# The right to repair in Thailand

## Improving outcomes for consumers, repairers, and the environment

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Southeast Asia Public Policy Institute

Research partners:

TEI THAILAND ENVIRONMENT INSTITUTE

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# Executive Summary

Right to Repair (R2R) is the concept that consumers should have the right to fix their products, devices and equipment, with access to parts, tools and documentation. Moreover, R2R provides legal protections for repair and discourages software restrictions that degrade a product's utility.

The lack of consumer choice, higher costs, and environmental concerns have driven the R2R movement to advocate for greater repairability, successfully resulting in groundbreaking R2R legislation in recent years, namely at the state level in the United States (US) and the European Union (EU).

In the EU, sustainability has been a key driver of the R2R movement, especially amid growing electronic waste (e-waste) and the associated emissions of consumerism. In the US, the R2R movement has largely been driven by consumer protection against original equipment manufacturers (OEMs) restricting access to independent repair through various technical and legal barriers, such as the practice of parts pairing, with debates increasingly centered around balancing safety and privacy concerns with empowering independent repair.

Meanwhile, the movement has continued to gain traction globally, supported by consumers who increasingly recognize the environmental and economic costs of constant upgrades promoted by OEMs and are choosing to upgrade their devices less often. Yet, restrictions imposed by OEMs on those seeking independent repair often still leave consumers with less choice, leading them to incur higher costs for authorized repair services and parts or replace their broken devices altogether.

## R2R Policy Developments

The ideal R2R policy framework should restrict OEMs from using software locks to prevent repair, or parts pairing, and encourage product design that features repairability in the first place. Beyond widening access to diagnostic tools and spare parts for independent repairers and consumers, several R2R laws, such as in Oregon and Colorado, explicitly restrict companies from using software locks to prevent repair – known as parts pairing. Most recently, the EU passed legislation that applies R2R to a wider range of consumer products including electronic devices. Australia passed its first R2R laws in 2021, which includes a mandatory data-sharing scheme to aid independent repairers, while India has launched an R2R portal and is preparing its own repairability index for mobile phones and electronic products.

In these jurisdictions, OEMs have scaled back on their restrictions to repair or are involved in consultations behind R2R policy developments, showcasing that the development of R2R frameworks can still balance industry concerns and interests with consumer protection. R2R promotes consumer choice and encourages independent repair, fostering healthy competition, improving the repair ecosystem at large, and generating greater trust amongst consumers - all of which also benefit OEMs in the long term.

As highlighted in the cases of the US and EU, robust R2R legislation does not necessarily compromise device security and privacy. On the contrary, a more open integration between authorized and independent repairers can foster and streamline collaboration in repair, including better education for independent repairers and consumers on the standards and guidelines needed to perform high quality repair. Engineering and technical capabilities of OEMs can also address concerns around security and privacy, as showcased by Google's repair mode feature.

## R2R Development in Thailand

While most countries do not have dedicated R2R laws yet, they likely already have a comprehensive set of consumer protection laws, with some countries enshrining e-waste legislation that may be interpreted to support a more consumer-centric approach to sustainable consumption. The culture of independent and informal repair is also ubiquitous in all regions. Southeast Asia is a case in point. Most countries in the region have consumer protection and e-waste legislation, as well as a strong economy of independent repair, that are conducive to the development of R2R-specific legislation.

Among these countries, Thailand has the potential to provide a supportive landscape for the development of R2R regulation, taking into account its existing consumer protection and sustainability policy frameworks, potential government interest and stakeholder support, and an active repair market and tradition. For one, the Thai government has begun drafting a 'Lemon Law' (the Defective Product Liability Bill) which for the first time introduces liability provisions for additional types of product defects beyond those associated with safety risks. As it stands, the proposed Lemon Law is not specific to repair but provides a potential framework on which R2R legislation can be developed.


Our September 2024 survey on the Thai device repair market, involving independent repair shops for mobile phones and digital devices and brand-authorized repair shops in Bangkok, reveals key challenges shared by independent repairers. These include limited access to repair information, tools, and parts; catching up with rapid technological advancements and training; reduced repair demand due to consumer preference for newer models and upgrades; OEM warranty policies; as well as competition from do-it-yourself (DIY) repairs attempted by consumers at home. There are some similarities and differences in the challenges experienced by small and authorized repair centers in Thailand. The survey also reveals shared challenges between independent and authorized repair shops despite their differing policies, including obtaining specialized tools and parts for more complex repairs as well as the limited availability and high costs for certain parts and tools, which discourage consumers from choosing repair over replacement. Respondents suggest that the government could do more to support a more robust R2R policy environment, including streamlining access to parts, standardizing pricing, providing government incentives, and promoting consumer education on repair benefits to support sustainability.

## Key Recommendations

Despite Thailand's notable move towards broadening access to repair through initiating the Lemon Law, the country's legal framework for R2R remains fragmented and incomplete, leading to uncertainty in repair practices. Amid the various opportunities and challenges presented by R2R, the right policy approach and support are essential to improve Thailand's R2R ecosystem.

Several vehicles to achieve a more comprehensive R2R policy framework in Thailand include:

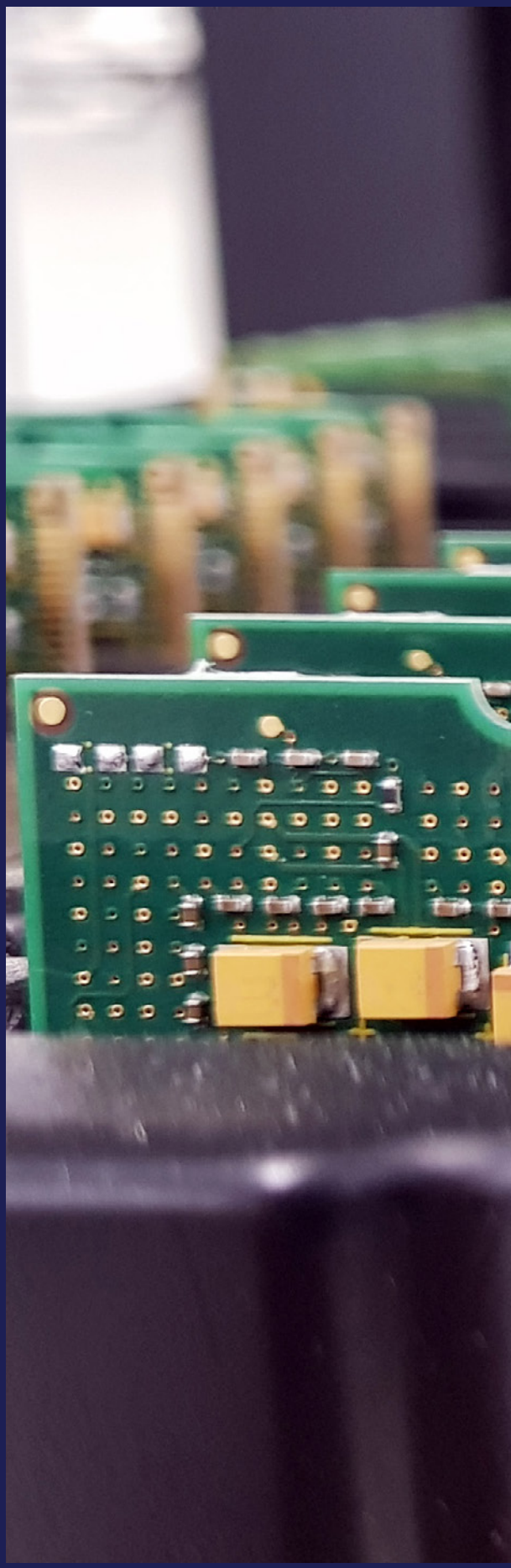
- **New legislation**
  Given the existing support for better repairability, sustainability, and consumer protection in Thailand, the government could draft a new legislation that directly enshrines R2R.

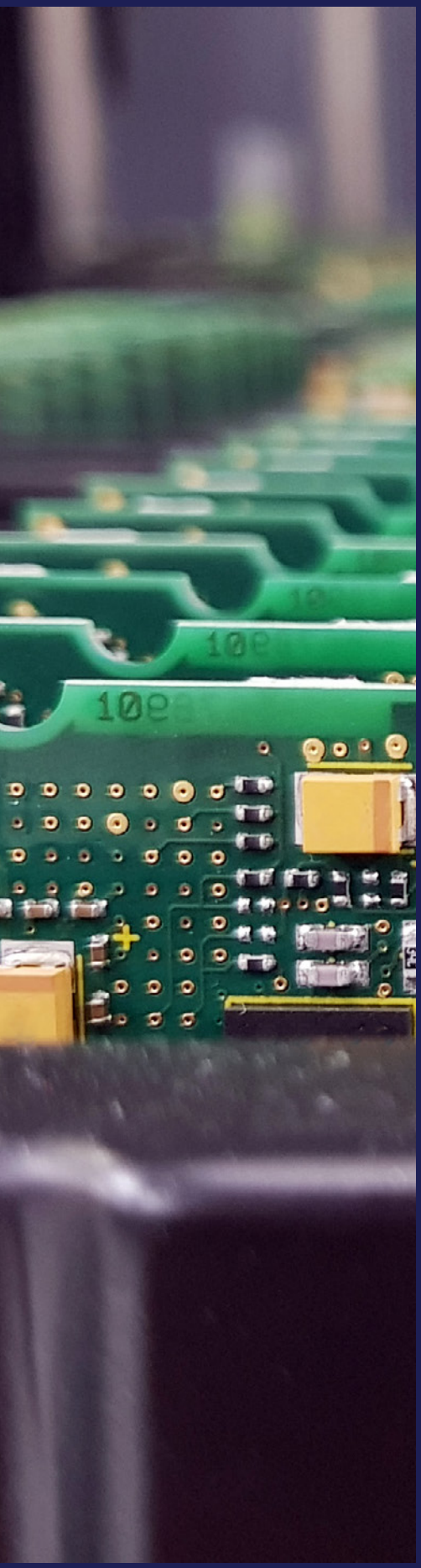
- **Amendments to existing legislation**
  Policymakers could amend existing or draft legislation, such as the Lemon Law still in discussion, to include provisions that would support R2R.

- **Banning restrictive practices such as parts pairing**
  Thailand can set an example to other countries in the region and beyond by banning restrictive practices such as parts pairing, especially given that it is one of the main limitations to repair faced by consumers and independent repairers.

- **Public engagement on sustainable consumption and repair**
  Beyond legislating R2R, the government could promote a more robust R2R environment by encouraging sustainable consumption at large.

- **Certification and support for repairers**
  The government could improve the overall quality of independent repairers by organizing training and certifications, potentially partnering with OEMs to train independent repairers on quality repairs and the importance of device security and privacy.





Beyond policy pathways, the Thai government and all stakeholders in the repair sector, including industry players and advocacy groups, can undertake supporting actions for an R2R policy framework:

- **Enhance consumer access to repairs**
  Some ways include legally broadening access to repair tools, manuals, and documentations. Manufacturers should also be legally required to make spare parts, repair manuals, schematics, and diagnostic tools available to independent repair providers and consumers.

- **Prevent OEMs from unfair repair practices**
  Thailand's future R2R policy should explicitly constrain OEMs from imposing unfair anti-repair practices, such as parts pairing—the practice of using software barriers to impede consumers and independent repair shops from replacing components.

- **Strengthen consumer protection laws**
  Legislation should explicitly provide consumers the right to repair their devices without voiding warranties, allowing them to use third-party repair services without repercussions. These protections could be included as part of the Lemon Law currently in drafting or be added as amendments to existing Consumer Protection laws such as the Product Liability Act 2008, which already addresses consumers' right to seek repairs when the item is defective.

- **Enhance repairability and longevity of devices**
  Thailand can encourage the integration of reparability as a design feature through several voluntary initiatives, including schemes for eco-labelling to signal repairability. Financial incentives, like tax breaks, could also be provided to OEMs that adopt repair-friendly designs and engage in Extended Producer Responsibility (EPR) programs.

- **Ban planned obsolescence**
  R2R legislation should prevent planned obsolescence, an industry practice to maximize profits.

- **Improve the repair sector**
  Reforms to the current repair sector will be needed, including standardizing repair standards and qualities, and educating OEMs to design products with repairability in mind.

