient (Muller).

While earlier practices might have gone unnoticed, the right to repair movement has been gaining much traction in recent years. There is no specific individual leading the movement; instead, it is a people-driven grassroots movement. There is no specific time when the right to repair suddenly became an issue. Over time, without a specific catalyst spurring this practice, companies realized that they could increase the control over their products. The lack of repairability is something that has become increasingly prevalent, leaving us in 2022 unable to find a large company that fully pledges towards genuine repairability. This is an issue between the people and large companies. The current situation is that the people have started to join together to say they have had enough and are no longer willing to accept the practices of these companies (Yanes 2020).

Analysis

The average person does not know how to fix their device when it breaks. This is okay; they are not expected to have the tools or the technical know-how to perform the necessary intricate fixes. The average person, though, should be able to hire someone with these skills to repair their devices. Therefore many companies, to address this issue, may choose to offer special repair plans at the time of sale to fix their devices by trained professionals, usually at unreasonable prices. What happens though, for companies who do not offer a repair program, or someone wants to hire a third-party repair service instead to do the job?

The Current Situation for Third-Party Repair Groups

On paper, anyone can take their device to a local repair store and get their device repaired. There is no rule currently against it. However, it is not that simple. The main issues that repair companies must deal with are inaccessibility to parts, diagnostic tools, voiding warranties, and products purposely designed not to be easily repaired. All these different issues, which are independently causing trouble for those who wish to repair their products, will be discussed.

To make production as efficient as possible, with the lowest costs, most products are made by having the manufacturing take place overseas in places like China where factories get orders in the millions for a specific proprietary component. The overseas manufacturers who have the rights to create the parts are allowed only to sell them as part of their contracts to the companies. This means that if a third party approached the manufacturer and made an order for the same part, which the factory is set up to make, they would turn them down and refuse to ship them the product. For the manufacturers, the order of a few thousand units is not worth the

money, considering that if they make a deal behind the backs of the large companies, then they will lose orders for millions of units (Rossmann 2020).

Accessing the parts that are needed is only helpful if one can properly diagnose what the issue is with the device. Diagnostic tools are made to help probe the problems with devices and better understand what needs to be fixed. Like the parts, these diagnostic tools are kept under lock and key from any third parties who wish to use them. This is also true for the schematics, which would be used to fix the chips and boards of these devices if repair groups had the knowledge contained in them. These tools are claimed to be the intellectual property of the companies. They do not wish to disclose them out of fear that competitors will create their rendition of the product once given the complete blueprint of the device (Weins 2021).

Another trick used to discourage buyers from going to third-party repairers and paying less is warranty voiding. People are told that if they go to anyone but the seller's authorized repairers, then that will void their warranty for fixing things that are covered. Therefore, if a person's product has an issue not covered by the limited warranty protection, he will feel pressured to have it repaired for a premium at the authorized repairer. This is so that in the future, if an issue covered by the warranty takes place, he will still be allowed to have it repaired by the authorized repairer.

Devices are becoming harder to open, and this is on purpose. Designed not to be opened by the average individual, they often require special tools to open properly without breaking. Attributed to the fact that a seamless device is more elegant and, when optimally designed, can be slimmed down, enhancing the design, devices often lack basic screw holes for a buyer to open their device. Is this the future? Are unrepairable devices the price that must be paid to get

compact devices like AirPods and Apple Watches, two devices famous for being virtually unable to be repaired? Even Apple completely replaces these devices whenever they are damaged and sent in for repair (Rossmann). These are only the practical issues, there are however, many legal issues with repairing that needs to be addressed.

Intellectual Property- The Legality of Repair

One of the central claims that companies will make to argue against the right to repair is the violation of their intellectual property. One of the forms of intellectual property violation is patent infringement. Within patent law, once an authorized sale of the product occurs, the purchaser and subsequent owners are free to use the product without any infringements. Under the category of “use” is repairing the device if necessary. Nevertheless, while repairing is permissible, reconstruction is not. This leads to the courts struggling to draw the line between repair and reconstruction (Grinvald and Tur-Sinai 100).