# About the Southeast Asia Public Policy Institute

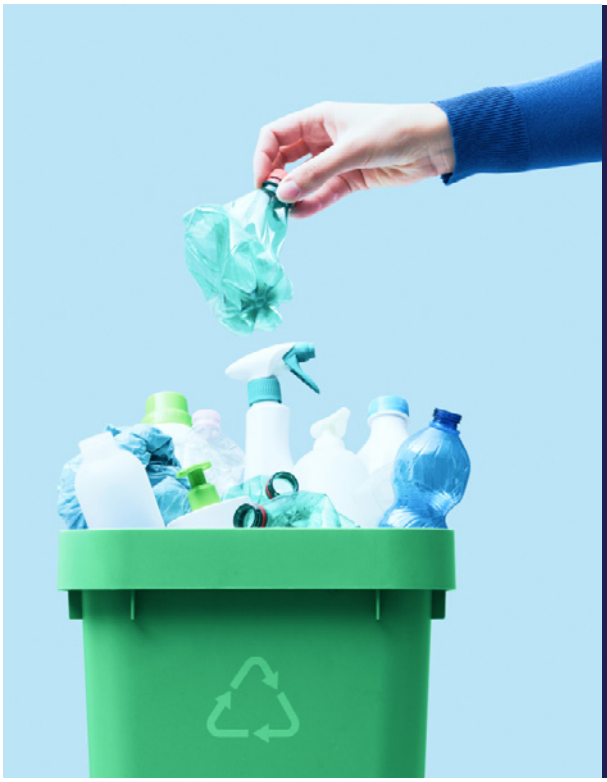
The Southeast Asia Public Policy Institute is a research institute based in Bangkok and Singapore, working across the region. Our mission is to support the development of solutions to the most pressing public policy challenges facing Southeast Asia in the 21st century. The Institute works on a range of issues across sustainability, technology, public health, trade, and governance.

We convene dialogues with stakeholders and decision makers to drive discussion on the challenges and opportunities facing markets in the region. The Institute draws on a network of in-market researchers, advisors, and partners to provide insights and recommendations for governments, policymakers, and businesses.

We collaborate with partners on projects to explore and drive discussion on policy challenges through:

- **Research and Policy Development**
  In-depth research providing insights and actionable policy solutions aimed at policymakers looking to move the needle on key issues.
- **Policy Dialogues and Roundtables**
  Present policy ideas and start a dialogue with the most relevant stakeholders holding the pen on policy development in markets across the region.

The Institute is founded on the premise that direct connection and candid, informed dialogue is crucial for both policymakers and business leaders operating in the region's changing economic and public policy landscape.



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**Our circular economy program**

Circular ASEAN is the Institute's circular economy program, which aims to explore best practice policy and develop the economic case for the circular economy in Southeast Asia and convene stakeholders and policymakers to drive the conversation on circularity and sustainability in the region.

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# Introduction

Right to Repair (R2R) is the concept that consumers should have the right to fix their products, devices and equipment, with access to parts, tools and documentation. Moreover, R2R provides legal protections for repair and discourages software restrictions that degrade a product's utility.

Across industries, from agricultural machinery and automotive vehicles to consumer appliances and electronics, manufacturers have implemented physical, legal, and digital barriers to independent repair. As a result, unless the manufacturer has a repair offering, customers can be left without any options for their damaged, faulty, or worn products. At worst, manufacturer-imposed barriers to repair disincentivize repair completely in favor of premature replacement, especially in advanced markets with high labor and logistics costs.

The inconvenience of being without essential items for even a short period of time – refrigeration for example, or a mobile phone – also harms consumers. The product launch cadence of digital devices also creates an expectation for consumers to upgrade, rather than repair, their devices. Research shows that when it comes to tech gadgets, most people are inclined to buy new products rather than repair their old ones.[1]

Some manufacturers maintain that closely managing repair is important for quality control, safety, and security. Manufacturers exercise a level of control over consumers by often voiding warranties if a consumer attempts to repair their own device or if repair is carried out by an independent third party. Manufacturers may also constrain access to parts, tools, and documentation for both consumers and independent repairers. Further, some manufacturers practice 'parts pairing' by which they impose software barriers and the serialization of spare parts that ultimately restrain independent repair.

In addition to providing consumers with more choice, R2R can also contribute to sustainability

in an economic system that prioritizes consumption and fails to account for negative externalities, such as resource use and waste. As production often accounts for the majority of the environmental impact within a product's lifecycle, extending the useful lifespan of a device – and deferring or avoiding the need to produce a replacement – has environmental benefits. In fact, quality, convenience, affordability, and sustainability can be supported through the development of a policy landscape that supports repairability.

Globally, policy that supports repair includes laws that cover specific products such as wheelchairs; laws targeting broader categories such as machinery, vehicles, white goods or electronics; and laws that address R2R as a concept. Many R2R policies provide access to manuals, software updates for a minimum predetermined duration, as well as the parts and tools to diagnose and repair devices that may be otherwise inaccessible to third parties and individuals. More sophisticated R2R policy also envisions that products should be designed with repairability in mind or require more detailed information from manufacturers – such as electronic schematics.

There are two global leaders in R2R policy that view the issue through slightly different policy lenses. The United States (US), which has historically led the repair movement, focuses more on consumer rights and individual empowerment. Much of the most progressive policies in the US have been developed at the state level, though there are supportive federal legislation and regulations. The US' approach to R2R also has a major focus on leveling the playing field for small repair businesses. The European Union (EU), on the other hand, approaches repair more from a sustainability angle, with the recent adoption of a Directive on the repair of goods as part of a broader sustainable consumption strategy.[2]

In recognition of the value of R2R, other countries such as Canada, India, and Australia have begun legislative or administrative processes for R2R policies or integrating R2R principles into their existing consumer protection laws and sustainability frameworks. Although these developments do not yet comprise comprehensive R2R legislation seen in the US and EU, they signal an increasingly dynamic global policy environment that supports access to repair.

Thailand is a case in point. Buoyed by high consumption patterns particularly for electronic devices, relatively high gross domestic product (GDP), a tradition of repair, comprehensive consumer protection laws, and growing attention to sustainability, the country is well-positioned for the development of R2R policy.

To better understand the potential for R2R and the challenges faced by consumers and businesses in the country, the Southeast Asia Public Policy Institute (SEAPPI) and partners interviewed more than 40 operators in the Thai repair sector including a survey of more than 30 micro, small and medium-sized independent repair shops (MSMEs), and supplementary interviews with brand-authorized repair shops and retailers. Our surveys and interviews focused on the repair market for mobile devices because they are effectively ubiquitous, high-value, resource-intensive to produce, and create complex end-of-life waste. While technically repairable, they also present obstacles to repair and have become an essential item that Thai consumers do not like to be long without. Additionally, mobile device manufacturers have increasingly made investments in engineering for repairability and started to build reverse logistics supply chains.

**Throughout this report, we will outline the key principles and policy drivers for R2R, review policy developments around the world including Thailand, analyze the outcomes of our repair sector survey, and give recommendations for improving the R2R policy landscape in Thailand.**

## Section I

Provides a brief history of the Right to Repair, explores the benefits of repair, challenges, and the counterarguments raised by some manufacturers

## Section II

Sets out the key policy principle for R2R and explores the global policy landscape and best practice in R2R policy

## Section III

Analyses Thailand's policy landscape and its support for repair

## Section IV

Dives into the device repair market in the country, integrating insights from independent and authorized repairers on the challenges of repair

## Section V

Presents recommendations to create a more supportive policy environment for sustainable repair in Thailand, building on the country's current legislative frameworks and advocacy progress around repair access, sustainability, and consumer protection

# Key Drivers of R2R

# R2R: A Brief History

Consumer and advocacy groups first recognized the need for Right to Repair (R2R) policy in the 1980s in response to a trend of manufacturers restricting repair options. Early advocacy efforts were concentrated in the US and focused on specific industries such as agricultural machinery, automotive and electronics. In 1990, the US federal government first responded to complaints around repair restrictions by amending the Clean Air Act, specifically by requiring automakers to provide independent repairers with the same emissions service information that would allow them to conduct repairs.[3] California also passed legislation that would require automobile companies to maintain websites containing service information for repair shops.[4]

The 2000s ushered in greater sophistication and complexity in consumer tech. However, the rise of such technology also saw independent repair businesses often blocked by manufacturers from performing repairs. Original equipment manufacturers (OEMs) stopped selling parts or tools, shipping products with schematic diagrams, and making available repair manuals.[5] Devices' integration with proprietary software also became a challenge for repair as security protocols could identify and reject replacement parts that were not authorized by the OEM.

Trade associations in the US, including groups for computer and medical equipment repair, were the early advocates of repairability.[6] Legal action against specific businesses and antitrust investigation undertaken by groups such as the Service Industry Association slowly evolved into legislative solutions as dedicated groups and community repair networks grew, including The Repair Association Fixit. The movement has since witnessed legislative breakthroughs supporting R2R, including federal and state-level legislation.

The EU began considering similar legislative action, leading to the adoption in 2024 of a new set of R2R rules to encourage the repair of broken devices.[7] The European approach to R2R policy has been driven largely by environmental and sustainability concerns, in contrast to the US' approach, which has been mainly influenced by consumer rights and the growth in small and medium-sized enterprises (SMEs). As such, R2R legislative efforts in the EU support the implementation of the EU's broader sustainable consumption strategy and green transition agenda, and complement existing regulations and directives governing both e-waste management and consumer policy.

The R2R movement is also gaining momentum globally. Although much R2R policy activism originated in the West, its influence has prompted countries in Asia to discuss and develop a framework for R2R legislation as part of the solution to tackle e-waste and strengthen consumer rights.

Notably, the concept of independent repair is not new in the region, including in Thailand. For decades consumers and businesses have relied on both brand-affiliated and independent repair for all kinds of vehicles and equipment such as air conditioners. As in other markets, independent operations in particular have faced challenges regarding accessibility to parts, tools and information. In interviews with repair sector operators, several interviewees noted a general decline in the number of independent repair shops, likely due to the rise of service contracts for larger equipment and the availability, decreasing cost, and consumer trends around electronic devices.

# Key Benefits of R2R

As with any complex consumer product, mobile devices create negative externalities throughout their lifecycle, from resource use and manufacturing to post-consumer electronic waste (e-waste). With mobile devices in particular, consumers face issues including limited lifespans for specific components (e.g. batteries), the relative ease that specific components can be broken (e.g. screens, audio components), warranty limitations, limited software support, and planned obsolescence. Policy that supports and incentivizes repair can mitigate these problems, with positive impacts for consumers, the environment, the local economy, and the OEMs themselves.

### Reduced environmental harm through e-waste and carbon emissions

The world generates around 50 million tons of e-waste each year, equivalent to throwing out 1,000 laptops every second.[8] Globally, only about 20% of e-waste is recycled, and the US alone loses US$10 billion value in unrecycled e-waste annually.[9] E-waste can end up in landfills, allowing harmful chemicals and greenhouse gases to leach into the environment.

Economies of scale in global manufacturing have decreased the cost of consumer electronics especially compared to the relatively high costs of repair, factoring in both the cost of new parts and labor. However, by repairing instead of replacing broken items, consumers can extend the lifespan of each product.

The environmental aim for repair policy should be to extend the average life of a device. Currently, the average lifespan of a phone is three years, though depending on the device brand this can vary from two up to eight years.[10] This figure is still far shorter than the 25 years it would take to offset a phone's environmental impact.[11] Around 60% of users change their phone every three to four years, while 20% change it every year, mainly due to aesthetic obsolescence.[12] Just extending the average phone use to four to five years, or purchasing three instead of four phones every decade, could significantly lower emissions and e-waste.

The associated lifetime emissions from a smartphone are not insignificant, globally contributing almost 150 million tons of CO2 or equivalent emissions.[13] Given that manufacturing contributes to 85% of a smartphone's total carbon footprint, the most impactful way to reduce a smartphone's carbon footprint is to extend its lifetime.[14] While the repair sector and parts supply chains do leave a footprint, fewer new products mean a lower demand for manufacturing, conserving energy and reducing the associated pollution from production, logistics, and transportation of products.

It is also important to note that e-waste is still an issue for the repair sector, and it is essential that the sector disposes of used parts responsibly and sustainably. Increasingly, mobile device manufacturers have invested in the longevity of their products in recognition of both the environmental and business value in promoting longer software updates or selling refurbished phones.[15] On average, consumers are also holding on to their mobile devices for longer periods as upgrades no longer offer significant differentiation in smartphone features.[16]

### Effective resource use

The extraction of critical resources for manufacturing, from water and minerals to rare earth elements, has a direct environmental impact and carbon footprint. The choice to repair instead of replacing broken items can thus help conserve raw and natural resources needed to produce items. It also decreases the unsustainable process of mining required to produce tech products. For example, most smartphone batteries rely on lithium, a metal mined in various places around the world that requires significant water and energy.[17] Beyond reduced overall consumption, increased repair, paired with an effective waste management and recycling systems, can contribute to better resource use.

### Value for consumers – cost and choice

The cost-saving benefit of R2R for consumers is significant. Extending the life cycle of a product can avoid the higher costs of purchasing new items. Extending the lifespan of electronic devices by 50% to 100% can not only mitigate up to half of total emissions but also reduce costs to the consumer by up to 25%, especially if repair is covered by warranty.[18] A US study found that an average household could save US$330 annually if they repair broken electronic devices rather than replace them, amounting to US$40 billion nationwide in the US alone.[19] This money saved would free up disposable income for consumers, potentially boosting the broader economy.

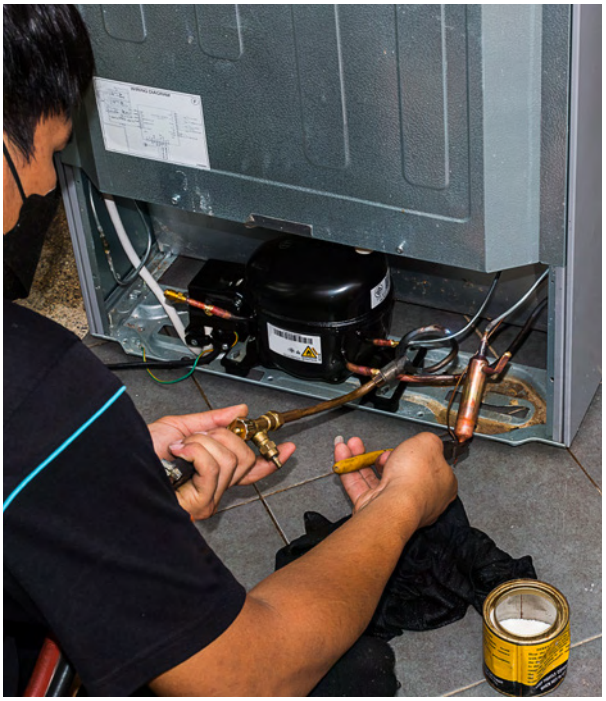
### Contributions to the local economy

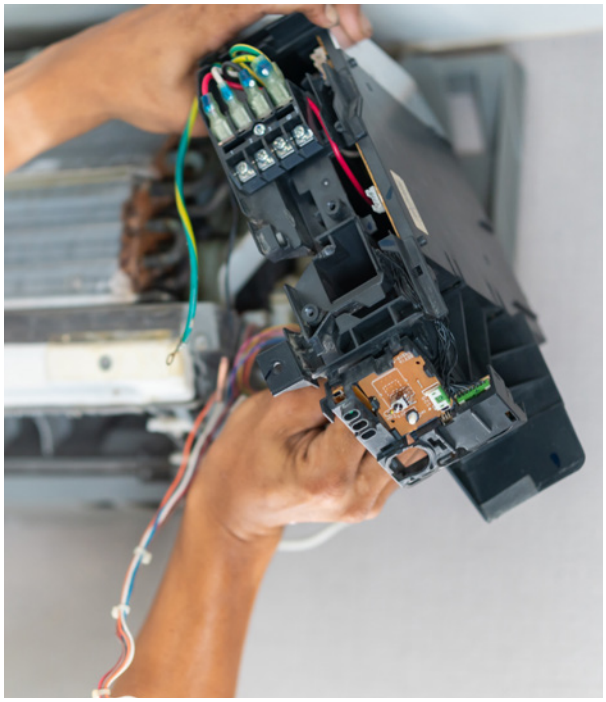
As more repair options become available, increased competition in the repair market can drive down costs. Independent shops and manufacturer-authorized services will be encouraged to improve service quality and innovate repair solutions, knowing that consumers are presented with more choice. While repair services by brand-authorized centers can provide the best solution to some consumers' repair needs, it is important that independent repair can operate competitively with authorized repair providers, especially outside of warranty. Even within warranty, it may be inconvenient to access authorized repair for various reasons, including distance to an OEM repair center and waiting time to deliver parts. Repair shops may thus compete on location, turnaround time, and additional services. Consumers should not be punished for taking this option by having their manufacturer warranty voided.

R2R also has the potential to support small- and medium-sized enterprises (SMEs) in the local economy, given that third-party repair shops are typically family-owned, independent, or homegrown small businesses. Such an ecosystem can also generate employment opportunities for individuals with specialized skills in repair, as well as incentivize investments in recycling systems.

### Greater incentives and trust for industry players

While R2R can appear to pitch OEMs against consumers and independent repair, OEMs can also benefit from policy supporting repair. To begin, device longevity and better access to repair can give OEMs a competitive edge in comparison to their competitors. Policy promoting repairability can help companies better align with their Environmental, Sustainability, and Governance (ESG) objectives – such as driving down carbon emissions, reducing waste, and improving efficiencies. Better compliance with ESG standards and reduced carbon footprint can also bring many advantages, including tax incentives, access to loans in the financial markets, and increased brand reputation and trust among consumers. Manufacturers can continue to engage in the repair market, providing repair services and competing with independent repairers on service, quality, and convenience.





# Common Criticisms of R2R

### Compromised repair quality

A common criticism is that do-it-yourself (DIY) and third-party repair services do not always adhere to the same quality standards set by OEMs. Third party replacement parts, diagnostics, or tools may vary in quality, which can impact the overall reliability of the repaired product. Repairs that fail to address mechanical issues such as electrical hazards and shocks, fires, and mechanical failures can lead to further malfunctions, posing safety risks to consumers. In the worst-case scenario, this could lead to a thermal event in a phone battery or the failure of a device. Regulators have excluded devices that have true health and safety concerns, like medical equipment, from R2R requirements. However, these challenges also illustrate the responsibility of OEMs to design their devices to be repairable over time to help empower consumers and ease repairs. Finally, OEMs must also support consumers and SMEs by providing access to authentic parts and tools to discourage the use of sub-par and non-authentic components that currently exist in the refurbished ecosystem.

### Threat to device security

Some independent repair shops and untrained repairers might not have the security expertise to handle repairs and data safely, potentially risking data breaches or mishandling of sensitive information. Medical technology manufacturers, for example, have expressed concerns that unauthorized third-party services are not required to follow FDA regulations or report adverse events, even as they deal with sensitive patient information.[20] However, regulatory and safety guardrails from manufacturers can mitigate this risk. Google's Repair Mode, for example, allows users to protect their data while their phone is being repaired, including in a third-party shop. From a legal standpoint, copyright and intellectual property (IP) laws can be enhanced to protect manufacturers from the threat to proprietary knowledge.

### Impact on product design

The R2R movement places an emphasis on repairability as part of the ideal product design. In the long run, R2R advocates hope this will lead to a robust and accessible repair environment, as well as reducing the need for repair as products are designed to be more durable and optimized for recycling and refurbishing. However, there can be trade-offs between design and repairability. On the one hand, innovations in consumer tech have resulted in more compact and complex designs for products like tablets, phones, and computers. On the other hand, the design of such devices might require the use of cutting-edge materials or non-traditional components that are not easily disassembled or replaced for repair. For example, manufacturing thinner smartphones relies increasingly on adhesives rather than screws and mechanical fixing, and specific tools and processes may be required for repair.

# Common challenges in repair ecosystems

Despite the potential benefits for consumers, the environment and the economy, some OEMs have sought to limit repairability or monopolize repair, for the reasons outlined above, as well as financial and competition considerations. The following outlines common practical barriers to repairability:

- **Software barriers**
  In the smartphone industry, some OEMs gatekeep repair by installing various software barriers, notably "parts pairing," whereby a new installed part may only function once authorized by the OEM, such as through remote pairing or matching a unique serial number. Common repair practices, such as harvesting spare parts from defunct devices for use in other devices, have become at risk because of the inherent anti-repair attribute of parts pairing. In some cases, this practice prevents even genuine OEM spare parts from operating within the device. As safety and security are often cited as a justification for parts pairing and software barriers at large, OEMs can still develop and manufacture safe devices without resorting to parts pairing, especially considering the advancement in OEMs' technological and engineering capabilities.

- **Physical barriers**
  Manufacturers can monopolize repair by restricting access to spare parts, tools, software, and technical documentation, citing security concerns and proprietary information. Independent repairers can only obtain unoriginal or unauthorized parts, making them a less appealing alternative for consumers already faced with tightly controlled repair options. Consumers who attempt to fix their own devices also lack access to comprehensive repair manuals and proprietary software tools required to finish repair jobs, even for otherwise simple fixes.

- **Legal barriers**
  Consumers are often trapped in contracts specifying that repairing with a non-authorized entity will break their warranty. Now a common industry-wide practice, such stipulation intimidates consumers from seeking repairs through independent repairers or doing it themselves. Consumers also have little to no say in repair pricing and negotiations, since the entire repair process is controlled by manufacturers.

- **Planned obsolescence**
  Manufacturers might deliberately design products – both hardware and software – with a shorter lifespan to encourage consumers to buy more

frequently. Apple, for instance, has faced multiple class action lawsuits over claims that it deliberately slowed down certain iPhones as they got older.[21]

- **Economic barriers**
  The high costs associated with repair services – exacerbated by access to parts, tools, and knowledge – drive consumers to purchase new items even when their device works perfectly well except for one component. If they go to unauthorized repair shops, they might pay lower costs but risk obtaining third party parts or voiding their warranty.

Reconciling the above interests and challenges can be addressed through robust R2R policy. In the ideal R2R policy environment, consumers do not only enjoy greater access to repair, but also trust that the policy fosters the highest standards of repair and device security, as well as promoting the integration of repairability and sustainability into design.

## Parts Pairing

Parts pairing is an increasingly common manufacturer practice to monopolize repair by the serialization of spare parts. Parts pairing is the main barrier to a supportive and comprehensive R2R ecosystem around the world.

***How it works:***

Some parts are given a unique serial number matched to an individual unit of a device by software. If these parts are repaired or replaced, they will only be accepted through remote pairing by the original manufacturer. Otherwise, the repaired parts will either fail to be paired with a device or lose their functionality unless the repair is authorized by the manufacturer, posing major barriers to independent repairers.

In 2023 alone, at least seven iPhone parts could trigger issues during repairs, compared to three in 2017, when Apple introduced facial recognition to unlock the iPhone. Parts pairing has continued to increase the number of malfunctions with later iPhone generations, and encouraged customers to turn to official stores or repair centers that charge higher parts for both parts and service. These malfunctions have been avoided by approved parts and sanctioned repairs. Following the passing of a law that bars parts pairing in Oregon, Apple plans to relax limits on repairs, having thus far encouraged customers seeking repair to only work with new and more expensive Apple-approved parts.

# The R2R Policy Landscape

# R2R Policy Principles

While there is a need for varied approaches depending on jurisdictions and local contexts, there are key features that can be considered comprehensive best practice R2R policy:[22]

- **Access to tools and replacement parts**
  Consumers and independent repair shops can access the same tools and genuine replacement parts available to the manufacturer at fair market prices. They also have the ability to bypass software locks that prevent repairs, taking into account personal data protection, proprietary software, and intellectual property (IP) rights.

- **Comprehensive documentation and manuals**
  Manufacturers provide clear and comprehensive repair manuals, schematics, manuals, and other documentation to facilitate independent repairs when possible.

- **Protection against deceptive contracts and manufacturer retaliation**
  Consumers are granted protection against voiding warranties, retaliatory measures, and losing manufacturer support for performing repairs or seeking the service of independent repair shops.

- **Exemptions**
  Careful consideration of exempting certain industries or product categories, such as medical devices, in consideration of existing laws while avoiding monopolies.

- **Fair market pricing**
  Fair market pricing for replacement parts and repair ensures that independent repair shops can thrive and that consumers are not priced out of the repair market.

- **Enforcement**
  Beyond passing R2R legislation, the enforcement mechanism entails educating consumers and repair shops on their rights and responsibilities, training independent repairers, and working with manufacturers to ensure compliance.

- **Design optimization**
  Products are designed to be durable and with repairability in mind, including software durability and ambitious testing criteria. When developing products, manufacturers take into account market and consumer data to determine key features and components to focus on.

# Global Policy Outlook

R2R policy has been most effectively implemented in the United States (US) and European Union (EU), although there is variation in the scope of existing R2R legislation depending on jurisdiction. The US' approach to R2R has been driven by concerns around consumer rights, empowerment for the formal and informal network of small repair businesses, and repairability. The EU has a greater focus on product lifecycle, the environment, and sustainability for R2R. Meanwhile, several countries have begun to discuss R2R legislation, driven by both consumer protection and sustainability concerns, particularly around e-waste. However, R2R policy is relatively nascent everywhere else, including in Asia Pacific.