Even if the line is drawn in favor of the right to repair, there are still other issues to contend with. Making a user sign a EULA, which is an end user license agreement, companies like Samsung within their terms and conditions state "any changes or modifications to your mobile devices not expressly approved by Samsung could void your warranty for this equipment and void your authority to operate this equipment (Grinvald and Tur-Sinai 101).” While it might be that in terms of patent infringement, someone who repairs their device is not held accountable, they can still be sued for breach of contract (Grinvald and Tur-Sinai 100-102). These EULA agreements, which people check off without giving it a second thought, are almost never read by consumers and can contain agreements to limit the use of the users without them realizing until they are in breach of contract or attempt to sue a company.

Another sneaky method that companies may employ to prohibit repair is by not relinquishing full ownership of the device. Suppose the transactions are structured in a way that the customers do not acquire full ownership by using a subscription or leasing business model. In that case, the control of the seller will not be exhausted. Thus, no-repair clauses could be imposed to limit the use of the products that they own. These formulations are more controversial, and that is why, as the paper will discuss, John Deere's claim of leasing their equipment has been brought to the forefront of the right to repair movement and multiple times into the mainstream media (Grinvald and Tur-Sinai 101-104).

The next form of intellectual property violations that is of concern is copyright law. In the Copyright Act, there is a notion, albeit to a limited extent, promoting a right to repair. The Digital Millennium Copyright Act (DMCA) is the United States' attempt to extend the reach of the Copyright Act into the digital realm to protect against the exploitation of works on digital networks. This attempt to secure the internet, when it was unimaginable that there would be this level of integration with the digital world, has many drawbacks due to its early adoption. One of the added copyright protections is that any digital lock, which is classified as a technological protection measure, may not be disabled (Grinvald and Tur-Sinai 104-106).

In practice, any technological product includes software, which would most likely have a digital lock. Even to diagnose, maintain, or repair a device, disabling this lock would make a person liable. The U.S. Copyright Office has partially recognized their out-of-date laws when it comes to the DMCA and has in the past announced exemptions that last for three years. One of these temporary exemptions that have been declared as a reason to disable digital locks is right to repair. While this is good news for supporting the right to repair, some of these exemptions have not been renewed in the past. Additionally, the U.S. Copyright Office does not explicitly permit

repair shops to take advantage of this exemption, saying that repair shops may “do so at their peril.” It is also illegal for these repair shops to traffic instruction manuals necessary for the repairs, making this win for the right to repair quite limited (Grinvald and Tur-Sinai 104-106). The car right to repair and specifically tractors is the approach that is most highlighted by the media and relatable to the public

Case Study: Car Repair Laws

In 2012, the Massachusetts Right to Repair Coalition successfully led a campaign resulting in Massachusetts passing a law providing for the right to repair automobiles. This required automakers to make the same repair and vehicle diagnostic information given to car dealers to independent non-authorized auto repair shops and car owners. What this means is that if a person has a Toyota car, then for all the maintenance their car needs they are not limited to only going to a Toyota repair shop where there is no competition between other repair shops for services rendered. They, by choice, can go to whichever auto repair shop they desire whether that be due to repair price or quality.

Once this decision was made in Massachusetts, which was not singled out for a specific reason, simply being the place where the law was passed, the following year the automotive industry elected to agree to work with independent car repair shops nationwide. According to a study by Kahane (2021), he concluded that Massachusetts took a big step forward addressing the asymmetric access to information by enacting the right to repair law for vehicles sold in the state. With his evidence he showed that after the law changed, smaller auto repair shops were more successful now that they had equal access than before.

This major success is legally limited, as Massachusetts is the only state to have formally passed a law requiring it. There was no reason to further lobby in other states after Massachusetts passed the law. While carmakers have provided information to other states to the extent that Massachusetts required, there are still gray areas that are causing trouble for repair shops. The carmakers, holding on to whatever semblance of power they have, are still limiting the areas that the diagnostic tools and parts are provided for based on the company's desires. Compromising the right to repair law that was passed, the advent of wirelessly transmitted vehicle data allows for the 2012 law to be circumvented as the law only talks about tools that are directly connected to the machine for diagnostics and does not strictly include a need to provide the data a carmaker can receive wirelessly without attaching a diagnostic tool. In response to the Massachusetts law's lack of foresight, a new measure has appeared as of November 2020 to close this loophole and expand what is included in the right to repair law (Jonathon NG 2019).