**EU – Policy Leading Up to the Directive on Right to Repair**

The R2R movement has made notable strides in the EU in the last two decades. The support for R2R is largely driven by activism and policymaking around sustainability, environmental protection, and consumer rights. Broadly, R2R ties well with the EU's focus on building the circular economy. The 2020 Circular Economy Action Plan, for instance, envisions a circular economy that will provide "high-quality, functional and safe products" that are efficient, affordable, durable, and designed for reuse, repair, and high-quality recycling.[23]

The EU is simultaneously requiring product specific durability, repairability, and software support minimum specifications through the Ecodesign of Sustainable Products Regulation (ESPR) that also requires e-waste to be properly treated and collected separately. For example, the Ecodesign for Smartphones and Slate Tablets, adopted in 2023 and applicable from June 2025 onwards, requires seven years of spare part support and five years of operating system support for those products to extend the useful life and enable a second user relationship with the original product. They also require devices to be designed with repairability in mind, such as guaranteeing resistance to accidental drops or scratches and sufficiently durable batteries that can withstand at least 800 charge and discharge cycles while retaining at least 80% of initial capacity.[24] Electrical and electronic equipment manufacturers are also required to comply with the Waste from Electrical and Electronic Equipment (WEEE) labelling policy, which requires that the labelled product must be sent to separate collection facilities for recovery and recycling.[25]

The repairability index is a key feature of EU's R2R regulations. In 2021, France became the first country in Europe to implement a repairability index, followed by Belgium in January 2024.[26] The European Commission is drafting a proposal for a new EU label addressing repairability for smartphones and tablets, including a repairability index, slated for introduction in 2025.[27]

Specific R2R frameworks also include the New Consumer Agenda issued in 2020, which presents a vision for EU consumer policy until 2025 and strives to promote repair and encourage more "circular" products as part of the region's "green transition".[28] In April 2024, the European Parliament adopted the directive on R2R which clarifies manufacturers' obligations to repair goods and encourages consumers to extend a product's lifespan through repair. In July, the Directive officially became law, enshrining the right for consumers to have broken products repaired in an easier, faster, and cheaper manner. Among other obligations, manufacturers must now provide spare parts and tools at a reasonable price. They will also be prohibited from imposing contractual, hardware, or software barriers to repairs, including some uses of 'parts pairing' - although EU R2R regulations are not as strong in limiting parts pairing as recent R2R laws in some US states.[29] In addition, the EU now requires manufacturers to provide "timely and cost-effective repair services" and enforce warranties on all products for three years, instead of two years previously.[30] Even after the three-year period expires, manufacturers are still required to provide repair services on common household products, the list of which includes washing machines, vacuum cleaners, and smartphones, and could be expanded to more household products in the future.


### US Federal Law

At the federal level, consumer protection, antitrust, and economic opportunities are featured heavily in R2R discussions. Resulting policy changes are also grounded in existing federal legislation for consumer protection, such as the Magnuson–Moss Warranty Act enacted in 1975.[31]

There was continued progress on R2R under the Biden administration in the broader political context of antitrust efforts. In July 2021, President Biden signed an Executive Order (EO) on Promoting Competition in the American Economy.[32] The EO encourages the Federal Trade Commission (FTC) to enact regulations that would prohibit manufacturers from restricting repairs by individuals and independent repair shops. The EO highlights the responsibility of the federal administration to combat the "excessive concentration of industry, the abuses of market power, and the harmful effects of monopoly and monopsony."[33] The EO has since inspired other areas of the federal administration and some states to take further action to advance R2R across industries.

In 2021, the FTC voted unanimously to ramp up law enforcement of R2R restrictions and has since announced multiple settlements in R2R cases.[34] In an August 2023 letter to the National Farmers Union, the Environmental Protection Agency (EPA) affirmed its support for R2R and clarified that R2R was compatible with Clean Air Act provisions and environmental laws.[35] In October 2023, the White House organized a roundtable with federal and state officials, small business owners, and private sector representatives to discuss the importance of the Right to Repair.[36] The US Copyright Office submitted new exemptions to Section 1201 of the Digital Millennium Copyright Act, which bars breaking software copy protection, to include a revamped section supporting more access to device repair.[37] The momentum for R2R has also resulted in the introduction of the Fair Repair Act, a federal bill that would require an OEM to make diagnostic, maintenance, and repair equipment available to independent repair providers.[38]

### US State Laws

At least 40 states, including California, New York, and Massachusetts, have introduced R2R legislation in some form for a broad range of sectors, with more than a dozen covering consumer electronics.[39] R2R legislation has also passed in Colorado (2020) and Minnesota (2023), among others, with around 30 states having active R2R bills across sectors with varying levels of stipulations and scope. For electronics, R2R legislation has been issued or enforced in Oregon, Colorado, Minnesota, California, and New York.

Key examples of progressive R2R policy include:


- In 2012, Massachusetts became the first US state to officially enact a Right to Repair Bill through the Motor Vehicle Owners' Right to Repair Act. Voted into law in 2020, the Act requires automakers in the state to open a data platform that would give access to information that owners and independent repairers need to diagnose and repair their cars.[40] In 2024, the state enacted an R2R law requiring consumer electronics manufacturers to make manuals, parts, and tools available for consumers and third-party repairers.[41] Additionally, the law bans manufacturers from blocking third-party components or parts that are otherwise functional replacement for manufacturers' parts.


- New York passed the first-ever consumer electronics Right to Repair in 2022, which went into full effect in December 2023. The New York R2R law covers many personal electronics, such as cell phones, laptops, video game consoles, and tablets, if they were first sold on or after July 1, 2023.[42] Manufacturers are required to open access to manuals, spare parts, and repair tools they share with authorized repair partners.


- In July 2024, California's Right to Repair Act came into effect, which requires manufacturers of electronic devices and appliances to make repair guides, parts, and tools available to consumers, repair facilities, and service dealers. Specifically, manufacturers of electronics with a wholesale price of US$50 to US$99.99 must make appropriate parts, tools and documentation available for three years after

the last manufacturing date. The period increases to seven years for products with a wholesale price of US$100 or more.[43]


- The same year, Oregon signed a landmark R2R bill into law. The new law aims to make it easier and cheaper for consumers to fix their broken devices, as well as reduce the amount of e-waste that ends up in landfills.[44] Under the law, manufacturers of consumer electronics and household appliances must provide the tools and information required to diagnose, maintain, and repair their products. Notably, the law is the nation's first to prevent parts pairing, which is a manufacturer's practice of using software to identify component parts through a unique identifier to prevent access to repair or provide misleading information about a third-party repair's quality.


- In May 2024, Colorado enacted into law one of the most expansive R2R bills in the country.[45] The new law expands on previous R2R policies applied to powered wheelchairs and agriculture equipment, and now applies to several electronic devices including mobile devices and computers. Colorado also introduced limits to the practice of parts pairing, making it and Oregon the only two states explicitly restrict parts pairing.[46]

### Other Jurisdictions

Several other jurisdictions have also developed policies supportive of repair:

France is the first country in Europe to implement a 'repairability index' on five categories of electronic devices: smartphones, laptops, televisions, washing machines, and lawnmowers. France's reparability index is a self-declared score calculated by manufacturers based on a standard assessment grid provided by the Ministry of Ecological Transition (MTE).[47] The index came after the French government adopted a law in 2019 mandating the display of clear information on the reparability of electrical and electronic equipment.[48]

Belgium followed France's footsteps in 2024 with the introduction of a similar repairability index, to be applicable starting in 2026.[49]

The United Kingdom (UK) enacted R2R regulations in 2021, in line with the UK government's policy on eco labelling and reducing e-waste.[50]

In July 2024, the Canadian government announced a public consultation to inform the development of a federal R2R policy approach in the country, having unanimously passed a bill supporting R2R at the House of Commons in October 2023. The bill would amend the Copyright Act to allow consumers to circumvent technological protection measures (TPM) when maintaining or repairing a product, including consumer tech and electronic appliances.[51]

Meanwhile, several countries in the Asia Pacific have stepped up R2R discussions.

Australia passed its first R2R laws in 2021, comprising a mandatory data-sharing scheme that allows independent mechanics access to diagnostic and repair information for vehicles.[52]

Thailand, while lacking specific legislation on repair, has begun drafting a 'Lemon Law', which for the first time introduces liability provisions for additional types of product defects beyond those associated with safety risks.

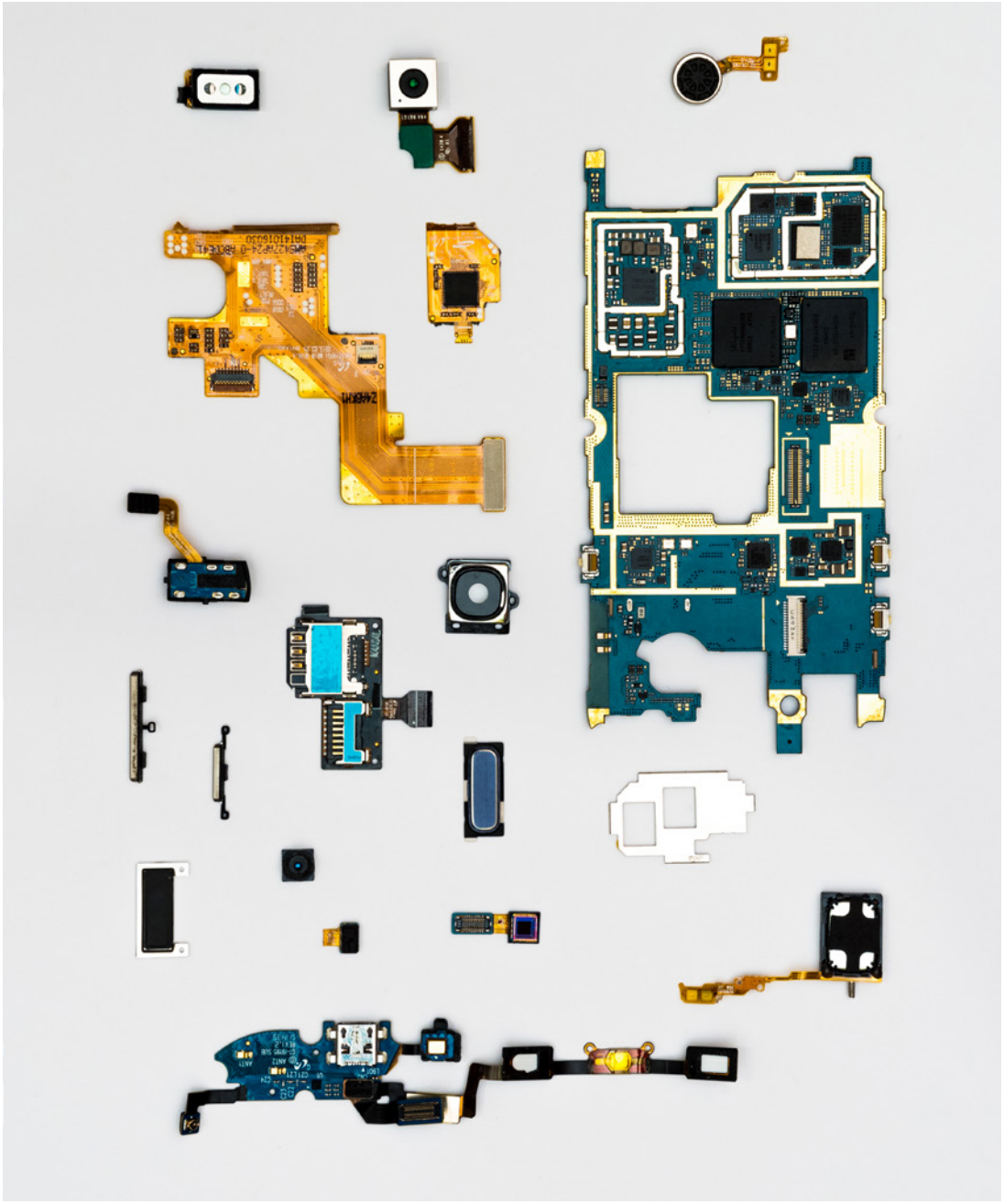
India's R2R approach fits under its circular economy agenda as outlined in Prime Minister Narendra Modi's Mission Lifestyle for Environment (LiFE) initiative. The country plans to launch its own repairability index for mobile phones and electronic products as of December 2024, implementing a 1-5 scoring system.[53] This development follows the launch of an R2R portal through the Ministry of Consumer Affairs in 2023, and initial R2R framework deliberations in 2023.[54] Several companies have registered, including Samsung, Apple, Xiaomi, Nokia, Xiaomi, and OPPO.[55]

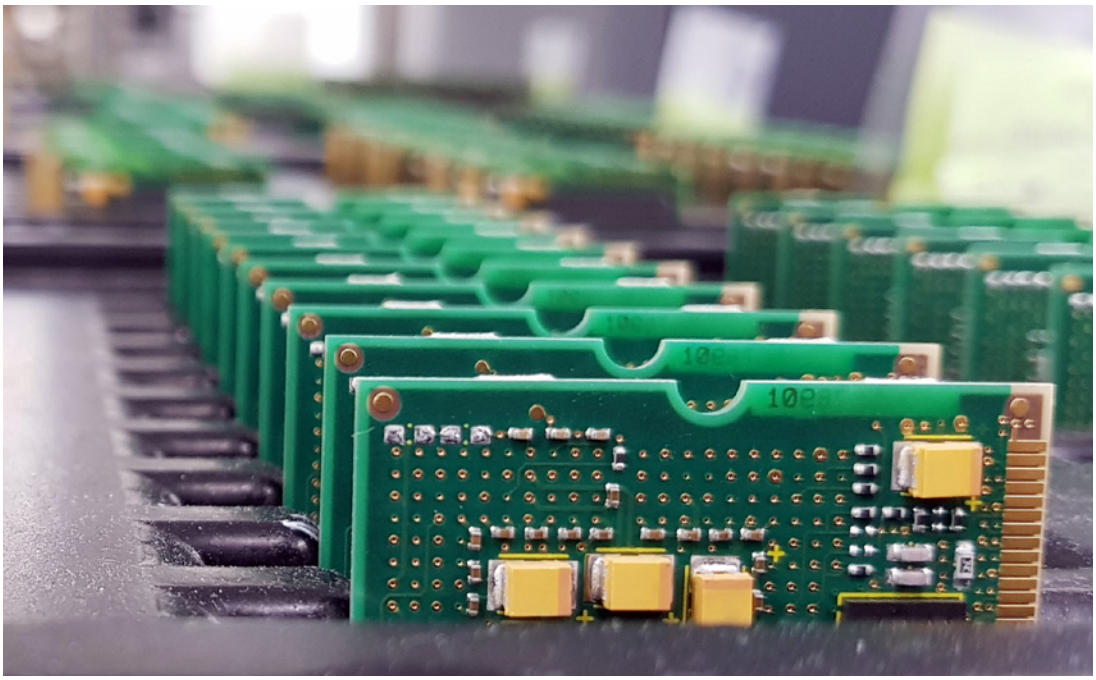
### Corporate Policies

Major companies in the consumer electronics industry have historically lobbied against R2R legislation and implemented various measures to prevent consumers and third-party repairers from accessing instructions and parts necessary to perform repairs. However, over time the same companies have shifted their approach to R2R and recognized the value of R2R legislation, although their stances on R2R implementation might vary.