Extending from this law for car repair are many questions as to what should be covered. An issue that Huseby (2020) brings up is how right to repair legislation should apply in the context of automated vehicles. Due to the high level of software integration, there is a greater cybersecurity vulnerability. This could lead to physical consequences in the real world if someone is given access to the data of an autonomous vehicle and hacks it to change the way the car's sensors react. Huseby argues that due to the inherent risk, the automated vehicle industry is not yet ready for the right to repair legislation to apply. However, she believes that until the automated vehicle industry becomes more pertinent, and a discussion is had, in the meantime there is a need to facilitate easier and cheaper repairs that can be performed by experts so as to discourage dangerous tampering and hacking of these potentially deadly vehicles.

Another extension from the general car repair category is tractor repair, which is one of the most significant areas that the right to repair is fighting. When an average person thinks about tractors, they think of a simple vehicle with an engine and a chair that can be used to pull different farming tools. The reality, as Green and Proctor (2021) explain it, is that farming in the modern era requires significant amounts of technology to be as efficient as possible using high-tech tractors. John Deere, the number one selling tractor brand in the United States, is subject to a lot of controversy over the repairs necessary for their tractors. Their tractors have hundreds of sensors on them to allow for innovation in the agriculture sector that makes their tractors and the tractors of their competition a necessary upgrade for any farmer using a low-tech tractor. John Deere has thousands of engineers working for them, most of them being software engineers rather than mechanical engineers. This is because the tractors run on code that takes the large amounts of data obtained by the numerous sensors and tells the farmer and the tractor what to do (Agam 2018). What then happens if one of these critical sensors has an error?

If even one sensor is not working, John Deere could have to send out a technician to the site to diagnose and fix the tractor. From this one sensor, the entire tractor will be shut down, leaving farmers without their tractor during critical times when time-sensitive work needs to be done. They are then forced to sometimes wait days for the technician, who can cost upwards of \$150 an hour, to arrive. This has led people to hack the software to give back the farmers' control over their tractors (Linarthatos 2021).

When a farmer spends \$800,000 on a tractor, they expect to own the tractor. When John Deere was confronted about their policies that made repairs difficult for farmers, they stated that it is not the farmers' tractors to repair them the way they want because they do not own them. Instead, it is an "implied license for the life of the vehicle to operate the vehicle (Matchar 2016)."

Tractors are not included in the automotive right to repair bill. The data, which is the big issue with these tractors, is still inaccessible even if they were. When the farmers buy the tractors, they sign a EULA that states that they do not have the right to tamper with the intellectual property of John Deere making the policies of John Deere completely legal for now (Matchar 2016). While John Deere is making the headlines in the United States for right to repair across the sea in the European Union there are other headlines with regards to the right to repair.

Case Study: European Union

There are the same difficulties with repairing devices in the European Union as there are in the United States. Like the outdated DMCA, the EU has an equivalent of outdated legislation in the field of electronics, making it harder for independent repair shops to repair goods. A difference between the U.S. and EU is that the EU has been more active in the field and has recently proposed new legislation for the long-term sustainability of products (Rosborough 2020).

In March 2021, the first right to repair regulations for electrical appliances took effect in Europe. The European Commission's "Ecodesign Measures," which originally included a rating only on the energy used during operation, will now include much more. The new regulations, which apply to appliances like washing machines, dishwashers, televisions, and refrigerators, require manufacturers to provide spare parts and repair documentation to independent repairers. This prevents repair monopolies that manufacturers were able to form in the past and holds them accountable for ensuring that the longevity of appliances will be extended by requiring them to supply these parts within fifteen business days for seven to ten years after the product's release (Schneider 2021).

Repair advocates quickly pointed out problems with this law. While the manufacturers would be required to give professional repairers access to parts, individuals are not given the same right to repair. Another shortcoming is that the manufacturers can work around these regulations by increasing the prices of these spare parts to inhibiting levels making the regulation useless if a company is unwilling to comply. They may also choose to only sell the replacement parts in a bundle instead of selling the individual part that is necessary, further defeating the spirit of the law while maintaining the letter of the law (Schneider 2021).

France, in early 2021, introduced a “repairability index” that is used as a score ranging from one to ten depicting how repairable a product is. These scores are based on five elements; availability of documentation, availability of spare parts, cost of those spare parts, ease of disassembly, and a fifth criterion that includes product-specific aspects. The covered products include appliances, smartphones, laptops, televisions, and lawnmowers. The score is then displayed close to the price on the packaging in the same size font so that the information is easily accessible and noticed by the purchaser (Mdepypere 2021).

The effectiveness of this French legislation is still too early to tell as of now. However, there has already been an increase in brands releasing detailed documentation that would not have been released if not for the index. One concern that is brought up is that the scores are not being established as one would expect it to be done, like a health grade for a restaurant, by a government authority. Instead, each manufacturer calculates their product’s score and puts it on the packaging. However, later in 2022, government spot-checks will determine if the score is reasonable to ensure the system's legitimacy (Rossmann 2021).

Another system that France plans to introduce is a fund to subsidize repairs that would further encourage people to have their devices repaired as opposed to throwing them out. The manufacturer, who already must allocate a fraction of the purchase price for the disposal costs of their products, would contribute the funds for this. This disposal fund would now be partly used for the new repair fund, though the exact numbers are still being worked out (Schneider 2021). These changes, along with a general pledge to consumers from the parliament that the EU supports the right to repair indicates that the European Union is taking a step forward in the direction of the right to repair (Höglund 2020). The amazing progress happening in Europe, compared to the United States, is mostly due to their more active approach in sustainability which is one of the core parts of repairability.

Environmental Impact

One of the critical elements of the right to repair is the reduction of electronic waste (e-waste) that happens if products last longer and are less likely to be thrown out. This is the primary approach that the EU focuses on with their laws trying to make devices more environmentally sustainable. With the increase of awareness around the world for things that are harmful to the environment, this may be the approach necessary to lobby for the right to repair successfully (Svensson 2018).

The technology inside our devices is constantly improving while the lifespan remains short. The result is that the amount of e-waste accumulating is growing, becoming the United States' fastest-growing solid waste category by over three times as any other category. In the United States alone, there are 133,000 electronic devices discarded daily, generating three million tons of e-waste annually as of 2007. According to Earth911, an online recycling

database, this number has only increased, “The United States generated 6.92 million tons of e-waste, about 46 pounds per person, in 2019. It recycled only 15% of the material (Earth911 2021).” This e-waste often is not disposed of properly, ending up in landfills exposing the environment to dangerous chemicals.

With the right to repair legislation enacted, the e-waste problem of electronics being thrown out would significantly decrease. Brown (2020) believes that once there is easy access to repairs, consumers will find it easy to make environmentally conscious decisions because it will save them money from buying a new device. The high repair prices currently incentivize consumers to buy new devices and desert their old ones leaving them to rot in a landfill. This built-in obsolescence costs the consumers more money, hurts the Earth, and only helps the companies selling the products by giving them more sales (Hernandez 2020). While the environmental impact is a long-term issue that more people are caring about, a broken ice cream machine is something more tangible and directly impacting and also surprisingly relates to the right to repair movement.

How this affects everyone

McDonald's Ice cream

McDonald's is a company one would not think would be in the spotlight of right to repair. However, they are currently under investigation by the Federal Trade Commission (FTC). Infamous for their always broken ice cream machines, some people have started to question how McDonald's has their ice cream machine not working more than any other food chain. McDonald's has recognized this, jesting about it in a tweet saying, “We have a joke about our soft serve machine but are worried it won't work (McDonald's 2020).” There is even a website

(<https://mcbroken.com>) that tracks the broken machines, and at the time of writing, 30% of the machines in New York are out of commission (Harris 2021).

Taylor, the ice cream machine makers, who are also long-time business partners with McDonald's, are the producers and servicers of the only model allowed in all of the franchise's stores. While able to produce an obscene amount of ice cream when they are working, these machines are constantly breaking down, leaving franchise owners perplexed trying to understand the error codes that the machine spits out. They then must call a Taylor technician to service their machine (Greenberg 2021).

As a fix for these machines, a startup called Kytch designed a device that plugs into the machine and simply explains the error codes. Understanding these error codes is not in the regular service manual and is only accessible with a technician service manual which contains a code to a secret menu to fix. Therefore, this device gained substantial attention from franchise owners and saved thousands of dollars in service calls. Last year, McDonald's warned franchisees to stop using the devices as they are not sanctioned and potentially pose a safety hazard (Harris 2021).