Microsoft has reaffirmed its support for the Fair Repair Act in Washington state, expressing that the bill balances the interests of manufacturers, customers, and independent repair shops and will provide more options for consumers.[56]

Google has reiterated its support for R2R, endorsing the Oregon R2R proposed legislation as a model for other states to follow. The company, which has comparatively been more open to R2R, also published a white paper on repair in early 2024 that details its viewpoint on R2R legislation, its current repair capacities, and how R2R aligns with the company's overall sustainability efforts.[57] While industry resistance remains, many tech companies are slowly moving in Google's direction, recognizing the opportunities and values presented by R2R. Google is the 2024 winner of The Repair Association's annual Repair Advocate of the Year award.[58]





# The Thai R2R Policy Framework

There is growing recognition in Thailand of the need for enhanced consumer protection that goes beyond product safety and refunds for defective products. Discussions on R2R in Thailand have been driven by advocacy groups with concerns around both consumer rights and environmental protection. Consumer advocates such as the Thai Consumers Council (TCC) and the Foundation for Consumers Protection (Focorp) have been vocal proponents of the Right to Repair (R2R) in the country. Environmental groups like the Ecological Alert and Recovery Thailand (EARTH) similarly highlight the e-waste issue and advocate for extended product lifespans and reduced e-waste generation.

R2R is slowly gaining interest among the public, activists, and policymakers, especially in the context of reducing e-waste and promoting a circular economy. However, the progress of R2R legislation in Thailand is still in the early stages. While Thailand has a comprehensive consumer lawbook, current legal frameworks do not specifically support repair.

Agencies like the Office of the Council of State and various legal research centers are beginning to explore the feasibility of adopting such legislation, particularly concerning fair access to sustainable repair services.[59] There are two draft laws already underway which touch on these issues. The first draft is the Elimination of Electronic Equipment and Electronic Devices Remnants Act, and the second is the draft of the Defective Product Liability Act — commonly known as the 'Lemon Law'.

# Thai Consumer Policy

Thailand's consumer protection is largely governed by two laws, the Consumer Protection Act 1979 and the Product Liability Act 2008. They are comprehensive in scope and focus on consumer harms. However, they have limited impact on supporting consumers' Right to Repair. For instance, although warranty terms for electronic products exist, they are usually designed by manufacturers in a manner that undermines consumers' rights to repair defective products.[60]

Meanwhile, the draft 'Lemon Law', if passed, would begin to establish the foundation for R2R in Thailand. However, it is still limited in terms of supporting independent repair and repair outside of initial warranty.

### Consumer Protection Act 1979

The Consumer Protection Act 1979 encompasses five types of protections: advertising, safety of products or services, labelling, fairness of the contractual terms, and any other relevant protections. Article 4 of the Act outlines the five consumer rights that the law protects: the right to receive accurate and sufficient information about products or services; the freedom to select or search for goods or services; the right to protect against the use of products or services; the right to fairness in contracts; and the right to receive consideration and compensation for damages. However, the Act has no provisions endorsing the right of consumers to repair their products. The law focuses more on protecting consumers from potential damage caused by product or service defects rather than advocating for the right to repair defective devices or finding effective ways to reduce e-waste.

### Product Liability Act 2008

The Product Liability Act 2008 has a primary goal to protect consumers from potential harm to their lives, bodies, health, sanitation, mental health, or properties from harmful products. Approved in principle in late 2022, the Act holds manufacturers responsible for product defects, requiring them to repair, replace, or refund certain defective products, including electronics and appliances, within a two-year period after sale. This law is significant because it addresses consumer rights for product repairs when items are defective; however, it does not broadly enforce rights for consumers to independently repair devices like mobile phones.

### Draft Products Defective Liability Act ('Lemon Law')

On November 22, 2022, the Thai cabinet approved in principle the draft Liability for Defective Goods Act ('Lemon Law') proposed by the Office of the Consumer Protection Board. The new bill aims to close current gaps in consumer protection laws by introducing liability provisions

for additional types of product defects beyond those associated with safety risks.

The bill has undergone multiple rounds of public hearings and revisions, the latest of which was in June 2024, and is now under review at the Office of the Consumer Protection Board (OCPB). The bill is a welcome development amid growing concerns around consumer protection as well as product reliability in Thailand, in addition to the growing problem of e-waste and sustainable consumption.

The draft law thus extends consumer protection beyond that guaranteed under the Consumer Protection Act of 1979. It also implies that consumers will have the right to file claims for repair of defective products not only against manufacturers, but also against sellers, distributors, or exchangers in the event of product defects.

If the consumer discovers any defect(s) more than 14 days after accepting the products, Article 15 affirms the consumer's primary right to request the seller to repair the product and the seller's obligation to do so within 30 days of receiving the product, or 60 days if the defective product is a car or a motorcycle. However, if the defect is irreparable or cannot be repaired within the time limit set by law, the consumer should have the right to ask the seller to replace the product, lower the price, or revoke the contract.

Moreover, Article 17 mandates that the seller bears liability for the repaired and sent product to the consumer for a minimum of six months, or one year if the defective product is a car or a motorcycle. The seller will also bear responsibility for all repair expenses, and they have the option to exchange the defective product for a new one at the consumer's discretion. Nonetheless, the draft Lemon Law grants several exemptions, such as an exemption from law enforcement in cases where the defective products are used, as stated in Article 4(1),unless they fall within the seller's liability presumption period.. The law will not apply to any purchase or hire purchase of used products or as-is products when this is clearly stated by the seller or hire-purchase provider or the auctioneer in an auction.

# E-Waste Policy

Thailand has made strides toward addressing e-waste. A 2018 e-waste law, effective since 2021, bans the import of specific e-waste items and emphasizes recycling and waste management. As with the EU example, sustainability is an alternative angle of approach to implement policies that support repair.

While Thailand has developed robust e-waste laws, implementation and enforcement remain uneven. There is also a lack of stipulation on the responsibilities that consumers, manufacturers, and retailers have in e-waste management. Nevertheless, Thailand's existing e-waste policy can lay the groundwork for a more comprehensive repair and e-waste management system in the future.

### BCG Economic Model Action Plan for Thailand's Development (2021-2027)

The BCG Economic Model Action Plan (2021-2027) is a key Thai government framework for promoting sustainable economic growth through the integration of Bio Economy, Circular Economy, and Green Economy concepts. It aims to enhance resource value, reduce new resource use, and address environmental issues. In e-waste management, the Circular Economy concept emphasizes reuse, recycling, and responsible product disposal, which helps minimize waste and promote sustainable consumption. The BCG model also encourages innovations in recycling technologies to improve waste management efficiency and reduce environmental impacts.[61]

### Draft Act on the Management of Waste from Electrical and Electronic Equipment (WEEE)

The draft of the Management of Waste from Electrical and Electronic Equipment (WEEE) Act aims to regulate and control the handling of waste from electrical appliances and electronic devices that have reached the end of their life or have become obsolete. This draft law focuses on establishing a systematic and standardized approach to managing such waste, with a goal to prevent environmental damage and protect public health from hazardous substances and materials found in e-waste, such as lead, mercury, and cadmium commonly present in many electrical and electronic products. In February 2024, the Thai Pollution Control Department posted the latest draft for public hearing.

### The Hazardous Substances Act (1992)

The Hazardous Substances Act B.E. 2535 (1992) is the primary legislation governing the management of hazardous substances in Thailand. It covers chemicals and materials that may pose risks to human health and the environment. E-waste, which includes deteriorated or end-of-life electrical appliances and electronic devices, is classified as hazardous waste

due to the presence of chemicals that can be harmful, such as lead, mercury, and cadmium.

### The Factory Act (1992)

The Factory Act B.E. 2535 (1992) provides a framework for controlling and managing factories in Thailand, including the management of e-waste generated by factory activities. The Act aims to prevent environmental and public health impacts from improper e-waste management. Its provisions detail requirements for e-waste management in factories.

### Voluntary Schemes

The Green Label is a voluntary certification program in Thailand that promotes environmentally friendly products and services. Certified products must meet criteria that consider their environmental impact across production, use, and disposal stages, aiming to reduce environmental harm and improve resource efficiency. By promoting durable, recyclable, and safe-to-dispose products, the Green Label addresses the issue of toxic e-waste. It also encourages manufacturers to take responsibility for proper disposal of their products at the end of their lifecycle, although it does not address the issue of repair.[62]

### Draft Elimination of Electronic Equipment and Electronic Devices Waste Act

The draft Elimination of Electronic Equipment and Electronic Devices Remnants Act aims to protect the public from harmful chemical leaks from improper e-waste disposal, promote the circular economy through recycling or reusing parts from electronic equipment and devices, and institute a safe method of disposing e-waste. The draft law was received by the Office of the Council of State in February 2024 for additional review. Although the Act focuses on protecting consumers from harm, its goals around recycling or reusing electronic equipment and devices align with the broader principle of sustainable consumption promoted by R2R. Article 15 of the draft law requires the producer or importer of electronic equipment and devices to be held accountable for the disposal of the e-waste. However, they can delegate this responsibility to the Elimination of Electronic Equipment Organization.

# Conclusions: R2R Policy progress in Thailand

The following table summarizes Thailand's R2R policy readiness, comparing ideal R2R principles with Thailand's current policy framework on consumer protection and e-waste, among others.

| Sustainable R2R Principles | Thailand's Current Policy Framework |
|---|---|
| Explicit introduction of the concept of Right to Repair | Supported (in draft) |
| Access to diagnostic tools and replacement parts | Not supported |
| Comprehensive documentation and manuals | Not supported |
| Protection against deceptive contracts and manufacturer retaliation | Moderately supported |
| Careful exemptions of certain industries or product categories | Supported |
| Enforcement, including training and education campaigns | Not supported |
| Limitations to parts pairing | Not supported |
| Fair market pricing for parts, tools etc. | Not supported |
| Functional policy for e-waste | Supported |
| Design optimization | Moderately supported by a voluntary green scheme |

While Thailand has covered the basic foundations to support repairability and sustainable consumption at large—such as e-waste and consumer laws—the country still needs legislation specifically covering R2R. As the current Lemon Law draft stands, Thailand still lacks regulations that require manufacturers to disclose repair information or provide parts and manuals to consumers or independent repair shops.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# The Device Repair Market in Thailand

Thailand has one of the largest markets for electronic devices in Southeast Asia, especially for smartphones as one of the most owned consumer electronics in the country. The Thai smartphone market shipped more than 14 million units in 2023,[63] and the penetration rate of smartphones in the country is predicted to reach more than 97% of the population by 2029.[64]

Thailand's consumption trend fits the broader trend in Asia, a region that produces almost half of the world's e-waste and where consumer electronics consumption is growing at 29% per year—compared to the global average of 10%. Consumers' increasing purchasing power, the wide variety of electronic devices at different price ranges, and digital economy developments are all driving device consumption among Thais. R2R thus presents an opportunity for Thais who can potentially benefit from greater device longevity and cost-saving repair options, among other benefits.