McDonald's later announced that they were working to help franchisees understand their device better by developing a device to let them know what is wrong with their machines. Kytch is now suing Taylor and McDonalds for conspiring to replicate their technology after Kytch discovered that they had bought one of their devices to reverse engineer. Aside from this lawsuit, the FTC is undergoing a preliminary investigation into Taylor and McDonald's. The overly complicated, poorly engineered machines have generated a lot of money for Taylor, with continued services generating around 25% of their business income (Haddon 2021). Just like

McDonald's who is part of the mass culture is an adversary to the right to repair, Apple, an even more prominent company, is one of, if not the biggest, adversary to the right to repair.

Apple Inc

While Apple is famous for its top-of-the-line devices they are also infamous for charging high prices to repair broken components of their fragile devices. With 46% of the market share for US smartphone shipments, Apple does not only have influence when it comes to design, but also when it comes to general policies. Apple is known for their Genius Bar which leads customers to believe their problems are being dealt with by the best people possible but after one gets a quote from a third-party repair shop and the so called "geniuses" the discrepancy begs the question, "Why does Apple charge so much more?" The simple explanation as the paper has been advocating until now is that Apple wants more control which leads to more money. By giving the impression that their service is of a higher quality and by making the price to repair comparable to the price to buy a new product all together, consumers are inclined to spend more of their money at Apple.

To increase the control over their repair market for their devices, Apple adds many hurdles for people who attempt to repair their own devices. As previously discussed, schematics, diagnostic tools, and parts are all virtually impossible to acquire through legal means. In a testimony in Washington SB 5799, a bill concerning the fair servicing and repair of digital electronic products, Rossmann explained his difficulty when trying to get access to a MacBook Laptop charging chip. He stated that he gets the charging chip by purchasing an iPhone battery charging case from Apple for \$150, only to rip it up and remove the chip. If he would go directly to Apple, they would charge \$1,500 to do this job, and they would wipe the entire computer's

data with their repair method. This is since, in 2018, Apple switched to using their proprietary charging chip, which had a minuscule difference to it, and told their manufacturer not to sell it to anyone else. This chip, which was accessible for \$10 dollars by electronic resellers, was now virtually inaccessible (Rossmann 2021).

While Rossman was able to think of a creative solution to parts inaccessibility, schematics are an issue that is harder to get around. For repair shops to get access to schematics that are necessary to understand what the electrical components on the board are for, repair shops rely on Apple employees to leak the files to the public. This does not always happen for every model and the difference between whether a repair shop can fix a problem on your laptop can be as small as whether the schematics for that model have been leaked (Stern 2021).

Another area where Apple has maintained control over is what damage is fixable. Apple has gone on the record stating in their repair forums and other locations that data recovery from a hard drive is impossible. What this means is that if one was to drop their device into a pool of water that the entire device would need to be scrapped and the files on the hard drive would be inaccessible. However, Jessa Jones a microbiologist turned iPhone repair person caused a lot of upheaval when CBC News released a segment where she showed that she has been doing data recovery for damaged Apple products that Apple said was impossible to do. Since then, Apple has changed their official stance on data recovery being possible (Stern 2021).

This was one example of Apple relinquishing some of their control, but over the past few years Apple has tried to protect their public image and has given away more of their control. One example of this is the Apple Authorized Service Provider Program. This program was supposed to be in theory everything that the right to repair movement was asking for. If a repair shop

chooses to, they can become Apple certified which would mean that Apple would recognize their store's ability to repair devices and Apple would provide schematics, diagnostic tools, and parts for repairs. This would ideally make the repairs of both Apple and independent repair shops on par with one another allowing for a competitive market, which is better for the consumer (Rossman 2020).

Ultimately, the program, while looking good from a public relations point of view, failed to give the independent repair shops the freedom to work on Apple products they thought they would receive. Instead, they were very limited in which repairs they were authorized to perform, and they required ordering individual parts from Apple before being able to start the repair process, causing the repairs to take longer. Apple also kept all their documents under lock and key, requiring members of this program to sign NDA's not being allowed to even speak about the program details. The details of the program are only public due to those who risked leaking the information against Apple. These details include the fact that Apple feels it is necessary to maintain the right to check the stock of a store for up to 5 years after the program to make sure they do not possess any Apple repair parts, legal or illegally obtained. As Rossman stated, this is the equivalent of "performing a drug test on a prior employee 5 years after he left the company and charging him for failing (Rossman 2020)."

In November of 2021, Apple, under more pressure as the right to repair movement gained more traction, tried again to update their stance on independent repairers with a new Self Service Repair Program. The reason for Apple's new stance is based on recent changes in Europe as well as the United States that the paper will later discuss. The new program promises that by the end of 2022, parts, tools, and manuals will be accessible for individuals to repair their iPhone 12's and iPhone 13's. While this program seems to be a step forward on Apple's part, many are

hesitant to congratulate Apple just yet due to the lack of details and prior failure with the Apple Authorized Service Provider Program. A question that is raised is, why would the program need a year to begin when Apple already has the infrastructure for part and tool distribution from the already established Apple Authorized Service Provider Program? The program, therefore, is most probably another public relations stunt to keep Apple relevant with the times and to look like the good guys (CNBC). This program is one of many recent attempts at improved public relations when it comes to repairing devices.

Current State of Repair in the United States

Pledges for Right to Repair

In July of 2021, President Biden signed an executive order to promote competition in the American economy. He encourages the FTC to “make it easier and cheaper to repair items you own by limiting manufacturers from barring self-repairs or third-party repairs of their products (Whitehouse.gov 2021).” The president in his order used the struggle of farmers and specifically confronted the practice of tractor manufacturers who lock their customers out of their equipment and force them to wait until a dealer can come and charge them unnecessarily high rates (Whitehouse.gov 2021).

As this essay is being written, partly due to the executive order, more changes are coming with the right to repair movement, finding itself brought up more in the mainstream media. A few months ago, Microsoft, after being pressured by shareholders, “agreed to evaluate and expand the repair options for its products (Cunningham 2021).” Specifically, they have agreed to evaluate the environmental and social impacts of increasing access to repair for products like the Surface and Xbox, which are notorious for being difficult to repair. They will also expand the

availability of certain parts and documentation and facilitate local repair options (Cunningham 2021). It seems that as more consumers are advocating for repairability, there is more discussion for repairability generating a positive feedback loop between what now includes the government and, in some cases, shareholders wanting a good image for their brand.

Why nothing has changed yet

There has currently been right to repair legislation proposed in over 25 states. While the Auto Right to Repair Act had 86% in favor, there are more difficulties with the right to repair electronics (Weins 2021). Companies are investing millions of dollars lobbying against the right to repair bills from being passed. They cite reasons like; it is dangerous for the repairer, it will decrease security, and it will lead to copies. Individuals, including professional repairers and experts in cybersecurity and teenagers who have been repairing since they were children, are in these courts testifying for their right to repair (Rossmann 2021).

The reason companies do not want the right to repair laws to pass at the end of the day boils down to control. They want to hold onto as much control over their devices as possible which helps them profit more. This control extends past when the device is sold. Companies are no longer satisfied with only making money on the sale of the device. They want to continue making money through subscription services as well as repair services. Introducing other factors like third-party repair shops would then diminish the monopoly they have on their device, adding pressure in terms of the prices of repairs and the types of repairs being done. If a technician is encouraged to tell the customer to throw out their device and buy a new one, then the company can increase its profits. Therefore, they are investing heavily into propaganda against the right to repair bills being introduced (Brownlee 2021).

The concern that if they were to allow for their products to be tinkered with, it would lead to other companies copying them is unfounded. In the past, products came with phonebook-sized manuals explaining every detail, including schematics and detailed descriptions of each part, yet it is not found that the reason this is not the standard practice anymore is that there were too many cases of stolen intellectual property. It is also not found that many people were injured from accessing this information and attempting to tinker with the device. Instead, every issue boils down to the financial motivation of companies to limit the access of consumers and take more control for themselves (Rossmann 2021).

What right to repair is not

Some can misunderstand what the right to repair is. Everyone agrees that when one buys something, there can be limitations to that device. For example, printers cannot print out money because built into the code of the computer is a piece of software that knows to cancel the print if an image too close to a bill is shown. Additionally, a person must put on a seatbelt when driving a car, and he needs to have a certification that it is in good enough condition to drive. The difference between these limitations and what right to repair is fighting for, is that these limitations are designed to be as less obtrusive as possible and are done with proper intentions other than financial ones (Brownlee 2021).

Another misinterpretation is that the right to repair is saying that the consumer must be the one to repair their own devices. This is incorrect; it is simply the ability to choose. While an individual might decide that they still want to spend the extra money on the so-called "premium repair" from the authorized repairers, the right to repair is still relevant for them because it will bring down the prices to make them more competitive to the equally equipped independent

repairers (Rossmann 2021). This idea of alternative means of device repair is commonly found in the actions of those part of DIY communities.