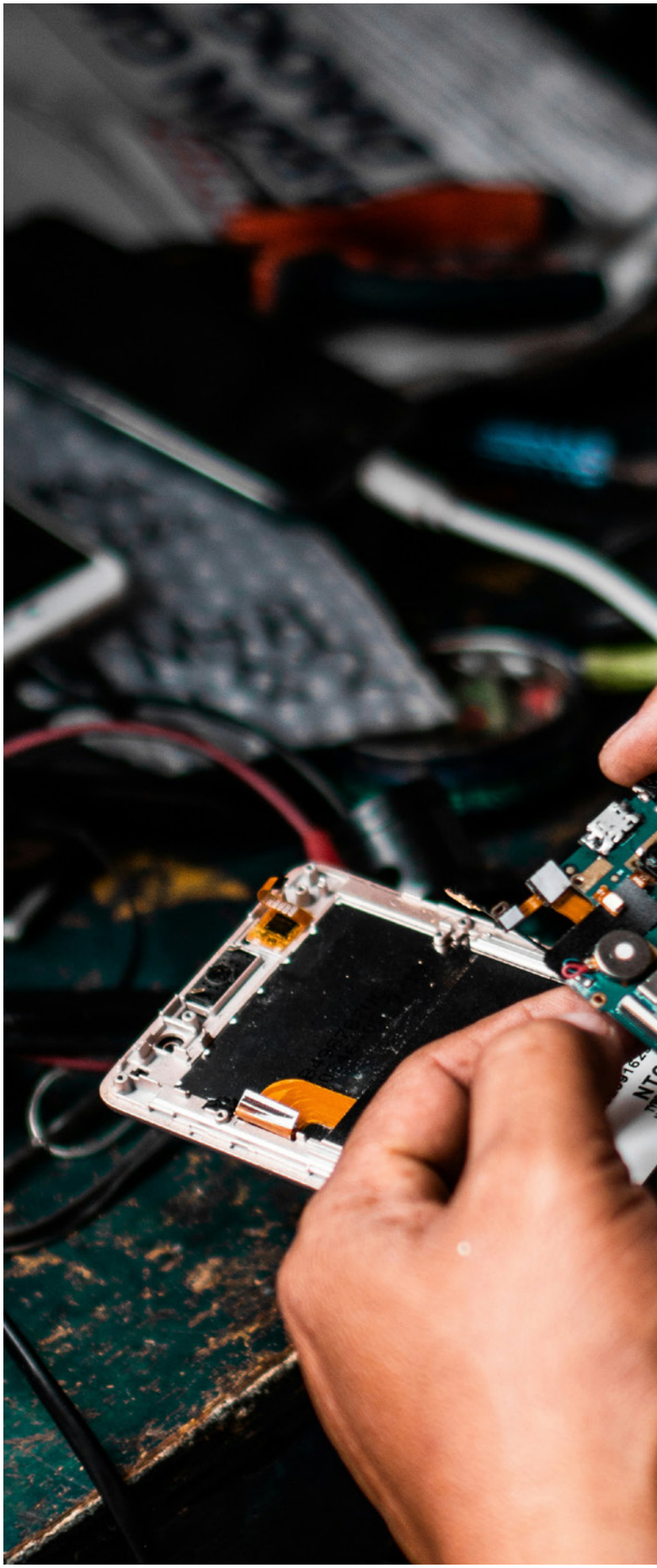
Meanwhile, Thailand's consumption trend has raised environmental concerns, especially around e-waste. The e-waste problem in the country provides an additional rationale for adopting R2R, which can simultaneously extend product life cycles and reduce e-waste. In 2023, 65% of hazardous waste from communities consists of e-waste, amounting to 450,000 tons.[65] The mobile phone and tablet waste generated was estimated at approximately 25,200 tons.[66] Meanwhile, only 21.10% of the total generated waste was properly managed. The main issues stem from insufficient collection of Waste from Electrical and Electronic Equipment (WEEE) at its source, inconsistent private sector participation, a lack of hazardous waste treatment facilities across the country, and unclear regulations concerning WEEE management.

Thailand's e-waste problem is exacerbated by imported e-waste. After China's total ban on e-waste imports in 2017, Thailand has seen a 20-fold increase in imported e-waste, amounting to 28.85 million kilograms in 2021 alone.[67] The majority of e-waste in Thailand ends up in the hands of scavengers and informal recyclers, who rely on rudimentary processes with great risks to their health and safety and the environment.[68] Controlling e-waste is therefore imperative, and must be achieved not only through regulatory measures and recycling initiatives, but also a shift in consumption patterns towards better repairability and reuse that R2R promotes.

# Repair survey methodology

In September 2024, the Institute and research partners conducted a survey to better understand the device repair landscape in Thailand. The survey targeted 31 micro and small to medium-sized independent repair shops for mobile phones and digital devices in mid-sized shopping centers in Bangkok, including Big C Future Park Rangsit, Zeer Rangsit, The Mall Ngamwongwan, and MBK mall.

To supplement the survey, we also conducted interviews with 12 brand-authorized repair shops including key players in the mobile device market, including Samsung, OPPO, Apple, AIS Care+, True Repair (Asurion), Huawei, Xiaomi, Vivo and other retailers that supply authorized repair services. In total, more than 40 operators in the repair sector were engaged. The results are detailed in the following sections.



# Thai Consumers' Attitude Towards Repair (repair sector point of view)

According to both independent and authorized repair providers, consumers tend to prefer replacing over repairing their broken devices, although this preference is slowly reversing globally. The first reason cited concerns costs: high repair costs deter customers from opting for repairs, especially if the repair cost is substantial compared to the value of a new device. The frequent release of new models also encourages customers to replace their devices instead of repairing them. Finally, some customers worry about third-party repairs voiding the manufacturer warranty or leading to issues with future repairs. Parts pairing particularly continues to be a barrier for independent repairs and consumers, leaving them with little options when seeking repair due to fear of device incompatibility, even when the parts are still fully functional. As such, there is a significant push and appetite from both consumers and repairers for a strong and supportive R2R policy framework in the country.

Authorized repair centers are trying to draw consumers towards authorized repairs, including through offering online and delivery-based repair services. Brands such as TrueMove, AIS, Huawei, Samsung, Apple, and Xiaomi reported having tailored solutions, with an aim to make repairs more accessible and flexible. It is unclear, however, whether these policies really draw consumers toward repair rather than new purchases, or simply redirect consumers towards an authorized repair provider when they otherwise would opt for an independent repair shop.

# Challenges faced by the repair sector in Thailand

All repair businesses stand to benefit from a more open and competitive repair ecosystem. Yet, despite Thailand's established repair sector, there are still serious challenges for high quality repair for both independent and brand-authorized repair services.

The following details the challenges facing independent repair shops in Thailand:

Challenge 1

**Limited Access to Repair Information, Tools, and Parts**

Some manufacturers do not share technical information or software needed for repairs, limiting access for independent repair shops and consumers who want to perform their own repairs. Limited availability and high costs of parts lead to delays and increased repair expenses, often discouraging customers from choosing repairs over replacements.

Over half of the small repair shops sampled (55%) reported not having any repair manuals. If a complex issue arises, repairers opt for self-learning on Google and YouTube or consulting experienced technicians. One shop operates as a family business with repair knowledge passed down through generations, and another indicated their manual was compiled by its technicians for internal use. Among the respondents (12.9%) who reported having repair manuals, one purchased a manual from China. Notably, authorized brand repair shops also revealed that insufficient repair documentation is one of the primary obstacles they face in providing repair services, affecting both repair quality and turnaround time.

Generally, authorized service centers or manufacturers also prohibit ordering or selling spare parts to small repair shops. Almost all sampled small shops (96.77%) reported that their establishments do not receive spare parts from authorized service centers or directly from the manufacturers. As such, nearly all opt to use spare parts from other manufacturers that are neither companies nor subsidiaries of the OEMs. These parts, referred to as "aftermarket parts," can serve as substitutes for original spare parts that are otherwise more expensive. The survey revealed that the prices of aftermarket parts typically differ from original parts by an average of 1,000 to 2,000 THB (US$30-60).

One small shop detailed that the aftermarket parts used for repairs have received the Industrial Standard (ISO) certification, are compliant with Thai law, and that the shop provides warranties for both repairs and parts. However, one respondent mentioned that their shop offers both original and aftermarket parts, informing customers of the prices and allowing them to choose. Almost half (40%) of the small shop respondents failed to provide clear information on the sources of the parts their shops procure. Some (16.67%) indicated that they source spare parts from China, while some others (16.67%) obtain them from

unspecified “companies.” Some (10%) reported sourcing parts from the “Sua-Pa” area, a major hub for the repair and sale of phone and digital device spare parts in Bangkok.

Challenge 2

### Rapid Technological Advancements

The fast pace of technological innovation in the smartphone industry requires repair technicians to continuously update their skills and knowledge. New wireless technologies and connectivity systems can make repairs more complex than in previous generations, raising the urgency for robust, periodic training and upskilling. Parts pairing exacerbates this challenge; even fully functional parts are often deliberately designed to be incompatible when the repair is conducted through non-authorized channels.

A majority of sampled small repair shops (74%), however, do not provide formal training in phone or digital device repairs for their technicians, who instead rely on self- and peer-learning or prior education in electrical repair. However, to keep up with new models of phones and digital devices, technicians sometimes participate in short training courses led by instructors or other technicians who teach. Some technicians might even enroll in training abroad, such as China.

For the small shops who do provide training (26%), some undergo training sessions organized by the manufacturers as part of promotional activities, while others conduct skill training sessions for their technicians monthly or quarterly, including for interested outsiders. It is noteworthy that, although most respondents in this group recognize the benefits of training organized directly by manufacturers for technicians, small repair shops share a concern that they might be limited to servicing only the products of a specific manufacturer, potentially resulting in lost income from repairs of products from other manufacturers. A respondent expressed the challenge of having manufacturers provide training for small repair shops, reasoning that manufacturers likely do not want their products repaired by independent repairers.

Challenge 3

### Complex Product Design

Modern smartphones are designed to be thinner, lighter, and more intricate. This makes repairs harder, as disassembling and replacing parts requires specialized tools and more advanced techniques. When it comes to brand-authorized repair centers, most providers reported that using brand-specific parts facilitates repairs. This approach minimizes compatibility issues particularly with software.

The survey of small repair shops yielded interesting information on the characteristics of the spare parts used for repairs. Almost a third of small shop respondents (30%) use genuine parts. Among this group, one respondent noted that the original parts used in their shop were only slightly more expensive than aftermarket parts, with a cost difference of approximately 20%. Respondents obtained them through various sources, such as original parts manufactured in China or other countries, and parts from unspecified "companies." Additionally, one respondent mentioned that some parts were "second-hand originals," salvaged from phones or digital devices brought in for repairs that are still functional.

None of the small shops in the sample use repair tools produced by the manufacturers. A third of respondents (32%) indicated they were able to use general tools for repairs without needing equipment produced by the specific original manufacturers. Eight respondents (26%) reported that certain types of tools or equipment could be utilized for repairs on both operating systems, while others could only be used for one specific operating system. If there were repair tools that could be shared, they would be used collectively. Five respondents (16.13%) specified that any tool or equipment for a particular operating system or brand had to be employed specifically for that system or brand. Additionally, some respondents mentioned importing specialized tools, such as glass or screen removal machines, from China, with prices around 100,000 THB (US$2,950) per unit.

Notably, despite their strict policy of using only brand-specific repair tools and parts, some brand authorized repair providers still reported difficulties due to insufficient access to specific tools needed for specialized repairs, affecting both repair quality and turnaround time.

Challenge 4

### Planned Obsolescence

Some devices are designed with a limited lifespan, particularly with components like batteries that are difficult to replace, which leads to consumers opting to purchase a new phone rather than repair the old one.

All participating small repair shops follow similar procedures for the repair of outdated devices. If the device has available parts, the shop can proceed with the repair; some shops even keep spare parts on hand for such cases. However, the shop will inform the customer if there are no parts available or cannot source them. Particularly for devices that face planned obsolescence and no longer receive operating system updates from the OEMs, the shop may recommend purchasing a new device. This is because planned obsolescence renders the device incompatible with certain apps even if repaired, such as banking or financial

applications, and repairs may thus not be cost-effective.

Additionally, the relatively low price of new devices makes replacement a more viable option. Some shops will offer to repair the device specifically to retrieve and recover important data. Some shops also purchase outdated phones or digital devices from customers, reselling them to clients who are willing to use older models due to limited budgets.

Challenge 5

### Consumer Desire for Newer Models

Many consumers upgrade to newer models as soon as they are released, even if their current device is still functional. This reduces the demand for repairs.

Some small repair shops may keep components that are still functional as second-hand genuine parts for future repairs. However, some opt to return all the old parts to customers without retaining any for further use. Additionally, certain shops choose to dispose of all parts, even those that remain functional, to reassure customers that new parts have genuinely been installed and that no old components have been reused in the repair process. It is worth noting that some manufacturers implement parts pairing practices that effectively render reusing functional parts in other devices impossible at times

Most repair shops indicated that they dispose of phones, digital devices, and parts that can no longer be used. The shopping malls or locations of the repair shops typically have designated personnel to collect or provide disposal boxes for malfunctioning components, such as batteries that have deteriorated. In some cases, unusable parts like batteries and screens are purchased by individuals, mostly Chinese buyers, for reuse, recycling, or resale. Some of these buyers extract valuable materials like gold from e-waste or defective parts.

The AIS E-Waste Project, an environmental and CSR initiative by Advanced Info Service (AIS), Thailand's top telecom company, has set up e-waste collection points at its stores and service centers nationwide, allowing customers to drop off unwanted electronic devices. These devices are then sent to certified recycling partners like TES-AMM Thailand, which specializes in extracting valuable materials such as gold and safely managing hazardous waste.

Challenge 6

### Competition from DIY Repairs

With the availability of online tutorials and guides, some consumers attempt to repair their phones themselves, which can reduce the number of customers for repair businesses.

Challenge

7

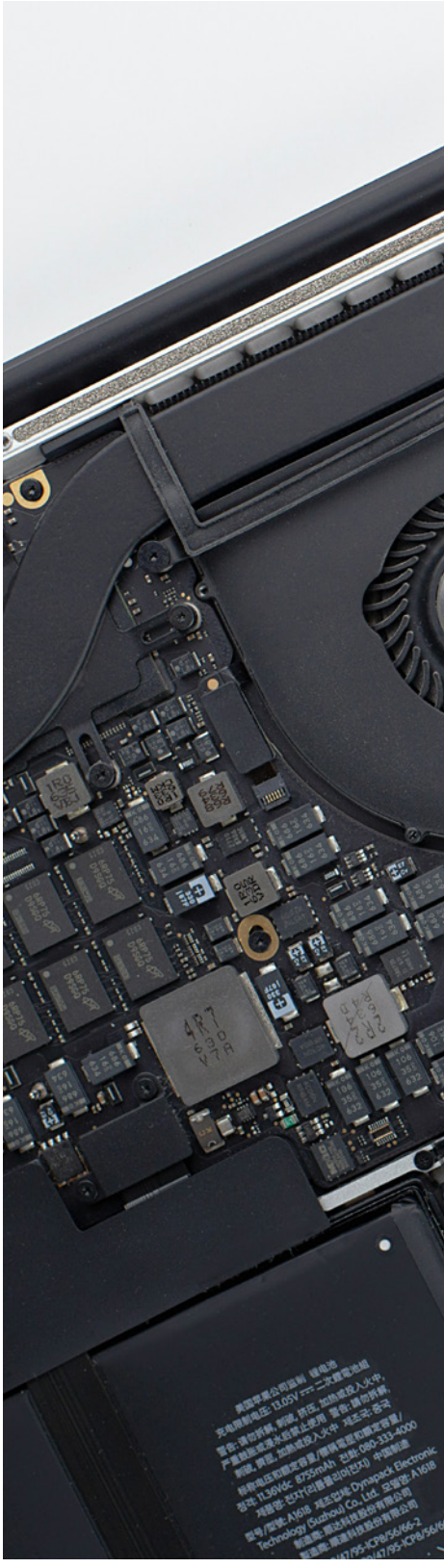
## Manufacturer Warranty Policies

Manufacturer warranties often include terms that require consumers to have repairs done at authorized service centers. Repairs done by independent shops may void the warranty, discouraging some customers from using third-party repair services.

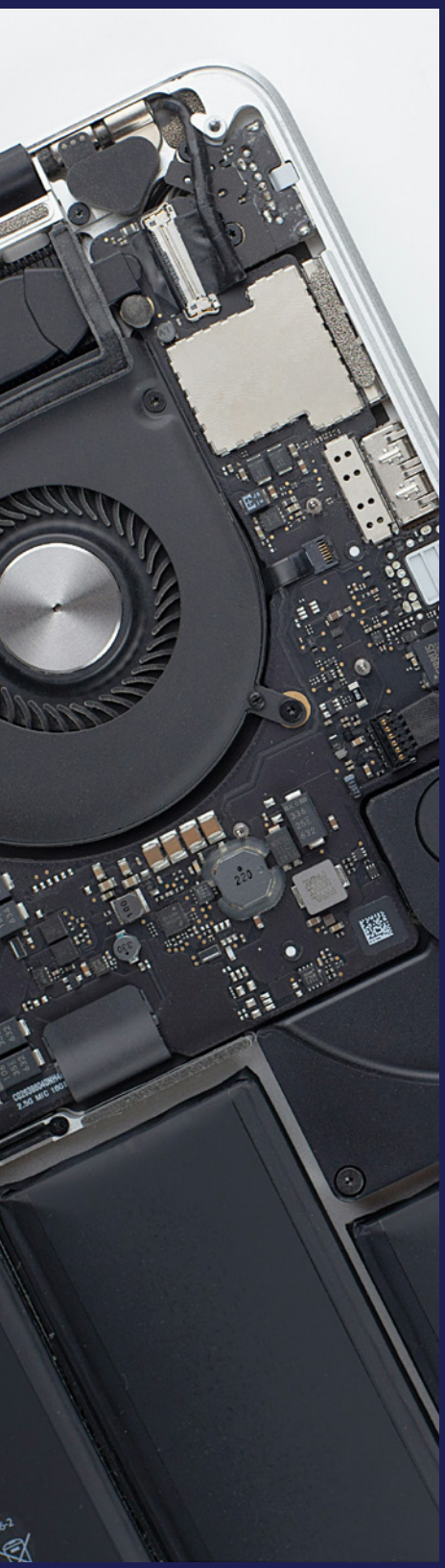
Each authorized repair center offers a variety of warranty services, especially for common issues like screen and battery replacements. True Repair supports users with flexible appointment and return services. AIS+ provides repair packages with parts and warranty support. Huawei's warranty policy offers specific coverage for manufacturing defects and parts replacements, including screens and batteries. Some authorized centers highlight the importance of brand-specific warranty policies in ensuring quality control. Apple and Samsung implement "Part Pairing" systems that will limit device functionality if uncertified parts are detected.

Meanwhile, all sampled small repair shops offer some form of warranty after repair, though the durations and conditions vary. The warranty terms are similar to those of common electronic devices: they cover issues caused by the repair itself, recurring problems, or defective parts used in the repair. However, the warranty does not cover damage from accidents such as drops, water exposure, or impacts, and customers are responsible for those repair costs.

Some small repair shops offer limited warranties, such as a seven-day guarantee for screen repairs. One shop provides a one-month warranty on all repairs, while another shop offers a full year's warranty on every repair. In contrast, certain shops do not offer warranties for specific items, such as counterfeit parts or LCD screens. Some shops also do not provide any warranty for screen replacements, explaining that customers may accidentally damage the device after the repair and fail to notify the shop.



# Looking Ahead: Addressing the Challenges Faced by Repairers



There are some similarities and differences in the challenges experienced by small and authorized repair centers in Thailand. Although both groups differ in their policies on procuring and using non-original spare parts, the surveys reveal a common challenge of obtaining specialized tools and parts needed for more complex repairs, affecting repair quality and turnaround time. Both groups also face limited availability and high costs for certain parts and tools, which often discourage customers from choosing repair over replacement.

More broadly, although both groups of repair providers receive training in some form, small repair shops rely more on self-learning and passed-down knowledge, which can improve their skills but may result in uneven repair quality across different devices or shops. Brand authorized repair centers, on the other hand, are trained by original manufacturers and can therefore provide guaranteed repair quality and consistency in outcomes. Further, small repair shops appear to be more flexible in integrating non-original spare parts, even refurbished parts, into repairs, while authorized providers are strict in using original parts to minimize compatibility issues. For this reason, authorized providers may penalize consumers who have used unauthorized parts before, such as by restricting their device functionality.

Although Thailand is moving towards broadening access to repair through initiating the Lemon Law, Thailand's legal framework for R2R remains fragmented and incomplete, leading to uncertainty in repair practices. Based on the survey results, the government could do more to support a more robust R2R policy environment. This would include streamlined access to parts, standardized pricing, government incentives, and consumer education on repair benefits to support sustainability. Additionally, respondents suggest adopting innovations like improved diagnostic tools and standardized methods to enhance repair efficiency for both consumers and businesses, encouraging more sustainable practices.

# Recommendations

The policy recommendations for supporting R2R in Thailand include amending current legislation and creating new R2R-specific laws to secure consumer access to repair parts and manuals. The draft WEEE (Waste Electrical and Electronic Equipment) law already aligns with R2R by focusing on sustainable e-waste management, and so are Thailand's various consumer protection laws. Additional recommendations involve incentivizing brand participation, aligning with Thailand's Bio-Circular-Green (BCG) model, and educating consumers on repair benefits. Standardized repair costs and warranty policies are also suggested to build trust and reduce e-waste, fostering a sustainable, consumer-friendly repair ecosystem.

To create a sustainable and consumer-friendly repair ecosystem, Thailand must establish a supportive R2R framework that also explicitly bans parts pairing. Meanwhile, explicitly calling out and limiting parts pairing can position Thailand as one of the more progressive countries in R2R and set a precedent for neighboring countries in navigating their own R2R policy ecosystem developments. Based on the current policy landscape, global best practices, and challenges specific to Thailand, the following recommendations address how to improve access to repair, reduce environmental impact, and promote collaboration between stakeholders.

There are several vehicles to achieve the above recommendations, including, but are not limited to:

- **New legislation**
  Given the existing support for better repairability, sustainability, and consumer protection in Thailand, the government could draft a new legislation that directly enshrines R2R.

- **Amendments to existing legislation**
  Policymakers could amend existing or draft legislation, such as the Lemon Law which is currently still under discussion, to include provisions that would support R2R.

- **Banning restrictive practices such as parts pairing**
  Thailand can set an example to other countries in the region and beyond by banning restrictive practices such as parts pairing, especially given that it is one of the main limitations to repair faced by consumers and independent repairers.

- **Public engagement on sustainable consumption and repair**
  Beyond legislating R2R, the government could promote a more robust R2R environment by promoting sustainable consumption at large. The government could explore potential partnerships with brands and original manufacturers, on public education campaigns regarding independent repair, controlling e-waste, and encouraging recycling.

- **Certification and support for repairers**
  The government could address ongoing concerns around the quality of independent repairers by organizing training and certifications. The government can potentially also partner with independent manufacturers to train independent repairers on quality repairs and the importance of device security and privacy. The government can also explore working together with repairer associations or independent groups to institute knowledge-sharing events and training programs.

**The following details actionable recommendations that the Thai government and all stakeholders in the repair sector, including industry players and advocacy groups, can undertake:**

Recommendation 1

## Enhance consumer access to repairs

The first principle of R2R is guaranteed access for consumers to seek repairs, either by themselves, through the manufacturers, or independent repairers. Some ways to enhance consumer access to repair include:

- **Legally broaden access to repair tools, manuals, and documentations**
  Manufacturers should be legally required to make spare parts, repair manuals, schematics, and diagnostic tools available to independent repair providers and consumers. Ideally, this guarantee could be baked into a legal provision added to the existing draft Lemon Law. By lowering barriers for independent repair shops, these policies would empower consumers to extend the lifespan of their devices, making repairs easier and more affordable. The Right to Repair Act in California, for instance, requires manufacturers to provide documentation, parts, and tools to owners, service and repair facilities, and service dealers.[69]

- **Prevent OEMs from unfair repair practices such as parts pairing**
  Thailand's future R2R policy should constrain OEMs from imposing unfair anti-repair practices, such as parts pairing— the practice of using software barriers to impede consumers and independent repair shops from replacing components. In the US, Oregon and Colorado were the pioneers in prohibiting manufacturers from using parts pairing to prevent an independent repair provider or an owner from installing an otherwise functional replacement part.[70]

- **Strengthen consumer protection laws**
  Legislation should explicitly provide consumers the right to repair their devices without voiding warranties, allowing them to use third-party repair services without repercussions. Defining clear guidelines on manufacturer warranties can help consumers understand repair options without risking warranty voids. Offering warranties on repairs and replaced parts also builds trust and ensures quality across brands, with many centers recommending a minimum three-month warranty. Additionally, standardizing repair costs across brands and service providers would prevent monopolistic pricing, ensuring fair costs for consumers and making costs more acceptable for consumers. These protections could be included as part of the Lemon Law currently in drafting or be added as amendments to

existing Consumer Protection laws such as the Product Liability Act 2008, which already addresses consumers' right to seek repairs when the item is defective. For example, under the US' Magnuson-Moss Warranty and FTC Acts, manufacturers cannot state that warranties will be void if consumers use third-party repair services or parts.