DIY Communities

While this paper is striving to emphasize a need on a macro-scale there is progress at the micro-scale. In areas where there is no change in terms of legislation or from the company's point of view there is always a DIY (do it yourself) community or a hacking community that on a small scale choose to enact the changes they want to their own products. While that is more tangential to our discussion which focuses more on the legality of the acts of the companies the fact that there are communities that take it upon themselves shows that this is what the people want even if they must jump through different hoops to not be shut down for copyright infringements when distributing their augmented software. It seems as if the stricter a company is with tampering its software the greater the communities are that form around it. The jailbreaking community for Apple iPhones has been hacking iPhone software since the inception of the iPhone (Ricker). When these communities hack software it is almost always about taking control of their own devices. Using the hardware that the company provides; users want to use its full potential and there should be nothing wrong with that.

In the summer of 2021, a new laptop company called Framework released a high-end laptop with comparable specifications to other brands like Asus, Dell and HP. The catch is though, that this laptop can be completely taken apart within a couple minutes requiring nothing but a simple screwdriver. The reason why this is so significant is that computers over the past couple of years have become increasingly harder to take apart. The implications of that are now to replace a battery would cost hundreds of dollars more that it should have because of the

difficulty and any broken components would most likely require an entire replacement of the logic board which is the overkill when only one part is broken. Apple is infamous for their high repair costs because of their MacBook's part integration that is designed to not be easily repaired and requires an entire replacement even when damage is minimal. The Framework Laptop avoids almost all of the issues the DIY and right to repair communities have. With it being so easy to swap out and upgrade parts because individual components are all accessible on their website, people are now able to customize their product and repair parts that customarily would not even be repairable. This product is a bridge between the DIY community and high-end companies, its current success shows that it is economically feasible to focus on trying to make the best user experience for a product instead of focusing only on how to get the customer to pay more. This product, by sacrificing little in terms of cost and design, can go toe to toe with the big companies while offering a more desirable customer experience, showing where the future of product design should be heading.

Conclusion

While it might be said that the people deserve a right to repair, it is evident that in practice, the people do not have one. So long as companies are making it near impossible to do so by limiting access to parts and tools, a critical right is being taken away. Therefore, consumers must choose to fight for their right to repair by joining together as the little guys against these giant corporations who are money-driven and do not care about unethically stripping consumers of the ownership of their products.

The right to repair movement has been gaining ground over the past few years as companies have worsened their policies. This paper has argued that the law is not clear about the validity of the claims companies are making in terms of intellectual property. Their interpretation of the right to protect their intellectual property might be within the law, and for sure, when an agreement is signed, the companies are allowed to enforce that their devices not be repaired. This, however, should not be the case. There should be laws to stop these money-grabbing practices of almost all big companies and force them to allow for their devices to be repaired.

Currently, there are dozens of states where right to repair legislation has been proposed. To concretize the main points, there should be at the very minimum several things brought up in these proposals. The most fundamental is that it needs to be explicitly stated that every individual has a right to repair. This means being able to open their devices and replacing a broken part instead of being forced to buy an entirely new unit. The second level would be access to parts. When part manufacturers are not allowed to sell a proprietary part because of a specialized deal, that is unethical. This would then discourage designers from swapping out generic parts for slightly altered ones. The next degree would mandate the diffusion of information like schematics and diagnostic tools, like what is being done in France. While requiring companies to maintain parts stocked for ten years is excessive, it is enough to simply give independent repair shops the same access as authorized repair shops.

On top of all those more fundamental rights, consumers are also entitled to others. If someone buys a device, he should be the uncontested owner of it, not leasing it indefinitely or forced to sign a license that states he has limited abilities to use it. There should be permanent exceptions for copyright and patent law allowing consumers to disable digital locks because the software is sold with the device, and it is not going to lead to people maliciously hacking

everything. Finally, when possible, companies should make their devices easier to repair and not purposely make it unnecessarily hard which would then encourage more people to repair their devices.

The increase in the amounts of e-waste generated and the increase in control that companies are trying to take in their products after they are sold has made it so now more than ever there is a need for the right to repair to be advocated for and recognized. This is an issue plaguing the entire electronics industry, and it will spread to others if not stopped. As argued in the paper, unethical business practices must be eliminated from product repair by demanding legislation to protect the people and take back the rights of every individual.

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