Recommendation 2

## Enhance repairability and longevity of devices

The ideal R2R policy should aim for repairability to be incorporated in product design, enhancing the overall product durability and lifespan. Supporting policy initiatives include:

- **Encourage repairability in design**
  Thailand can encourage the integration of reparability as a design feature through several voluntary initiatives. It is important, however, to focus on repair outcomes rather than design mandates, since specific design requirements to improve repairability may have unintended consequences that inhibit innovation. There are also several initiatives that can encourage repairability in design, such as voluntary schemes for eco-labelling to signal repairability. This initiative would highlight products designed with repairability in mind, such as those with replaceable components and accessible repair documentation. Additionally, financial incentives, like tax breaks, should be provided to manufacturers that adopt repair-friendly designs and engage in Extended Producer Responsibility (EPR) programs. These incentives would encourage brands to create sustainable products, benefiting both consumers and the environment by fostering a culture of over-placement.

- **Ban planned obsolescence**
  R2R legislation should prevent planned obsolescence, an industry practice to maximize profits. By banning planned obsolescence, consumers can extend the expected lifespan of their devices, thereby minimizing new production and the associated environmental and consumer costs. In October 2023, Quebec, Canada, enacted Bill 29, the Act to protect consumers from planned obsolescence and to promote the repairability of products.

Recommendation 3

## Improve the repair sector

The R2R ecosystem should strive to empower not only consumers, but also independent repairers. Reforms to the current repair sector will be needed, including standardizing repair standards and qualities, and encouraging manufacturers to design products with repairability in mind.

Some ways to support the repair sector include:

- **Address barriers to entry for independent repair shops**
  To support independent repair providers, the Thai government could offer grants or subsidies for repair training programs, ensuring a skilled workforce capable of handling modern and complex electronics. Additionally, a certification system for independent repair providers would help build consumer trust, ensuring reliable and high-quality repairs. The government could potentially partner with the private sector, such as specific brands or device manufacturers, to offer training to independent repairers. Access to higher quality training, including that provided by OEMs, can alleviate concerns around repairers' technical skills and quality. Another way is to work together with the private sector on certification for independent repair providers and a database by which consumers can locate certified independent repairers. By addressing these barriers, Thailand can increase the availability of skilled labor in the repair industry, making it easier for consumers to find qualified repair services. Apple and Tesla, to illustrate, have rolled out independent repairer programs for independent repair providers interested in offering out-of-warranty repair service that can be replicable in Thailand.[71,72] Through these programs, qualifying independent repairers can access genuine parts, tools, training, service guides, diagnostics, and other repair resources.

- **Tax breaks for repair, parts, and tools**
  Economic incentives can help independent repair shops, especially SMEs, to be more competitive and provide repairs at the highest standards, including using tools and parts of the highest quality given that cost is a major barrier. Tax breaks or subsidies, for instance, can help small repair shops procure the most updated tools, undergo training or upskilling programs, and hire more skilled technicians.

- **Establish government-industry collaboration**
  Effective R2R policies require collaboration between the government and industry stakeholders. Establishing collaborative platforms for policy development would allow for shared goals, aligning business interests with national environmental and consumer protection goals. This partnership would help address challenges in implementing R2R and ensure policies are practical and beneficial for all parties involved. One platform for such collaboration could be in the form of a multi-stakeholder forum or association involving environmental and consumer protection groups, industry representatives, and independent repairers. India, for example, strives to eventually institute a mandatory R2R framework. In the meantime, the government has set up a portal under which original manufacturers

can voluntarily upload details on their products, components, and warranty and post-sale information, easing their transition into a future R2R regime.

Recommendation 4

## Ensure proper management of e-waste

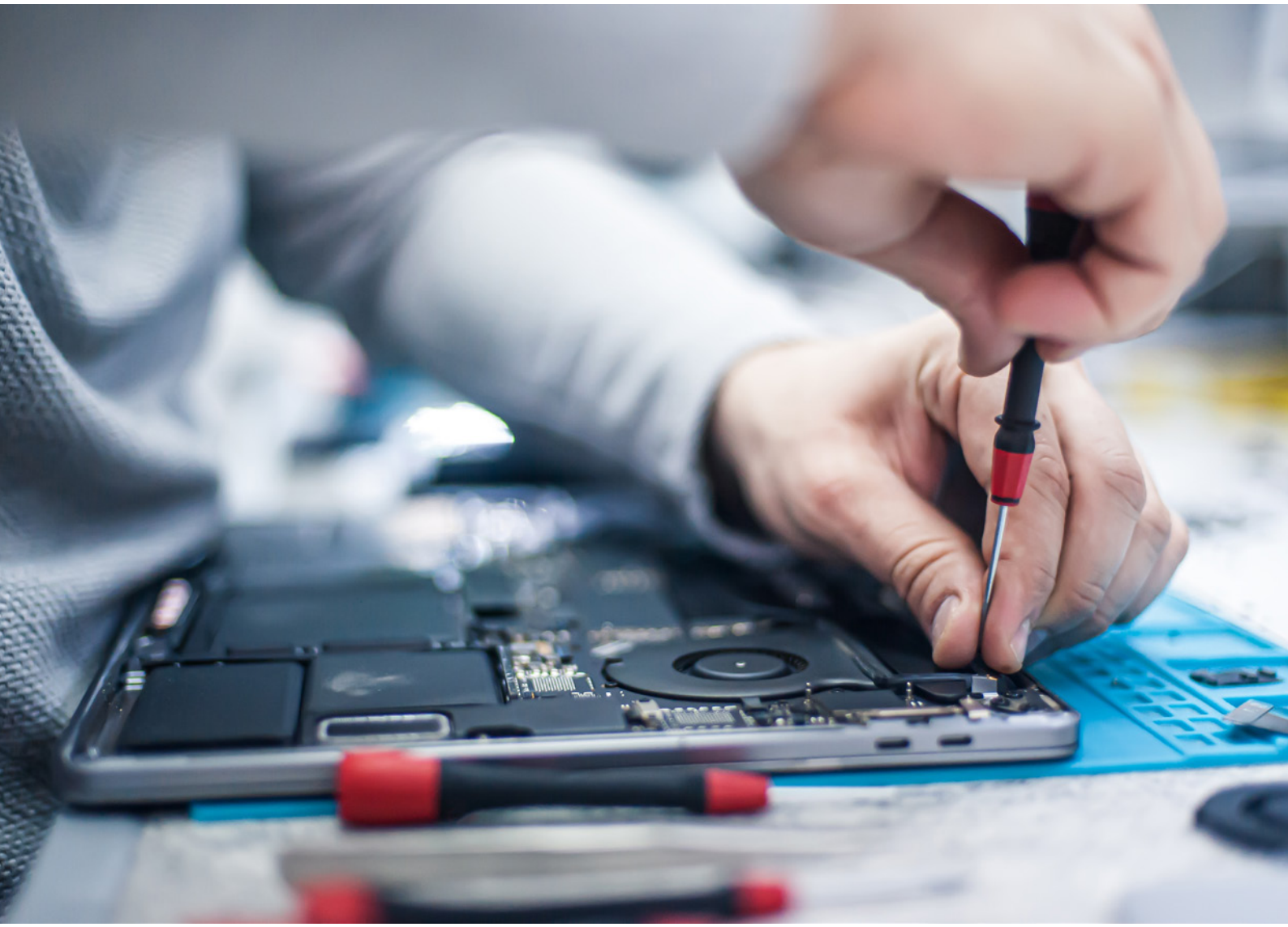
The ideal R2R policy ecosystem should be integrated with discussions on waste management, particularly e-waste as a problem that better repair practices can directly minimize. In Thailand, there are several ways to ensure better management of e-waste as it relates to R2R:

- **Incorporating the WEEE Draft Law**
  Thailand's ongoing development of the Waste Electrical and Electronic Equipment (WEEE) draft law aligns closely with R2R principles, especially in managing e-waste. This draft law could complement R2R efforts by requiring manufacturers to handle e-waste responsibly, thus reducing environmental impact and supporting sustainable repair practices. Integrating WEEE guidelines with R2R recommendations would create a cohesive framework for a sustainable and consumer-oriented repair ecosystem.

- **Promote sustainable consumption and production**
  Increasing public awareness of the environmental benefits of repair over replacement is essential. Nationwide campaigns should educate consumers on the positive impact of repairs, such as reduced e-waste and resource conservation. Integrating R2R policies with Thailand's circular economy initiatives, like recycling, refurbishing, and reuse, would help embed these principles within broader sustainability policies. Aligning R2R with circular economic goals would also encourage consumers to view repairs as a primary option for extending product lifespans. The government could work together with the private sector, such as tech companies, on joint public awareness campaigns on R2R as well as the recycling ecosystem. France's Repairability Index can serve as an inspiration. In 2019, the French government issued a law mandating display of clear information on the repairability of electrical and electronic equipment, adding repairability into consumers' calculations in purchasing a new device.[73]

- **Promote e-waste reduction and recycling through policy reform**
  Encouraging recycling programs that link to repair services would further reduce e-waste. Manufacturers should be incentivized to establish repair and refurbishment programs as part of their e-waste management responsibilities. Providing discounts on future purchases or repairs when consumers recycle old devices would

motivate sustainable behavior. Additionally, take-back schemes for end-of-life products should be mandated, making repair, reuse, and recycling options easily accessible to consumers. Manufacturers can even explore working directly with independent repair shops on e-waste collection or supplying refurbished parts. More broadly, the government can improve access to recycling for consumers and repair shops, such as setting up more collection points and bins for e-waste, integrating informal waste collectors into e-waste management, and incorporating recycling into school learning. Such initiatives align with Thailand's environmental goals by promoting responsible disposal and reuse of electronic devices.



# Challenges to Legislating R2R in Thailand

### Strong policy leadership and messaging

Strong and cohesive policy leadership is essential to the successful development and implementation of R2R policy in Thailand. Legislating R2R will not be an easy feat, given the involvement of multiple stakeholders, from consumers to industry players and repairers, and the intersection of repair with pressing issues such as carbon footprint, user privacy and safety, and waste. However, as the US has shown, although state law has largely been driven by consumer and environmental concerns, progress at the federal level has hinged on the Biden administration's antitrust policy. In the EU, significant leadership and initiatives on environmental issues have generated momentum for sustainable consumption and production, leading to the relative ease of legislating R2R.

### Original manufacturers and large businesses

Manufacturers and large businesses may face challenges in adhering to laws that guarantee and protect consumers' rights to repair products, particularly those in the electronic equipment category such as mobile phones or laptop computers. The implementation of an R2R legislation would impose additional duties and responsibilities on large manufacturers, including tracking, fixing, repairing, and replacing new products for consumers, as well as specifying the warranty period for products. This, in turn, will inevitably lead to an increase in production costs.

We therefore expect some resistance from the business community for the Lemon Law, although it is not a full-fledged R2R piece of legislation. Allowing a grace period, guaranteeing fair pricing, considering industry voices, and supporting the Lemon Law issuance through a study are some measures that can be taken to lessen adverse impact on both the business community and consumers, especially to ensure that the Lemon Law does not result in more expensive products.

### Consumer protection

Despite the Lemon Law's orientation towards further securing consumer rights and protection, there are potential obstacles to implementing it that derive from consumer concerns. To begin, consumers in Thailand, where personal data protection standards are not as robust as in other jurisdictions such as the EU, might feel apprehensive towards trusting independent repair shops. In such a case, a feature such as Google's Repair Mode might ease some of these concerns around third-party mishandling of personal data. In addition, without a guarantee for fair pricing, consumers might feel priced out from the higher costs of repair, especially if the spare parts are hard to find due to some products' obsolescence. In this instance,

consumers might still opt to buy new products instead of repairing defective ones – even with R2R legislation in place.

### Independent repairers and third-party repair shops

Ensuring that independent repairers and third-party repair shops are integrated with manufacturers' repair ecosystem will be a challenge. Some independent repairers and repair shops might still choose to work with unofficial diagnostic tools or ingenuine spare parts due to the lower costs and potential profitability, even when R2R legislation would broaden access to original spare parts and repair tools. Educating independent repairers on the importance of genuine spare parts and repair tools will be crucial for R2R implementation in Thailand, both for consumer satisfaction due to repair durability and quality, as well as for repair business continuity and gaining consumer trust.

The successful roll-out of Thailand's Lemon Law – and more sophisticated R2R policy – will thus require multi-stakeholder collaboration and commitment to creating a sustainable and efficient repair ecosystem. To this end, Lemon Law implementation must consider the interests and incentives of all parties in the R2R value chain, including consumer and environmental groups, OEMs and businesses, distributors, independent repair shops, and regulatory agencies. Especially in Thailand, where law enforcement is carried out by multiple and often overlapping agencies, policy and enforcement coordination will be key.

In addition to legal measures, an important approach to support and promote Right to Repair or Thai consumers, particularly for electronic equipment and devices, is to instill consumer trust and confidence when they take their defective products to independent repair shops. One measure to achieve this is requiring robust and regular inspections and issuing certification for repair shops. Future R2R legislation should also govern mechanisms for reporting incidents related to personal data protection. In addition, original manufacturers and distributors can conduct training for independent repair shops and repairers to achieve upskilling, educate on the importance of using genuine diagnostic tools and spare parts, and standardize repair quality. Finally, R2R implementation should also consider the guarantee of fair and accurate pricing.

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